THE DANISH

INGOLF-EXPEDITION.

VOL. VI A.

PUBLISHED AT THE COST OF THE GOVERNMENT

BY

THE DIRECTION OF THE ZOOLOGICAL MUSEUM OF THE UNIVERSITY

COPENHAGEN
H. HAGERUP
PRINTED BY BIANCO LUNO A/S
1902–1928.

Contents of Vol. VI A.

THE DANISH INGOLF-EXPEDITION.

VOLUME VI.

1.

PORIFERA.

(PART I.)

HOMORRHAPHIDÆ AND HETERORRHAPHIDÆ

BY

WILL. LUNDBECK.

WITH 19 PLATES AND 1 FIGURE IN THE TEXT

TRANSLATED BY TORBEN LUNDBECK

COPENHAGEN.

PRINTED BY BIANCO LUNO

1902

Ready from the Press May the 15th 1902.

CONTENTS.

Homorrhaphidæ and Heterorrhaphidæ.

Porifera.

I.

By

William Lundbeck.

The present treatise is the first part of a work on the *Porifera* collected by the Ingolf-expedition. The material for this work, however, does not consist of that of the Ingolf-expedition only, but I have, for the sake of completeness, included all the sea-sponges, found in our Museum, from Greenland, Iceland and the Faröe Islands, and upon the whole from the territory treated of here. The latter material has especially been collected by the Greenland-expeditions that have been sent by the Commission for the geological and geographical examination of Greenland; partly also by the men of war that have navigated the seas round Greenland and Iceland, as also by some other collectors: especially must be mentioned a considerable collection, made by Dr. Mortensen in 1899 at the Faröe Islands. Of the whole material, however, the portion collected by the Ingolf-expedition during its two cruises in 1895 and 1896 forms by far the greater part. The collection of sponges made by this expedition was quite exceptionally great, greater, I think, than any made by any single expedition before. Finally I got from the museum in Bergen by the kindness of Dr. Brunchhorst the sponges of the Norwegian North-Atlantic Expedition, which I have included here, as the earlier work on those sponges needed a revision. The geographical territory of the present work may therefore be given thus: the eastern part of the Davis Strait and the sea north of a line through the southernmost station of the Ingolf at about 57° L. N. across to the south of the Faröe Islands, that is to say, the whole of the North-Atlantic (species from the Norwegian fjords, however, have not been included). From this territory I have endeavoured to include all the species, also those that are not found in the material, but have been mentioned in the literature as found within the territory.

With regard to the terms used in the descriptions I shall premise a few remarks. The terminology employed in describing the spicules is mainly the same as has been used by Ridley and Dendy and by Topsent, and upon the whole by all recent authors, so that an explanation will be unnecessary.

For the more or less membranous part of the body of the sponge which forms the surface and covers the subdermal cavities, the term dermal membrane has been employed. It may be thinner or thicker, and more or less pronounced; where the subdermal cavities are large and widely spread it is distinct and easily separable, while in forms with small subdermal cavities it may be little or not at all marked off inwardly. The term Ectosome, which is now most frequently used of this part, I have not employed, as the question is not here of a structure of a definite morphological value, and the term dermal membrane is therefore only used as a descriptive term. The dermal membrane may be a thin membrane without spicules, but may also be provided with spicules variously grouped, and in the latter case we may speak of a dermal skeleton, but this skeleton is frequently not distinctly marked off from the other skeleton of the sponge, being only its outer part. The dermal membrane is frequently, especially when it is a thin membrane without spicules, supported on spicules projecting from the skeleton; in such cases I have employed the descriptive expression that the dermal membrane is pierced by spicules and the surface shaggy. In the undamaged sponge a real piercing hardly takes place, but is only apparent; it is also probable that it is especially prominent in specimens kept in spirit, on account of the contraction.

It has been correctly observed by Vosmaer in Porifera (Bronn's Klassen und Ordnungen), and by many other authors, that the terms pores and oscula have certainly been used of structures far from always being homologous. Of late the term pore has often been used of the apertures of the incurrent canals in the subdermal cavities, and then the pores of the surface have been called dermal pores (*Ostia* Minchin). This I think unnecessary, as it does not come nearer the homology. Vosmaer (Tijdschr. d. Nederl. Dierk. Vereenig. (2) III, 1890—92, 238) has proposed other terms, trying to establish homologies with regard to the excurrent apertures, so that he calls the aperture with which his cloaca opens outward, osculum, and the openings into this cloaca of the excurrent canals procts, when there is only one opening, and proctions, when one canal has more than one opening; in certain sponges the osculum is wanting, and then the apertures of the excurrent canals on the surface are procts or proctions. In the same way he uses the term stomata for the pores on the surface of the sponge, or stomions, if there are more than one pore for each canal. Hitherto he has only tried to establish this terminology in the Hexactinellids and Tetractinellids; whether it may be used there may be doubted, and at all events it cannot be used in the Monaxonids; in forms with large subdermal cavities, for inst., it will be impossible to distinguish between stomata and stomions. Therefore I always use the term pore of the incurrent openings on the surface of the sponge, while I use the term osculum or oscula of the excurrent opening or openings on the surface, but in the latter case it may sometimes be a matter of judgment what is to be called osculum. In a tubular sponge as a *Siphonochalina* or many species of *Reniera* I call the opening of the tube osculum, and in a leafshaped sponge with the excurrent openings on one side I use of those the term oscula. The difficulty occurs at forms of transition between the above mentioned, as for inst. funnel-shaped or opencalicular sponges, but in these cases the signification of the terms used will appear from the description. Minchin is surely right, when he says (Lankester: A Treatise on Zool. II. The Porifera and Coelenterata, 1900 pp. 23 and 36), that most frequently these questions can neither be decided by outer study nor by anatomical examination, but only by the knowledge of the development of the individual forms. For the present we must therefore be satisfied with knowing that the terms used do not imply homologies.

Although, of course, the pores of a given sponge may be found in all degrees between open and shut, I have thought it serviceable, as a rule, to give the measured limits of the sizes of the pores in the different species.

By the examination of the spiculation and the spicules I have especially endeavoured to give exact measures, as also to give figures of the different forms. As the spicules prove to be upon the whole constant with regard to size and form, they form the best specific characters. At the same time I have tried, as far as possible, always to find the younger phases of the individual forms of spicules, which I have drawn together with the pictures of the fully developed spicules. By this examination it has proved to be a general rule that almost all spicules are begun in about their full length, and then the growth takes place exclusively by apposition, and sometimes by apposition after fixed lines. A growth in conformity with the organic growth does not take place, neither any growth by contemporaneous resorption and apposition. According to this the younger spicules must always be inscribable in the fully developed ones, and from this follows again with regard to the microsclera that the smaller forms are not, as is commonly stated, forms of development of the larger ones, but independent, fully developed spicules [1]). If, for instance, we have a sponge with sigmata, and these, as is generally the case, are varying in size, then the smaller sigmata are not young forms of the larger ones; by apposition the smaller ones would only become thicker, but very little longer. That this view is correct is corroborated by the finding of quite thin young forms having almost the same length as the grown ones. In the single cases account of this fact has been more particularly rendered by the description of the species. In this respect the sponge-spicules, as will be seen, form a parallel to the silicious shells of the diatoms, which, once formed, do not show any growth, properly so called, but only grow by apposition partly after fixed lines. Of microsclera I have in this part only treated of the forms found in Heterorrhaphidæ. With regard to the chelæ and anchoræ quite the same thing has been fully shown by Levinsen (Studier over Svampe-Spicula. Vidensk. Medd. fra den naturh. Foren. i Kobenhavn for 1893. 1894), and in the next part of the present work I expect to corroborate the statements of this author for a great number of forms.

As to systematism I have, for the forms treated of here, chiefly followed Ridley and Dendy, partly also Topsent. I have kept the family *Heterorrhaphidæ* of Ridley and Dendy, as it seems to me to be naturally enough bounded, and I do not, as does Topsent, think that we are more justified in using the megasclera than the microsclera as distinguishing characters. The family *Pœciloscleridæ* of Topsent, which is chiefly characterized by monactinal megasclera, includes nevertheless the genus *Desmacidon* s. l. with diactinal megasclera, and this genus is chiefly distinguished from *Gelliodes* by its having chelate microsclera; if no regard is paid to the microsclera as a distinguishing character, *Gelliodes* might as well be classed with the *Pœciloscleridæ*. On the other hand I think with Topsent that *Tedaniinæ* by their spiculation are related to the *Dendoricinæ*, and therefore they have not been included here; at present more genera without chelate microsclera or quite without microsclera are known, which nevertheless no doubt must be classed with the *Desmacidoninæ*.

As I have explained more particularly in the mentioning of the genus *Phlœodictyon* (Ridl.)

[1]) I must, however, here notice that O. Schmidt (Spongien d. adriat. Meeres 1862, p. 6—10), although with regard to these spicules supposing a growth like the organic growth, says of "die charakteristischen hakenförmigen Körper der Gattung Esperia": "In einigen Arten kommen ... kleinere und grössere Formen vor, allein dies sind in einer und derselben Species zwei Arten solcher Körperchen, nicht junge und alte". Thus he has correctly interpreted this phenomenon.

halina olim) I have thought it correct to break up the group *Phlœodictyinæ*, and classed its two genera, one with *Homorrhaphidæ*, the other with *Heterorrhaphidæ*.

It would seem as if the larvæ in the *Monaxonida* show group characters (Maas, Topsent), and it is not improbable that the systematism will be highly altered, as for inst. Bidder has altered the systematism of the calcareous sponges according to quite new and at all events very interesting views. At present, however, I think the division of the sub-order *Halichondrina* into the families *Homorrhaphidæ*, *Heterorrhaphidæ*, *Desmacidonidæ* and *Axinellidæ* to be the most natural — as also the most practical one.

Order Monaxonida.

Suborder I. *Halichondrina.*

Fam. I. **Homorrhaphidæ.**

Subfam. 1. **Chalininæ.**

The subfamily *Chalininæ* the only distinguishing character of which is the amount of spongin uniting the spicules into fibres, cannot, as has also been generally recognized, be kept sharply distinct from the *Renierinæ*, as the least sponginous forms form a transition to these latter, while on the other hand forms with much spongin and reduced spiculation form a transition to the horny sponges. In the present work I have tried to make the distinction in the following way: to be referred to the *Chalininæ* a species must have at any rate the primary fibres quite sponginous, even if the mass of spongin is small. If this is not the case, I refer the species to the *Reniera*, even if, as is the case in several species of *Reniera*, separate longitudinal fibres with a rather large amount of spongin are to be found; neither do I take into consideration a higher development of spongin in the basal part or stalk of the sponge. When the distinction is established in this way, we shall, in by far the most cases, get an outer characteristic, viz. the consistency; even *Chalininæ* with very little spongin will show an elasticity that is not found in the *Reniera*-species. Thus the distinction seems to me to be in most cases quite natural, although it cannot be said to have solved the question.

While it is thus very difficult to mark off the whole group, it is not much better with regard to the genera. Many of these are based on characters running gradually into each other, as for inst. on the number of spicules in the fibres, by which character it has been tried to distinguish between *Pachychalina* and *Chalina*, although there is no distinct difference; also the outer form has been used as a distinguishing character, by Lendenfeld even to an extreme degree. It is to be supposed that the great number and richness in forms of the *Chalininæ* have led to this condition of things, for it may be said, I think, that this subfamily, a few particular forms excepted, has no more value as a systematic group than the genus *Reniera*; this genus might be divided into genera after the same characters, but the limits between these genera would be doubtful; several of the characters, taken for inst. from the skeleton and the surface, by which genera of the *Chalininæ* are characterized, are in the *Reniera* used as specific characters. There has, however, been no opportunity for a more thorough study of the *Chalininæ*, as the whole material has only comprised six species belonging to three genera.

The *Chalininæ* are forms generally found in more shallow water, although a few species reach to a depth of ca. 150 fathoms.

A phenomenon frequently seen in the *Chalininæ* and with special distinctness in dried specimens where only the skeleton is left, is a formation like yearly rings. In longer branches they are often seen in great numbers above each other, their form most frequently more or less resembling a conical surface. If a branch is cut through, one or more concentrical rings will be seen. These "yearly rings" are formed by the meshes of the skeletal net being in these places finer than in other places, and especially by the presence of more transversal fibres than in the part just inside of the spot, and in this respect these layers are constructed in the same way as the surface. The phenomenon evidently is one of growth. It has already been mentioned by Bowerbank (Mon. of. Brit. Spong. I, 152) who also thinks it to be a phenomenon of growth.

Pachychalina O. Schmidt.

The form lobose or digitate, branched or unbranched, the sponge solid. The fibres polyspicular with more or less spicules. Spongin differently developed.

1. **P. Schmidtii** n. sp.

Pl. I, Figs. 1, 2. Pl. VIII, Figs. 1, 2, 3.

Club- or fingershaped. The fibres forming a rather regular skeleton of primary longitudinal fibres and secondary transverse fibres, the meshes mostly rectangular. The longitudinal fibres with numerous spicules, the transverse fibres most frequently with fewer spicules; always a distinct spongin-sheath. Oscula spread on the surface, sometimes with a tendency to a marginal position. Spicules 0·178—0·208^{mm}.

The specimens in hand of this species are unbranched, finger- or clubshaped, in the lower part generally narrowed to a short stalk. The specimens are of about the same size, of a length between 80 and 100^{mm}, and a diameter of about 15—30^{mm}. A specimen which I take to be a young one, and which is attached to a shell, is much smaller; it is cushionshaped and has a height of 10^{mm}. The colour (in spirit) is yellowish grey. The consistency, as in most *Chalininæ*, is firm, but very elastic. The *surface* is even, but not quite smooth, the ends of the primary fibres rising a little above the skin. The *dermal membrane* is transparent and very thin, and consequently it is often lost; judging by what I have been able to observe, it has no spicules and rests on the skeleton below, the ends of the primary fibres rising through it. *Oscula* are scattered on the surface, in some places more thickly than in others, and in one specimen that is somewhat compressed, a tendency towards a marginal position of the oscula is to be perceived. The openings of the oscula are almost circular, with a diameter of from a little more than 1^{mm} to 3^{mm}, their edges are often somewhat rising. I have not observed the pores, as the skin was mostly wanting in the specimens.

The *skeleton* consists of stout polyspicular fibres of a thickness of 0·09—0·10^{mm}. There is always a copious and distinct mass of spongin; in some fibres the spicules are very numerous, and then the spongin is either not seen to surround the fibres at all, or only to surround them to a slight degree, but most frequently the spicules form the middle part of the fibres and are enclosed by a strong sheath of spongin. In the transverse fibres the spicules are fewer and often not so regularly arranged after the longitudinal axis, as they are in the longitudinal fibres, but there is plenty of spongin. In the stalk the spongin is particularly copious, and therefore the consistency is harder than in the other parts of the sponge. The fibres form a rather regular skeleton; from the base and middle of the sponge the longitudinal fibres, the primary ones, spread, in a sheaflike way, on every side upward and bend towards the surface, in some places branching off in acute angles; perpendicularly on those the transverse fibres are found, which only stretch from one longitudinal fibre to the next one without forming longer coherent fibres; neither are they present in any great number, and accordingly in most places they are far from each other, so that the meshes formed get a rectangular shape; only at the surface are the transverse fibres closer together, and here the meshes become quadratic; immediately at the surface the transverse fibres form a dense, but irregular net of meshes on which the dermal membrane is resting. Farther down in the sponge may be found the layers mentioned in the introduction to the *Chalininæ*, running more or less parallel with the surface, and with more closely set transverse fibres, so that these layers remind of the structure of the surface of the skeleton. This peculiarity must be connected with periodicity in the growth. The distance between the longitudinal fibres generally varies from $0{\cdot}3^{mm}$ to $0{\cdot}6^{mm}$. On account of the above mentioned structure of the skeleton it will in the middle part of the more or less cylindric sponge show a rather irregular texture, from which longitudinal fibres radiate on every side running upward and bending outward to the surface. This structure of the skeleton is distinctly seen as well in a transverse section as in a longitudinal one through the middle of the sponge.

Spicula are oxea slightly curved and very gradually tapering; the tapering is so gradual, that the thickness decreases from the very middle of the spicule; but the decreasing in thickness is not great, so that the point proper commonly is not especially long. The length is between $0{\cdot}178^{mm}$ and $0{\cdot}208^{mm}$, and the thickness in the middle varies between ca. $0{\cdot}01^{mm}$ and $0{\cdot}014^{mm}$. Among the oxea some styli are seen which are almost always short, and are to be regarded as monstrous forms. Some needles a little shorter and especially finer, up to very fine ones, are seen, which I take to be developmental forms; they are, however, seen in the fibres, and fibres exclusively filled with such needles may be found.

It has not been possible to refer this species to any one hitherto described; among species that had to be taken into consideration, were especially *Pachychalina compressa* Schmidt and *P. excelsa* Schmidt. Both these species have been mentioned so briefly that it would be impossible to recognize them, but the original specimens of both species are in the museum of Copenhagen. *P. compressa* was founded by Schmidt 1870 (Grundzüge einer Spongienfauna d. atlant. Gebiet p. 37) as occuring at Iceland; an examination of the original specimen, however, has now proved it to be, not a *Pachychalina* but a *Homœodictya*, the chelæ so characteristic for this genus having been found in it, although in small numbers[1]. The other species was founded by Schmidt in the same place as occurring at

[1] I must here call attention to the fact that the *Chalininæ* and the genus *Homœodictya*, which latter, at all events one of its species, as to skeleton and outer form is very like the former, may easily be confounded when the specimens

the Scaw; it is a digitate, branched species, by the structure of its skeleton and the form of its spicules closely related to the present one, with which, however, it would seem that it cannot be identified.

Locality: Onundafjord in Iceland, depth 10 fathoms, 3 specimens (the author); west of Iceland, depth 22 fathoms, a little fragment (Drechsel); the bank southwest of Sudero, one specimen (Jorgensen); the Faröe Islands, a little specimen (Müller).

2. P. caulifera Vosm.

Pl. II, Figs. 1, 2. Pl. VIII, Figs. 4, 5, 6.

1882. *Pachychalina caulifera* Vosmaer, Niederl. Arch. für Zoologie, Supplementsband I, 1881—82, 33, 15, Tab. I, Fig. 14, Tab. III, Figs. 64—66.

1887. *Pachylina caulifera* Levinsen, Dijmphna-Togtets zool.-bot. Udbytte. 1887, 350, 8, Tab. XXIX, Fig. 4, Tab. XXX, Fig. 1.

Stipitate, club- or fingershaped, unbranched (younger specimens) or more or less richly branched (older specimens); the branches cylindrical or somewhat compressed. The fibres form a regular skeleton of longitudinal and transverse fibres, the meshes quadratic or rectangular. The longitudinal fibres with a few spicules, sometimes with only a single series, the transverse fibres formed of single spicules. Only little spongin, forming no distinct sheath, or only a very thin one. The surface quite delicately shaggy from projecting spicules. Oscula spread; sometimes especially found on one side of the branches, sometimes they are placed in rows on the edges of the compressed branches. The spicules oxea, evenly tapering, 0·118—0·148^mm.

Pachychalina caulifera was etablished in 1882 by Vosmaer on an unbranched, oarshaped specimen; in 1887 Levinsen referred some unbranched, or at most twobranched cylindrical sponges from the Kara Sea to this species. I have before me two specimens, both richly branched and considerably larger than those described. The larger specimen has a height of 49^{cm}, and is richly branched, the originally few branches dividing into more and more; and the branches, being at the base somewhat compressed, are at the top cylindrical or all but cylindrical, and are here rather thin, their diameter being between 5^{mm} and 10^{mm}. The other specimen is shorter; is has a height of 27^{cm}, but the branches, which are also somewhat compressed, are comparatively thicker, and do not become cylindrical at the top, where the larger diameter is 10—18^{mm}. Both specimens have a distinctly marked stalk being in both full 5^{cm} long. The colour (in spirit) is light brown to light yellow. The stalk is darker brown, so that we have here a colouring similar to that shown in the figure of Vosmaer (l. c.), but not, however, with the sharp boundary shown in that figure. The consistency is spongy and elastic, the stalk is hard. The *surface* of the sponge is even and looks almost smooth, although it is densely, but quite short shaggy, the spicules of the ends of the primary fibres projecting a little. The *dermal membrane* appears as a thin transparent membrane; it rests on the subjacent skeleton, and if

of *Homæodictya* are dried, as is often the case with old specimens in museums. These specimens have perhaps been washed out at the preparation, or, what is also often the case, they have been found dead on the beach, and the soft parts have long ago rotted and been washed away. In such cases the chelæ, which are not connected with the skeleton, would either be quite wanting or only a few be left. It is also to be supposed that such a confounding has taken place more than once.

a piece of the skin is cut off, the meshes of the subjacent skeleton is by the microscope seen through the skin, and the ends of the primary fibres project from the nodes. As the transverse fibres of the skeleton are mostly formed of single needles, this skeleton appears as an irregular, mostly unispicular reticulate work, most frequently only in the nodes united by spongin. Otherwise no spicules are found in the dermal membrane. The *pores* are round or oval openings, and are found, single or two or three together, in the meshes formed by the subjacent skeleton; the size is from 0·03^{mm} to 0·12^{mm}. *Oscula* are round, sometimes a little oval openings of a diameter of 1—4^{mm}, they are found dispersed everywhere on the branches in rather great numbers; when the branches are somewhat compressed, they are often set in rows on the edges, and they may also be more numerously or almost exclusively found on one side of the branch; but upon the whole they are best characterized as dispersed. They are often a little projecting, and these projections may grow into papillæ of a length of 7^{mm} (in which cases we have, perhaps, a beginning branch). On the stalk there are no oscula at all.

The *skeleton* is chiefly of the same structure as in the foregoing species, and built upon the principle which upon the whole is found in the *Chalininæ*. Longitudinal fibres (primary fibres) run longitudinally through the sponge, and spread to all sides like a sheaf, reaching to the surface where they project a little; they are united by transverse fibres (secondary fibres) into a rather regular network. Far the greater part of the longitudinal fibres are polyspicular, but with far fewer spicules than in the foregoing species, and also unispicular fibres are seen; otherwise the fibres are somewhat different with regard to their thickness and the number of spicules, the thickness being about between the thickness of a spicule and 0·09^{mm}, and the distance between the longitudinal fibres is ca. 0·12^{mm}—0·17^{mm}; thus the fibres are considerably thinner and the reticular work finer than in the foregoing species. Neither do the transverse spicules here form coherent fibres, but reach only from one longitudinal fibre to the next, and are for a great part formed of but one spicule; in the inner part of the sponge they are far from each other, so that the meshes are more or less rectangular, but towards the surface they are nearer to each other, and here the meshes are more or less quadratic. The spongin is not by far so strongly developed as in the foregoing species, and most frequently it forms no distinct sheath or only a very thin one round the spicules of the fibres; in the nodes it is distinctly seen; the transverse spicules are not generally quite surrounded by spongin, but only cemented at the ends. Besides the skeletal tissue thus constituted, some fibres are seen here and there running longitudinally along the branches without going to the surface, which fibres may divide and anastomose; they are a little stronger than the regular longitudinal fibres, and have more spongin forming a distinct sheath. Towards the base of the sponge the amount of spongin is greater, and the spicules of the fibres are here surrounded by a distinct spongin-sheath. In the hard, solid stalk the amount of spongin is very considerable, and at the same time it passes from colourless to yellow; the intervals between the fibres are here very small, and the whole mass forms a very solid tissue.

Spicula are straight ore most frequently slightly curved oxea, evenly tapering. The length is between 0·118 and 0·148^{mm}, and the thickness 0·008—0·0114^{mm}. Shorter and finer needles, to quite fine ones, developmental forms, are also found in small numbers, as also a few styli.

Although Vosmaer does not give the length of the needles, the species is so well consistent with his description and pictures that I think the determination to be sure; Vosmaer seems to attach some importance to the presence of the outermost little, marked off point in the oxea; such a form of the point, however, is frequent in many species of sponges. I have been able to examine the original specimens of Levinsen, and have found them to be quite consistent with my specimens. The specimens both of Vosmaer and Levinsen are presumably younger forms, and therefore unbranched or twobranched, while during growth the species becomes more richly branched.

Gemmulæ. The two specimens in hand have both been attached to the shell of a large *Modiola modiolus* together with a *Homœodictya* and a *Myxilla*; they have both been broken off, but the shell has been kept. The stalk spreads at the base into a little incrusting part with a skeleton of irregularly arranged, very sponginous, polyspicular fibres, and between these a mostly unispicular network. This part was closely filled with the bodies described by Bowerbank under the head of *Diplodemia vesicula* as ovaries (Mon. Brit. Spong. II, 357, III, Pl. LXX, fig. 12); but when *Diplodemia vesicula* by O. Schmidt (Grundzüge einer Spongienfauna d. atlant. Gebiet. 1870) had been declared to be a fragment of a Chalinine, Topsent in 1888 (Compt. rend. CVI, 1299) referred it to *Chalina oculata*, and described the structures, by Bowerbank called ovaries, as gemmulæ. The gemmulæ of the present species are, with regard to their whole structure and the place where they are found, quite consistent with the description given of those in *Chalina oculata*. They are found in the very lowermost part of the stalk adjoining the underlayer, and in the basal spreading of the stalk to a number of about a hundred in one specimen and a little fewer in the other. They are closely crowded together, the form is oval, the length is on an average 1·37^{mm} and the breadth 0·83^{mm}. The colour (in spirit) is yellow. They are situated in the skeleton of the basal spreading closely connected with the fibres. They consist of a capsule of quite the same appearance as the spongin and furnished with rather close-set spicules, running parallel to the surface and of the same kind as the other spicules of the sponges, and also here as in *Ch. oculata* fibres seem to run through the capsule. I have not been able to find any foramen. The contents of these gemmulæ appear under the microscope, but without any more close examination, as a whitish, strongly granulous substance. The specimens are taken towards the end of May.

Besides in *Chalina oculata* Topsent l. c. mentions similar structures in *Ch. gracilenta* Bow.; in this incrusting species they are also found towards the substratum, but they are here smaller, 0·25^{mm}. Thus we know at present three Chalininæ, in which these structures are found. That they are really gemmulæ cannot of course be decided with certainty, until their development has been examined. Their being found, at all events in *Ch. oculata* and in the present species, quite down at the base of the hard, compact and apparently dead stalk would, if they are gemmulæ, seem somewhat particular.

Locality: Vestmanhavnsfjord in the Faröe Islands, depth ca. 70 fathoms, two specimens (Th. Mortensen).

Geogr. distrib.: The species is before known from the Barents Sea (the locality with a query) (Vosmaer) and from the Kara Sea, depth 6 fathoms (Levinsen).

Remarks. The *Pachychalina oblonga* Arm. Hans. enumerated by Vanhöffen (Grönland-Expedition der Gesellsch. für Erdkunde zu Berlin, II, 1, 1897, 248) from Karajak-Fjord in North Greenland, is a *Reniera* (see pag. 51).

Chalina Grant.

Form somewhat varying, often digitate and more or less branched, or leafshaped. Fibres unispicular or at all events with quite few spicules; spongin variously developed, often copious.

1. Ch. oculata Pallas.

Pl. VIII, Fig. 7.

1766. *Spongia oculata* Pallas, Elench. zoophyt., 390, 239.

1767. *Spongia dichotoma* Linn., Syst. Nat. Ed. XII, 1299, 14.

1776. — — Müller, Zool. Dan. Prodrom., 256, 3088.

1842. *Halichondria oculata* Johnston, Hist. Brit. Spong., 94, 2, Pl. III, figs. 1 and 2.

1864. *Chalina oculata* Bowerbank, Mon. Brit. Spong. I, 208, Pl. XIII, fig. 262; II, 361; III, 169, Pl. LXVI, figs. 1—3.

1887. *Euchalinopsis oculata* Lendenfeld, Zool. Jahrb., II, 815, 1.

1893. — Levinsen, Det vidensk. Udbytte af Kanonbaaden Hauchs Togter, 418, 15.

1896. *Chalina oculata* Lambe, Sponges from the Atl. coast of Canada. Transact. Roy. Soc. of Canada, Ser. II, Vol. II, Sect. 4, 184, Tab. I, figs. 2, 2 a.

Of this species I have, from the territory treated of here, only two specimens; one is a little, unbranched, presumably young specimen of a length of 30mm; it has a well marked stalk, 9mm long and very thin; the other specimen is larger, of a height of 85mm; it is branched and is upon the whole of the typical form. The *skeleton*, arranged in the usual way, is chiefly unispicular, but also polyspicular fibres are found towards the middle of the branches; but they contain only few spicules. In specimens from the Danish seas, however, polyspicular fibres may be seen in greater numbers, so that most of the primary fibres are polyspicular; but also here the number of spicules is only small. Thus the species is somewhat varying with regard to this character, and therefore it is on the border between *Chalina* and *Pachychalina*, between which two genera no quite distinct limit can be drawn. The spongin is in the present specimen rather strongly developed, so that most frequently a distinct spongin-sheath is found round the spicules; also the transverse fibres are most frequently quite surrounded by a layer of spongin, however thin. The distance between the fibres is on an average ca. 0·1mm. *Spicula* are slightly curved, more rarely straight oxea, evenly and rather gradually tapering. They are more varying in length than is commonly the case, from 0·12—0·178mm, and the thickness varies from about 0·008—0·013mm; a few of the largest needles are found with a thickness of up to 0·015mm; but the longest needles are not always the thickest ones; an average size of ca. 0·149mm in length and a thickness of 0·011mm is by far the most common. Besides these needles which on account of the proportion between length and thickness convey an impression of being fully developed, some finer and quite fine needles are found measured to a length of from 0·08—0·13mm. Some few styli may be found.

Locality: Vestmanhavnsfjord in the Faröe Islands, depth ca. 70 fathoms, a little unbranched specimen (Th. Mortensen); the Vestman Islands, depth unknown, one specimen (Sæmundsson).

Geogr. distrib. This species seems to be very widely spread, almost cosmopolitan; it is frequent at the coasts of England (Bowerbank), in the English Channel at the French coast and at the southern point of Britany at Croisic (Topsent), as also along the western coast of Jutland (Levinsen); on the

Atlantic coast of America it is found from Florida to Labrador (Carter, Lambe, Verrill). It is further enumerated as found in the bay of Bengal, the Mergui archipelago (Carter, var. *fibrosa*, this determination, however, is likely to be doubtful), and finally with regard to Polynesia from the Fidji Islands, New Zealand and the Auckland Islands south of New Zealand (Lendenfeld). Thus the species is spread from 63° 20′ Lat. N. to about 50° Lat. S. Its bathymetrical distribution reaches from shallow water, about 4 fathoms to about 80 fathoms, which seems to be the largest depth, in which it has hitherto been taken.

2. **Ch. spatula** n. sp.

Pl. II, Fig. 3, Pl. VIII, Figs. 8—9.

Leaf-shaped or spatulate, stipitate, the blade oval. The fibres form a regular skeleton of longitudinal fibres and transverse fibres with quadratic meshes. The fibres almost exclusively unispicular, the transverse fibres consisting of single spicules connecting the primary fibres. Only little spongin forming no visible sheath. Irregularly running, polyspicular longitudinal fibres with more spongin are present. The surface finely shaggy from projecting spicules. Oscula have a somewhat projecting edge, they are spread and found on both sides. Spicula oxea 0·19—0·22^{mm}.

This species has a fine and regular form like an erect, oval leaf running below into a stalk passing evenly into the leaf. The height is full 14^{cm}, of which ca. 6^{cm} may be put down as stalk; the largest breadth of the blade is 65^{mm}. Below the stalk is cylindric, and passes by degrees into the flat blade. The thickness of the stalk in the middle is ca. 8^{mm}; the blade is thickest below, and has here a thickness like that of the stalk, 8—9^{mm}, in the middle its thickness is ca. 6^{mm}. The nether half of the margin of the blade where the transition from the stalk is still felt, is rounded, while in the upper half part it is drawn out to a rather sharp edge. The colour (in spirit) is whitish yellow. The consistency is elastic, but the sponge is rather soft. The *surface* is smooth, but finely shaggy from the projecting spicules. The *dermal membrane* is very thin and transparent, and rests on the skeleton below, the ends of the primary fibres projecting through it. When the sponge is seen in spirit the very close-set round subdermal cavities or mouths of the incurrent canals shine through the skin; they have on an average a diameter of 1^{mm}; in some places they are seen to be incompletely separated, so that they run into one another and form irregular lacunae. *Oscula* are spread on both sides of the sponge, a single one is placed quite at the edge; they are also found on the stalk down to the lower third part of it; they are circular openings with an average diameter of 3^{mm}; their margin is somewhat projecting, so that they have a sharp edge; the canal into which they lead, does not run horizontally inward, but obliquely downward, and therefore oscula do not point horizontally outward, but a little obliquely upward, so that the margin is most projecting at the lower edge of the oscular aperture. The *pores* are situated in the thin dermal membrane; they are round or roundish holes of very varying sizes measured from 0·011—0·27^{mm}. They are found on both sides of the sponge, and continue also down on the stalk. In most places the pores are placed close together, they often reduce the membrane to a network, so that the pores are only separated by thin strings of tissue; in such cases they get an irregular polygonal form, and may get a still greater size than the measures given. When a piece, cut off parallel to the surface, is examined under the microscope, the skeleton under the skin is seen as a unispicular, irregular net work, from the nodes of which the ends of the primary fibres rise.

The *skeleton* is chiefly constructed according to the principle common in the Chalinines. It consists for the greater part of a rather regular network of more or less quadratic meshes. In the middle of the stalk and the leaf a more open and irregular network is found in which primary and secondary fibres are not to be distinguished; from here fibres issue towards the surface; these primary fibres are directed a little upward on their way to the surface, but they bend a little, so that they meet it at a right angle; especially in the lower part of the sponge the bending upward is quite slight, and the fibres go almost quite horizontally to the surface; in the upper part of the leaf the bending upward is more conspicuous. The secondary fibres consist only of single spicules connecting the primary fibres, and forming together with those the reticular work, but they do not form, or form only to a small degree, coherent fibres. The primary fibres are mostly unispicular; they may, however, especially in the lower part of the sponge, be polyspicular, but only with a few spicules alongside. The distance between the primary fibres is about the length of a spicule, or ca. 0·15—0·18^{mm}. The spongin is only present to a small degree, it is distinctly seen in all the nodes, and under sufficiently magnifying powers it may in most places be seen as an exceedingly thin layer covering the fibres; the elastic consistency of the sponge implies also that the fibres must be richer in spongin than is the case in the *Reniera*-species. In the stalk the spongin is more richly developed than higher up in the sponge. Besides the regular skeleton described above, some more fibres are found, viz. some rather powerful ones, beginning in the stalk and running as longitudinal fibres up through the sponge branching off and anastomosing. Down in the stalk they are polyspicular and surrounded by a strong spongin-sheath, here they may reach a thickness of 0·12^{mm}; in branching off upwards they become thinner, and the number of spicules smaller down to only a couple of spicules, or they become quite unispicular; the spongin also decreases, but may, however, still be seen as a thin, but distinct sheath. Outside the skeletal net some spicules are found dispersed; they are generally shorter and finer than the spicules of the skeleton.

Spicula are slightly curved, sometimes straight or almost straight oxea, evenly and rather gradually tapering; the curve sometimes is quite even, but sometimes it may also be confined more or less distinctly to the middle part. The length is between 0·19—0·22^{mm}, most frequently it is about 0·208^{mm}, the thickness is 0·010—0·012^{mm}. As before mentioned some spicules are found spread in the sponge; they are found in no small numbers, and are shorter and finer, up to quite fine ones; by all transitions in size they are connected with the spicules of the skeleton.

With regard to the outer features this species recalls the description by Fristedt of the *Chalina groenlandica* from the eastern coast of Greenland, mentioned below, but the spicules of this latter species are abruptly pointed and more curved.

Locality. Only one specimen of this beautiful species has been taken, Station 34, the Davis Strait, 65° 17' Lat. N., 54° 17' Long. W., depth 55 fathoms; the specimen is attached to a stalk of a hydroid together with two species of calcareous sponges, an ascidian, a couple of hydroids, a bryozoa, and two octactiniæ of the genera *Voeringia* and *Paranephthya*.

3. **Ch. groenlandica** Frstdt.

1887. *Chalina groenlandica* Fristedt, Vega Exp. vetensk. Iakttagelser, IV, 417, Pl. 23, fig. 19.

This species I have not seen. It must be closely allied to the preceding one, is leaf-shaped, and has presumably been of a similar form, but among other particulars it differs from it by having the spicules more curved and more abruptly pointed. Fristedt gives the length of the spicules to be 0·2mm. The species is only known in a couple of fragments.

Locality. The eastern coast of Greenland, depth 140 fathoms (Fristedt l. c.).

Siphonochalina O. Schmidt.

Tubular, often somewhat branched forms, the surface of the tubes smooth, both inside and out; each tube with a round opening at the summit. The fibres various, unispicular or polyspicular, and with little or much spongin.

1. **S. pulcherrima** Frstdt.

Pl. I, Figs. 3—4, Pl. VIII, Figs. 10—11.

1885. *Chalina pulcherrima* Fristedt, Bidrag till kännedom. om de vid Sveriges vestra Kust lefvande Spongiæ. Kgl. Sv. Vetensk.-Akad. Handl. 21, Nr. 6, 49, Tab. IV, fig. 3a, 3b.

Tubular, most frequently several tubes issuing from a common base or stalk, sometimes anastomosing, the single tubes with slight, irregular, annular swellings. The fibres form a regular network of longitudinal fibres (running towards the surface) and transverse fibres; the meshes quadratic. The fibres generally unispicular. Only very little spongin. Particular polyspicular fibres running longitudinally, are found, especially in the inner part of the skeleton. The surface is finely shaggy from projecting spicules. Each tube ends with a large osculum. Spicula oxea 0·23—0·26mm.

The specimen in hand of this species agrees in its habitus very well with the figure of Fristedt l. c. It is formed of a short stalk from which issue several tubes, altogether there have been four of them, but one has been torn off. The tubes are coalesced in a part of their length, two of them have a side branch, but this is for some part of the length coalesced with the principal tube. All the tubes end at the summit with an osculum the edge of which is rather sharp, the tubes being conically tapering at the summit. The tubes show some slight irregular, annular swellings. The total height of the sponge is 12·5cm, the tubes have an average diameter of ca. 20mm, the thickness of the wall is 5—6mm, somewhat thicker where the swellings are found. The colour (in spirit) is grayish yellow. The consistency is of a middle firmness, the sponge is rather soft for pressure, but elastic. The *surface* is finely shaggy from projecting spicules. The *dermal membrane* is a thin transparent membrane resting on the skeleton below. Each tube ends, as has been mentioned, in an *osculum* the edge of which is sharp, as the wall, on account of the conical tapering, becomes thinner at the summit. The oscula have a diameter of 5—8mm according to the size of the tube; they are smallest in the two younger branches. The oscula lead into an oscular canal of the same width, which, narrowing only a little, continues quite down to the stalk; the oscular canals of the branches open into those of the principal tubes. Into this canal the excurrent canals open with round apertures of a diameter of

1—2^{mm}, but also smaller openings are found between them, down to a diameter of 0·2^{mm}. The greater openings are partly placed in transverse rows, however with some irregularity. The course of the canals is chiefly very regular; below the skin the openings of the incurrent canals are found as small round subdermal cavities, and the canals stretch almost directly from here, by and by uniting to principal canals, in a curved manner obliquely inward and upward, and open into the oscular tube; accordingly all the openings in this tube are turned somewhat upward. The membrane covering the oscular tube, rests on the skeleton below, which forms an irregular net of meshes, but no spicules project, so that the inside of the oscular tube is not shaggy as the outer surface of the sponge. The *pores* are found rather closely in the dermal membrane, sometimes so closely set, that the membrane forms only thin strings between them; they have been measured to a size of 0·04—0·268^{mm}.

The *skeleton* is chiefly of the common structure, only with the modifications necessitated by the form. Immediately below the skin covering the oscular canal, an irregular network is found, corresponding to the skeletal tissue found in the middle of a cylindric or leaf-shaped Chalinine. From this primary fibres bending upward in a curved manner, run to the surface which they meet at a right angle, and there they are projecting. These fibres are connected to a rather regular net of meshes by spicules that form no coherent fibres, but most frequently are single; the meshes are quadratic or rectangular. The rather regular net formed in this way, gets a less regular appearance on account of the many canals running through it; as these grow in width inwardly, the net appears to be closer towards the surface and more open inwardly, but this appearance is only owing to the lacunæ made by the canals, while the skeletal net itself is of the same width. This skeleton is almost exclusively unispicular, primary fibres with two or three spicules alongside being only found here and there; the distance between the primary fibres is fixed by the length of the spicules and is on an average 0·2^{mm}. Besides the skeleton described some polyspicular longitudinal fibres of different thickness are found; they originate in the stalk, which is almost exclusively formed by such fibres and consequently is very firm and hard, and they run longitudinally through the sponge branching off and also anastomosing. Upwardly they become thinner; they have a thickness of from 0·24^{mm} down to 0·06^{mm}, but at their base in the stalk their thickness may be up to 0·5^{mm}. They run in greatest number in the inner part of the wall of the sponge towards the oscular tube, but they have otherwise no regular course. The spongin is in the skeleton present only to a comparatively small degree, it is seen copiously and distinctly in all the nodes, and it may often under sufficiently magnifying povers be seen stretching down along the spicules or quite surrounding them with an exceedingly thin layer, but in many places it seems to be confined to the nodes. Neither do the polyspicular longitudinal fibres show any spongin-sheath, but they are nevertheless, as is seen by colouring, quite or almost quite surrounded by an exceedingly thin layer of spongin. The spicules are in these fibres rather regularly arranged in bunches, and where the ends of the bunches catch each other the spongin is most distinct and is seen as a slightly yellow-coloured transverse band.

Spicula are oxea, most frequently slightly and evenly curved, rarely straight; they are rather gradually and sharply pointed; the length varies from 0·23—0·29^{mm}, the thickness is between 0·015 and 0·02^{mm}. Shorter and finer spicules up to exceedingly fine ones are found, but in rather small numbers, the finest ones have a length of ca. 0·13^{mm}.

Locality. Jakobshavn in Greenland, one specimen, depth unknown (Pfaff).

Geogr. distrib. Fristedt gives two specimens from Bohuslän, depth ca. 90 fathoms (175 metres).

2. S. mollicula n. sp.

Pl. VIII, Figs. 12—14.

Of a somewhat irregular form consisting of a stem, from the ends of which tubes issue. The fibres form a regular skeleton of longitudinal fibres (running towards the surface) and transverse fibres, the meshes are quadratic, rectangular, or polygonal. By far the greatest part of the fibres unispicular, only sometimes with a couple of spicules. Only little spongin. Particular longitudinal fibres wanting. The surface finely shaggy from projecting spicules. Each tube ends with an osculum. Spicula oxea somewhat curved, 0·13—0·178^{mm}.

The only specimen in hand of this species has a somewhat irregular form; it is in two places fastened to pieces of laminarian fronds, and from here originates on one side a cylindric stem, dividing into two branches each ending with an osculum; on the other side of the fastening two shorter tubes issue. The principal stem seems to have been lying more or less horizontally, while the tubes have risen more or less vertically from the stem. The total length of the specimen is ca. 60^{mm}, and the diameter of the stem 10—12^{mm}. The colour (in spirit) is light brown. The consistency is very soft, but elastic. The *surface* is finely shaggy from projecting spicules. The *dermal membrane* is thin and transparent, and rests on the skeleton below. Each tube ends with an *osculum* of a diameter of 2—3^{mm}; the ends of the tubes are rounded, and accordingly the edges of the oscula are not sharp. The osculum leads into an oscular canal of the same diameter, and the oscular canals of the tubes are continuations of the canal of the stem. As far as I have been able to decide, the canals run from the surface obliquely upward and inward as in the preceding species, and the excurrent canals open into the oscular tube. The *pores* are found in great numbers and very close together in the dermal membrane, often reducing this to a reticular work; most frequently they are round; their sizes have been measured to 0·03—0·18^{mm} [1]).

The *skeleton* is of quite the same structure as in the preceding species; accordingly it consists of primary fibres running from the wall of the oscular tube in a curved manner upward and outward to the surface; these fibres are connected by transverse spicules mostly single or only forming incomplete fibres. The net is rather regular, and the meshes quadratic, rectangular, or polygonal. The distance between the primary fibres may be somewhat varying; most frequently it is equal to the length of a spicule, or 0·12^{mm}, but it may be considerably greater, up to 0·23^{mm}, and upon the whole the skeleton is more open than in the preceding species; its regular structure is distinctly seen in the tubes, but is far less marked in the stem. The skeleton is almost exclusively unispicular, some of the primary fibres may, however, be composed of a few spicules in their whole course or part of it; polyspicular longitudinal fibres as in the preceding species, are not found here. In spite of the soft consistency of the sponge the spongin is comparatively more developed than in the preceding species; it is

[1]) This species shows a particular structure, which I have not been able quite to interpret: besides primary fibres projecting through the dermal membrane, there are also here found transverse spicules, so that we get a net of spicules outside of the dermal membrane. This peculiarity may perhaps be due to contraction on account of the sponge having been kept in spirit, it is also possible that the real dermal membrane has been lost.

copious in all the nodes, and in the primary fibres it may frequently be seen to surround the spicules completely, while the transverse spicules most frequently appear to be only cemented at the ends.

Spicula are rather small oxea; they are always more or less curved; sometimes the curve is even, but frequently it is more sharply localized in the middle of the spicule. The pointing varies somewhat, from a fairly long to a quite short, sometimes even rounded point; in the latter case the rounding has a quite small point marked off. The length varies from 0·13—0·178^{mm}, most frequently towards the latter figure, also the thickness is somewhat varying from 0·008—0·011^{mm}. The thickness and length are in no fixed proportion to each other. Shorter and finer needles, up to exceedingly fine ones are found in no small number spread in the tissue, the shortest ones measured had a length of 0·092^{mm}.

Locality. Egedesminde, Greenland, depth unknown, one specimen (Levinsen).

Subfam. 2. **Renierinæ.**

Halichondria Fleming.

Without definite form, forming incrustations, lumpy or more or less erect. The needles without any real order spread in the tissue, sometimes forming fibres, but no regular reticulate skeleton. Spicula oxea, commonly long and slender, rarely strongyla. Spongin wanting (or present only to a scarcely appreciable amount).

The sponges belonging to the genus *Halichondria* are usually of no definite form. They may form incrustations, be formed as thicker or thinner crusts, or be irregularly massive or lumpy, or they may finally be more or less erect and sometimes slightly branched, and it is to be supposed that several species may appear under more or less of these various forms, or at all event vary much in form, and these variations may even to a certain degree influence the other structure (the skin, the skeleton). The recognition of the species must therefore primarily be done by means of the spicules, and the other skeletal structures, the nature of the surface etc. can only be of secondary importance. In spite of the general recognition of the secondary importance of the outer form, not only here, but upon the whole in many Monaxonids[1]), there has not uncommonly been laid too much stress upon this feature. The species of the earlier authors will, when no exact figures and measures of the needles are given, commonly not be identifiable. Bowerbank thus under the genera *Hymeniacidon* and *Halichondria* has twenty and odd species belonging to the genus *Halichondria* in the signification used in this work; this, no doubt, is too large a number, but most of these species will not be identifiable without an examination of the original specimens.

[1]) It is to be supposed, however, that the secondary importance of the outer form applies especially to the genus *Halichondria* (and a few other genera, for inst. *Hymeniacidon*), and is connected with the only little differentiated skeleton of this genus; it is also seen that species of this genus, when they have a skeleton made of fibres, get a more definite form. *Halichondria panicea* is a good type of an especially varying and polymorphous species. The outer form of the sponge species, however, is often little known, because many species have been etablished on slight material, fragments or more or less damaged specimens. I am inclined to think that it will be seen by and by, when new collections procure well-kept specimens, that the species often, within certain limits, have a rather definite form.

1. H. panicea Pall.

Pl. IX, Fig. 1.

1842. *Halichondria panicea* Johnston, Brit. Spong. 114, Pl. X, Pl. XI, fig. 5.
1866. — — Bowerbank, Mon. Brit. Spongiadæ, II, 229, III, Pl. XXXIX and XL.
1870. *Pellina bibula* O. Schmidt, Spongienf. atlant. Gebiet. 42.
1870. *Amorphina panicea* O. Schmidt, l. c. 77.
1881. *Amorphina megalorrhaphis* Carter, Ann. Mag. Nat. Hist. Ser. 5, Vol. VII, 368.
1887. *Halichondria bibula* Levinsen, Dijmphna Togtets zool.-bot. Udbytte, 352, 11, Tab. XXX, fig. 4 a—b.
1887. *Halichondria panicea* Ridley and Dendy, Challeng. Report, Monaxonida, Vol. XX, 2, Pl. II, figs. 2, 3.
1887. *Amorphina panicea* Fristedt, Vega Exp. Vetensk. Iakttag. IV, 421.
1887. *Amorphina grisea* Fristedt, l. c. 425, Pl. 24, fig. 10, Pl. 27, fig. 10.

Of this common species we have a large number of specimens. It is most frequently incrusting, especially on algæ, and from this form it grows out into large cushions or lumps, and consequently it is formed as flat cakes, cushions, or roundish or lengthy lumps. Only one specimen, from Reykjavik, has a more definite form, conical, tapering tubes, or cylindrical, at the summit flat tubes rising from a flat spreading; the tubes have at the summit an osculum leading into an oscular canal. This form corresponds with the picture of Bowerbank, Pl. XXXIX, fig. 5 and Pl. XL, fig. 1. In the lumpy forms the oscula are spread and most frequently only present in small numbers. In almost all the specimens the dermal spicules form the well-known regular net of meshes with three, four, or many sides, in which net the pores are lying, often so close that the membrane is reduced to a mere network. Now this net may be rather varying in appearance, and may also be quite wanting, so that the dermal spicules are lying closely packed and in all directions. The character on which the species must chiefly be based, is the form of the spicules; they are very long tapering, always a little curved, and this curve is exceedingly frequently seen as a rather sharp bend in the middle. The size of the spicules is somewhat varying from 0·35—1 mm; this latter size is given by Carter for his species *H. megalorrhaphis*, his own opinion of which is that it is only a variety of *panicea*, and Ridley and Dendy give, l. c., several sizes between the measures given above. The largest length of spicules measured by me, is ca. 0·6 mm. Among the spicules are also seen styli and monstrous forms, but always only sparingly. The genus *Pellina* of Schmidt, which was based on the presence of a distinct skin with a net of spicules, is, as has been shown by Grentzenberg (Die Spongienfauna d. Ostsee. Inaug. Dissert. Kiel, 1891, 12) and Levinsen (Det vidensk. Udbytte af Kanonbaaden Hauchs Togter, 1893, [illegible]) by an examination of the original specimens of Schmidt, not to be distinguished from the genus *Halichondria*, and the species *Pellina bibula* is identical with *H. panicea*. I have had occasion to examine one of the specimens of Fristedt of *A. [illegible] grisea*, and have not been able to find any character separating this species from *H. panicea*.

As has already been mentioned, some of Bowerbanks species will, no doubt, prove to be identical with *H. panicea*, what can only be decided with certainty by an examination of [illegible] specimens. Levinsen, in the work quoted above, has referred *Sp[illegible]* Müller (Zoologia Danica, III, 71, Tab. CXX) to *panicea*, and judging by the figure it can scarcely belong to any other species. Also Johnston's *H. [illegible]* (Brit. Spong. and Lithophytes, 135, Pl. XII, fig. [illegible]) has by Levinsen been referred to this species; the spicules pictured by Johnston do not, to be sure, resemble those of *panicea*, but I have had the opportunity to examine a piece sent by the Rev. A. M. Norman under the name of *H. coalita*, and the spicules of this piece agree very well with those of *H. panicea*. Schmidt's *Reniera simitubulosa* (Die Spong. d. adriat. Meeres, 1862, 75) would, according to his expressions in Grundzüge einer Spong. Faun. d. atlant. Gebiet 1870, 42, also seem to belong hither, but this species is otherwise not easily judged. Grentzenberg, l. c. 13, is of opinion that *Amorphina pasiscens* from the North Sea, established, but very incompletely described by Schmidt (Jahresbericht d. Commiss. zur wissensch. Unters. d. deutsch. Meere in Kiel für 1872—73, 115) is also *H. panicea*, what also seems rather likely. Finally Topsent in his account of the species of Bowerbank (Revue biol. du Nord de la Fr. VII, 1894, 14) expresses the opinion that further *Hal. caduca, incerta, ambigua, Hym. Thomasii* and *tegeticula* are synonymous with *panicea*. It must however, be remembered that *Hal. incerta* and *Hym. Thomasii* belong to those species, to which Bowerbank attributes two forms of oxea; if we are to regard it to be correct that they have been referred to *panicea*, it must consequently be supposed, that Bowerbank has interpreted developmental forms of the needles as special forms.

In Johnston l. c. a complete list is found of the earlier, more or less certain synonyms of the species; to this list may thus be added as probable or certain: *Spongia coalita* Müll., *Halichondria coalita* Johnston, *Halichondria sevosa* Johnston (according to Bowerbank), *Pellina semitubulosa* O. S.? *Amorphina pasiscens* O. S.?, as also the species of Bowerbank: *Halichondria caduca, incerta* and *ambigua, Hymeniacidon Thomasii* and *tegeticula*.

Locality: Halichondria panicea is a very common species in the northern and arctic seas, and we have it from Greenland: Holstensborg, Egedesminde, Godhavn; from Iceland: Reykjavik, Hvamsfjord, Seydisfjord, Faskrudsfjord, Finnefjord, as well as from station 127, north of Iceland, 66° 33' Lat. N., 20° 05' Long. W.; from the Faröe Islands: 6 miles to the N.W. of Kalso, Klaksvig, and Ejdesound. The species is found to no great depth; the greatest depth from which we have it, is 60 fathoms, which is also the greatest depth from which it is given with certainty in the literature.

Geogr. distr. The species seems to be completely cosmopolitan; it is found from the arctic seas to the Mediterranean, and is known from Ceylon, Kerguelen Island, the Torres Strait and Japan, and it was taken on the Belgian antarctic expedition between 70° and 71° 18' Lat. S. (Topsent)[1].

2. H. genitrix O. Schmidt.

Pl. IX, Fig. 2 a, b, c.

1870. *Amorphina genitrix* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet. 41, Tab. V, fig. 9.
1887. *Amorphina nodosa* Fristedt, Vega Exp. vetensk. Iakttag. IV, 423, Pl. 24, figs. 7—8.

The form most frequently roundish, more or less irregular. The surface grooved and ruffled. The dermal membrane with a somewhat irregular reticulation of spicules. Oscula spread. The spicules form no fibres. Spicula oxea falling, as to their sizes, into two rather well bounded groups, the smaller ones 0·10—0·17^{mm}, the larger 0·238—0·67^{mm}.

Under the name of *Amorphina genitrix* Schmidt l. c. established a species on a few specimens from Greenland, and these original specimens of Schmidt I have had before me. The description

[1] Topsent Arch. de Zool. Expérimentale et Générale. Notes et Revues. 1901. 1) gives the depth on which all the sponges of the expedition were taken, to be 400—569 metres; according to this *H. panicea* seems there to live at a considerable greater depth than hitherto known.

by Schmidt is very incomplete, but in giving a new description of the species I shall have chiefly to restrict myself to the needles and their forms, all the specimens being in a rather bad condition.

We have several specimens of the species. One of them mentioned by Schmidt as having Die Gestalt eines 1½ Zoll dicken, handgrossen Fladens , is a piece of a very compact, almost suberite-like consistency; it has been growing as a plate over a group of Balani. The surface is more even than in the other specimens; the spicules are closely packed in all directions, and no dermal membrane can be separated from the tissue below. We cannot, however, be sure that the specimen has kept its original skin, and consequently, when Schmidt says: mit zahlreichen, verschieden grossen Osculis , this is not certain, as the openings in the upper surface of the specimen do not appear to be naturally bounded oscula.

The other specimens of the species, of which Schmidt says: Andre gelbliche, faustgrosse Stücke haben eine krause, wabige Oberfläche, mit Osculis im Grunde der Waben , are roundish pieces of a much looser consistency than the preceding one. The specimens have a highly ruffled *surface*, which is, perhaps, only so conspicuous, because the skin is wanting, or is only left in places; but where it is left, the surface is grooved, and the grooves separated by sinuous swellings: the *dermal membrane* is only found undamaged in a smaller part of one specimen, and here it appears to have a reticulation of spicules about as in *H. panicea*, although coarser and more irregular. *Oscula* are spread and appear, as stated by Schmidt, especially in the grooves of the surface, but as to their number and size nothing can be said on account of the skin being destroyed. In spite of the difference of the specimens as to consistency their relation is seen by the fact, that all the specimens have spicules of the same form and size. In the *skeleton*, as far as I have been able to observe, no fibres are found, but the spicules are lying in the tissue in all directions. *Spicula* are the caracteristic feature of the species; they are oxea, and are exceedingly varying in length, from 0·09—0·67^{mm}. The medium sizes are the scarcest, so that the spicules may also be said to fall into two groups as to size; the smaller ones are most frequently of a length of between ca. 0·10—0·17^{mm}, the larger ones may be of a length between 0·238—0·67^{mm}, but, as has been mentioned, the distinction is not sharp. Although the smaller needles are found throughout the sponge, they seem to be most frequent in the dermal membrane and in the membranes bounding the canals; they are, however, far from exclusively forming the spiculation of these membranes, but are found between the larger needles, and seem always to be arranged more or less perpendicularly on the larger ones. The larger needles are slender, long tapering, and most frequently with a rather sharp bending in the middle; upon the whole they are formed like the needles in *H. panicea*; the smaller needles are more or less curved, and evenly, but not long tapering. That the smaller needles are not developmental forms is seen by the fact, that the thickness is about the same in the smaller and in the larger ones, about 0·01^{mm}; the smaller ones being, however, frequently somewhat thinner. On the other hand finer needles may be found, which by their length are seen to be developmental forms of the large ones. The smaller needles resemble to a certain degree the *Reniera*-needles, and this, I suppose, is the fact that Schmidt thinks of, when he writes: Die Form ist interessant, weil sie die Uebergänge der Nadeln vom Renierentypus in den der Amorphinengruppe direct zeigt . As has been correctly observed by Schmidt, monstrous forms of the needles are rather frequent in this species; especially frequent is among the smaller needles a form as fig. 2 c. Schmidt's figures, Pl. V, fig. 6, are altogether monstrous forms, while he gives no figures of the normal needles of the species.

The examination of the spicules in the *Amorphina nodosa* of Fristedt, of which I have had a little piece, has shown this species to be identical with *H. genitrix*. Its outer form, as described by Fristedt, l. c., agrees also very well with this view. In the spiculation only the smaller spicules seem generally to be a little finer than in the specimen of Schmidt, and of monstrous forms I have only seen a few. Otherwise the figure by Fristedt, especially of the smaller spicule, is not correct. It is easily understood that Fristedt has not been able to determine the species according to the description and figure by Schmidt, especially, because Schmidt, as before mentioned, only gives figures of monstrous needles. In Fristedt we get the information that the species can reach the size of a human head.

Locality. We have of this species four specimens and some fragments, all from West-Greenland; only for one specimen a more particular locality, Umanak, is given.

Geogr. distr. West-Greenland and Spitzbergen (Fristedt).

3. **H. fibrosa** Frstdt.

Pl. IX, Figs. 3 a, b, c.

1887. *Amorphina fibrosa* Fristedt, Vega Exp. vetensk. Iakttag. IV 426, Pl. 24, figs. 11—12.

Irregular, more or less roundish or incrusting masses. The dermal membrane in some places with a close reticulation of spicules, in other places the spicules closely packed. Oscula few, spread. The skeleton consists of loose fibres, not distinctly marked. The spicules oxea, falling as to size in two groups: the larger 0·35—0·59^{mm}, the smaller 0·17—0·29^{mm}.

Of this species there are in the collection some more or less roundish pieces, all fragments, and some irregular crusts growing on calcareous algæ. The best conserved specimens are of a rather firm consistency. The *skin* shows in most places a reticulation of spicules, closer, but looking coarser than in *H. panicea*; in other places the spicules are closely packed without forming any reticulation. *Oscula* are few and spread. The *pores* are found in the meshes of the dermal reticulation as in *H. panicea*.

The *skeleton* consists of loose and irregular, not sharply marked fibres, which form, at all events frequently, a very irregular and indistinct network. The skin is not, or is only in the places where a dermal reticulation is found, separable from the body itself as a dermal membrane properly so called; in the other places the outermost layer of the sponge is remarkable by the closely packed spicules; in a section perpendicular on the surface, this part appears distinctly marked off from the tissue below, and this layer, which is developed into a skin, has a thickness of ca. 0·3^{mm}.

Spicula are oxea, falling into two rather well defined groups of size, which are also of different occurrence in the sponge. The larger ones have a length of 0·35—0·59^{mm}, most frequently they are 0·47^{mm} long; they are slightly bent, almost of the same thickness throughout their length, and are evenly, but shortly pointed; their thickness is very varying, but may be rather great, up to 0·017^{mm}; a swelling is not unfrequently found in the middle or nearer to one of the ends. The smaller spicules are finer, more or less curved, and vary in length between 0·17 and 0·29^{mm}. The larger spicules form the skeleton and the dermal reticulation, while the smaller ones are found in the outermost part of the skin outside the dermal reticulation, and form, especially where no reticulation [illegible] layer in the outermost part of the skin; they are further found in the membranes th[illegible] canals and cavities, and these membranes have often chiefly these smaller spicules, whi[illegible] seem to form part of the fibres.

It is with some hesitation that I have determined this species as *H. fibrosa*, although I [illegible] had one of the original specimens of Fristedt for comparison. They agree, however, as to form and structure, the fibres have the same degree of development, and the dermal layer shows also in some places reticulation, in others closely packed spicules. The spicules also fall into two groups, but the larger ones are somewhat differing from the spicules of my specimens; they are finer, [illegible] only a thickness of 0·011mm, by which fact the difference between the smaller and larger spicules becomes less marked; further they are often more strongly and more irregularly curved, and often longer pointed; Fristedt, who does not mention two sizes of the spicules, states their length to be 0·5—0·9mm, and declares the latter length to be the more frequent; it is to be supposed that an error has taken place in the measuring, as the greatest length measured by me in the specimen of Fristedt before me, is 0·50mm; nor does the figure of Fristedt agree with what I have observed; the spicule pictured by him in fig. 11, is far too long tapering and recalls the spicule of *H. panicea*, while the spicules of the specimen sent to me, are almost altogether more shortly pointed; finally must be mentioned that spicules with a swelling are also found in the specimen of Fristedt. The smaller spicules agree in form and structure with those in my specimens. According to this I must regard my specimens as belonging to this species, and especially, as also the thickness of the large spicules appeared rather varying in my specimens.

Locality. West-Greenland; we have two glasses from an earlier time, one without any nearer locality given, the other from Proven. Later the species has been taken on Ikertokfjord, depth 30 fathoms (Th. Holm).

Geogr. distr. Like the preceding species this latter one is only known as arctic; besides in West-Greenland it has been taken in the Behring-Strait, depth 25 fathoms (Fristedt l. c.).

Note. As we have seen, these two species, *H. genitrix* and *fibrosa* belong to the group of *Halichondria*-species having spicules of two sizes; the smaller spicules here correspond to those which Bowerbank calls "*tension spicula*", and as species, in which "*tension spicula*" are different from skeleton spicules, we find in Bowerbank: *Hymeniacidon Thomasii, Brettii, fragilis,* [illegible] *Halichondria inconspicua, incerta* and *edusa*; it will, however, only by an examination of original specimens be possible to get a sure idea of these species; as has been mentioned under *H. panicea, Hymeniacidon Thomasii* and *Halichondria incerta* are perhaps synonymous with this species. Fristedt (op. cit. IV. 424) mentions a species, *Amorphina renieroides*, a piece of which I have had for examination: the spicules of this species, varying from 0·15—0·6mm, remind of the spicules in *genitrix*, but it seems to be distinguished from this species by the fact that the spicules are thicker and not so long tapering, and besides, otherwise contrary to the observations of Fristedt, considerably thicker than the small spicules of the species; it is likewise distinguished from *genitrix* by the fact mentioned by Fristedt, that the outermost spicules are more or less perpendicular on the surface.

4. **H. velamentosa** Arm. Hans.

Pl. I, Fig. 5. Pl. IX, Figs. 4—6.

1885. *Reniera velamentosa* Armauer Hansen, The Norwegian North-Atlantic Expedition XIII, 4, Tab. I, fig. 10, Tab. VI, fig. 3.

Formed as erect leaves of an irregular shape, most frequently triangular or somewhat cordate, that is to say, narrowing below and with a curved upper edge, sometimes of an irregular, very obliquely cut off and compressed calicular form. The surface rather smooth. The dermal membrane with a spiculation of irregularly spread spicules forming here and there an irregular net. Oscula numerous, small, chiefly confined to one side. The skeleton consists of fibres, forming an irregular network, longitudinal fibres are especially conspicuous. Spicula oxea 0·58—0·8^{mm}.

This sponge is formed as lamellæ of different forms and thicknesses. Most frequently the form is somewhat triangular with a curved upper edge and the sides converging downwards; they seem to have been attached by the lower part, but here they have been broken off. The largest of the specimens, whose form is irregular, has a height of 16^{cm}, a breadth of 14^{cm}, and a thickness of ca. 4^{cm}. Besides the more or less regularly formed lamellæ, there are found in the material some fragments, a few of which seem to suggest that the lamellæ may be drawn out to a stalk downward. Two of the least damaged specimens are of an irregular, very obliquely cut off and compressed calicular form, and have certainly had a short stalk; this form is, perhaps, the normal form of the sponge. These two specimens have a height of 9—10^{cm}, a breadth of 8—9^{cm}, and the wall has a thickness of 1·5—2^{cm}. The *surface* is rather smooth, but has more or less conspicuous, irregular folds and swellings. The colour (in spirit) is dirtily grayish brown or brown. The *dermal membrane* is easily separable from the tissue below, and is provided with a rather close spiculation of irregularly spread spicules forming, however, here and there an irregular net. *Oscula* are present in great numbers, they are small, round or oval, of a size of from ca. 2·2^{mm} down to 0·5^{mm}. Most frequently the dermal membrane surrounds the oscular aperture as a little, higher or lower cone; in some places oscula are close-set in groups, in other places spread. The *pores* are situated in the dermal membrane in the intervals between the spicules, sometimes very close-set; their measured sizes vary between 0·023—0·17^{mm}. As in many leafshaped sponges, oscula seem also here to be found chiefly on one side of the sponge, and the pores on the other, but this feature is, however, far from being strictly carried through; on the side chiefly provided with pores, groups of oscula and spread oscula may be found, and on the other hand a few pores may be seen on the oscular side.

The fibres of the *skeleton* are rather well marked, and form an irregular network; longitudinal fibres are especially marked, and may reach a considerable thickness and firmness.

Spicula are oxea, they are evenly and rather gradually tapering, but not to so high a degree as in *H. panicea*; they are slightly curved or more rarely straight; the length varies between 0·58—0·8^{mm}, but is most frequently ca. 0·75^{mm} with a thickness of 0·017^{mm}. Shorter and finer oxea are only seen singly. A few styli are found, which seem especially to occur in the dermal membrane; in this strongyla may also be found quite singly.

As I have had a piece of one of the specimens of Armauer Hansen, I have been able to determine the species with certainty; without a comparison with an original specimen [illegible] would have been impossible, as the descriptions, as well with regard to this species as to the other species established by Armauer Hansen, are exceedingly short, and the figures of the spicules are incorrect and not to be recognised.

Locality. From stations 53, 95, and 96 we have some rather well preserved specimens; from stations 21, 27, 28, 104, 106, and 128 we have only fragments, and from the three stations last mentioned these fragments are so small and damaged, that the only point of support for the determination is the spicules, which, however, agree completely with those of the other specimens. The depths on which the specimens have been taken, vary between 303 and 1330 fathoms; the whole specimens are from a depth of ca. 700 fathoms. The above mentioned stations are situated: in the Davis Strait (27 and 28), south of Greenland (21), in the Denmark Strait (95 and 96), north of Iceland (128), and east of Iceland (53, 104, 106).

Geogr. distr. The species has been taken, besides by the Ingolf-expedition, at the northern coast of Norway, depth 271 metres (The Norwegian North-Atlantic Expedition).

5. H. osculum n. sp.

Pl. III, Figs. 3—7. Pl. IX, Figs. 7—[illegible].

The form somewhat varying, but always erect and more or less compressed. The surface rather smooth. The dermal membrane with an irregular, large-meshed net of spicules. Only one osculum is found, formed like a spout; it may be found near the top or more or less far down the side, and sometimes on a special projection. The skeleton consists of an irregular network of loose fibres and here and there spread needles. Spicula oxea 0·6—0·92 mm.

This sponge has an erect, more or less compressed form, which may however be somewhat varying. The height of the specimens in hand is about 35 mm. The colour (in spirit) is light brownish gray or yellowish gray. The *surface* is smooth, but on account of the dermal skeleton it has a wrinkled or coarsely reticular appearance. The *dermal membrane* may as a thin, transparent membrane be separated from the tissue below, and is provided with an irregular net of spicules with comparatively large meshes. With regard to *osculum* this species is rather interesting, each specimen having only one osculum, which may be situated in a somewhat different way, close to the summit of the sponge or farther down the side, and sometimes it is found on a special projection, which is in one specimen a side-branch[1]. This osculum has a form about as a conical spout formed by the dermal membrane, and the dermal needles are here arranged in a parallel way with one end turned to the oscular opening; from here they radiate into the skin, and pass by degrees into the dermal reticulation. Sometimes the osculum is only found with difficulty, as it is situated in a depression. The oscular opening leads into a kind of oscular tube, stretching as a hollow through the whole sponge or the greater part of it; in this hollow the openings of the canals are found; they are [illegible] and have a diameter of ca. 0·1—1·5 mm. Round these openings the spicules of the membrane covering the hollow, are grouped as a coarse network. The inner hollow is often [illegible]

[1] In this specimen (Pl. III, fig. 6), the upper end [illegible] osculum

in the region of the osculum lying so near the surface, that the wall is here reduced to a thin, transparent membrane; this is especially the case, when the osculum is situated on the side of the sponge, and then this part is often formed like a groove, and in this groove the osculum may be more or less retired. The *pores* are lying in the meshes of the dermal reticulation; they do not seem to be numerous, and are very small, ca. 0.02^{mm}.

The *skeleton* consists of a rather dense, but irregular network of loose or not sharply marked fibres or bundles of spicules, and in some places it seems to be only formed by irregular spread spicules; most frequently the fibres or bundles contain many spicules. The dermal skeleton, as has been mentioned, consists of an irregular and large-meshed net of spicules, and a similar one is found in the membrane lining the inner hollow.

Spicula are slender oxea, slightly curved in the middle; they decrease in thickness from the middle towards the ends, and are long and finely tapering; thus they, as to their form, resemble the needles of *Halichondria panicea*, but they are longer than is common in this species, and most frequently their curve is hardly so sharp. The length varies from 0.6^{mm} up to 0.92^{mm}, but in by far the most cases it is 0.78^{mm}, the breadth is about 0.017^{mm}; shorter and finer spicules are only very rarely seen.

Locality. Of this interesting species, which, though somewhat varying in form, is well characterized by its single, spout-shaped osculum and the structure of this organ, the Ingolf-expedition has taken ca. 15 specimens, station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms; we have further a couple of specimens, taken by the East-Greenland expedition 1891—92 at the south end of Jameson's Land, depth 10—60 fathoms. Thus the species has hitherto been taken in the Davis Strait and at the eastern coast of Greenland.

H. oblonga Arm. Hans.

Pl. II, Fig. 4. Pl. IX, Fig. 10.

1885. *Reniera oblonga* Armauer Hansen, The Norwegian North-Atlantic Expedition XIII, 4, Tab. II, fig. 5 A, Tab. VI, fig. 2.

Erect, more or less cylindrical. The surface grooved on account of the projecting ends of the fibres. Oscula spread. The dermal membrane thin, without spicules, pierced by the ends of the fibres. The skeleton consists of fibres forming an irregular network. A small amount of spongin present. Spicula oxea, rather thick, and shortly and abruptly pointed, the length $0.41—0.447^{mm}$.

Of this species we have four specimens, all rather cylindrical, of a length of $3.3—4^{cm}$ and a diameter of 10—14^{mm}; they are, however, all broken off at the lower end; one specimen seems to have divided into two branches above; according to this the typical form of the sponge seems to be cylindrical, erect, unbranched or with a few branches. The colour (in spirit) is light yellowish or brownish gray. The *surface* is uneven and grooved, and the ends of the fibres project. The *dermal membrane* that is supported by the ends of the fibres, is exceedingly thin and transparent, and contains no spicules; the examination of it is difficult, as it contracts when torn off. *Oscula* are rather numerous, spread on the surface, of a diameter of ca. 1^{mm}, but somewhat varying in size. On account of the difficulty attending the examination of the dermal membrane, I have not with certainty seen any *pores*.

As mentioned above, no particular dermal skeleton is found, but the dermal membrane is supported by the ends of the fibres. Otherwise the *skeleton* consists of an irregular network of loose fibres; most frequently the fibres have a thickness of 3—5 spicules; sometimes they contain still more spicules. The system of canals is very strongly developed, and therefore the soft tissues are scarce in proportion to the skeleton, and of spread spicules outside the fibres as good as none are found. Here and there the ends of the spicules are seen to be cemented by a very scarce and completely clear mass of spongin, which is, however, only observed with difficulty on account of its clearness and the small amount of it.

Spicula are comparatively thick, somewhat curved oxea; they are almost of equal thickness in their whole length, are abruptly pointed, and the point is bounded by rather straight lines, so that they approach tornotes in form. The bending may be more or less pronounced, but they are rarely straight; most frequently the bending makes an even curve, sometimes, however, it is rather sharp. The size of the spicules is very constant; the length is between 0·41—0·417^{mm}; they may be a little shorter, and may also reach a length of up to 0·52^{mm}, in one specimen especially they often reach a length of 0·5^{mm}. The thickness most frequently is 0·023^{mm}, but may also be a little less. Spicules being to a considerable degree shorter and finer than those mentioned, are very scarce.

As I have had before me one of the specimens of Armauer Hansen, I have been able to determine the species with certainty; the specimens of Armauer Hansen are somewhat larger than those described above; they have a height of 5^{cm}, and a diameter of ca. 2·5^{cm}, as may also be seen from the habit-figure cited (Pl. VI, fig. 2), but otherwise they are of the same form; the specimen I have seen, was likewise broken off at the base.

Locality. Of this species we have three specimens from East-Greenland, obtained by the East-Greenland expedition 1891—92 in the following places: 72°24' Lat. N., 19°42' Long. W., depth ca. 130 fathoms, two specimens; the south-end of Jameson's Land, depth 10—60 fathoms, one specimen, and further one specimen, taken on 63°15' Lat. N., 9°35' Long. W., depth 270 fathoms (Wandel).

Geogr. distr. East-Greenland and west of the Faröe Islands; with regard to the specimens of the Norwegian North-Atlantic expedition the station is unknown.

On station 85, 63°21' Lat. N., 25°21' Long. W., depth 170 fathoms, station 89, 64°45' Lat. N., 27°20' Long. W., depth 310 fathoms, and station 97, 65°28' Lat. N., 27°39' Long. W., depth 450 fathoms, the Ingolf expedition has taken some fragments and a little specimen, which, I think, must be referred to this species. The whole specimen has a height of ca. 20^{mm}, and also the fragments seem to have belonged to small specimens. As to outer form and skeletal structure they agree completely with the typical specimens, and also the form of the spicules is the same; on the other hand the spicules of these specimens are a little smaller, the length varying from 0·30^{mm} quite down to 0·208^{mm}, while the thickness is about 0·014^{mm}. In spite of this rather considerable difference in the size of the spicules, I feel obliged to refer the specimens to this species, as the other structures show no difference, and we also in the typical specimens may find spicules of a length not exceeding 0·30^{mm}.

One specimen has further been taken at station 64, 62°06' Lat. N., 19°00' Long. W., which I must also refer to this species. It is of a similar size as that of the typical specimens, but is irregularly flattened; in all other respects it is of quite the same structure, only the skin is somewhat incrusted [illegible] than [illegible] be found in the other specimens. The dermal membrane is [illegible] the [illegible] better preserved than in the other specimens, and therefore I [illegible] pores which are found to be spread and were measured to a diameter of [illegible]. The membrane is otherwise thin, transparent and contracts when torn off as in the other specimens. The principal difference is that the spicules have an average length of [illegible] and thickness of [illegible], or a little thinner, and thus they are a little longer and thinner than in the typical form. As the spicules in other respects are quite the same, the specimen must likely [illegible] the species; the spicules in one of the typical specimens, as we have seen already, [illegible] tendency to be a little longer and thinner. The specimen is from a considerably greater depth than the others from our stations.

This species belongs to those *Halichoclona*-species most closely allied to the *Reniera*; the feature of the skeleton that the ends of the fibres project through the dermal membrane is a particular character of most of the *Reniera*-species, and also the presence of spongin or a spongin-like substance as well as the form of the spicules point to the *Reniera*. The species must however on account of the [illegible] irregular skeleton, only consisting of polyspicular fibres, be referred to the genus *Halichoclona*.

Remarks. In Grönland-Expedition der Gesellsch. für Erdkunde zu Berlin II [illegible] Vanhöffen mentions a species by the name of *Pachychalina* [illegible] Arm. Hans., and thus he is of opinion that the *Reniera* [illegible] of Armauer Hansen is a *Pachychalina*; as will have appeared from the preceding description the *Reniera* [illegible] Arm. Hans. is a *Halichoclona*, and the species mentioned by Vanhöffen is not identical with *Halichoclona* [illegible] H., but is a *Reniera* (see p. [illegible]).

[illegible] H. tenuiderma n. sp.

Pl. [illegible] Figs. [illegible]

[illegible]

[illegible]

[illegible]

We have this species in only one specimen; [illegible] cushion-shaped and attached to a fragment of a shell of a *Buccinum*. It has a greatest length of [illegible] and reaches to a thickness of [illegible]. The [illegible] is greyish white, the consistency is tolerably firm. The surface is finely spinulous [illegible] the projecting ends of the fibres. The *dermal membrane* is a thin, transparent membrane [illegible] by the ends of the fibres projecting through it. In this membrane [illegible] are found, which are [illegible]; they have a diameter of up to [illegible] on the other hand have not been observed.

The [illegible] open and irregular network, especially it is irregular in the deeper [illegible] the surface it shows distinct primary fibres running more or less [illegible] these fibres are polyspicular, but with few spicules in [illegible]. While these fibres are distinct and rather regular, the transverse [illegible] spicules found singly and without any regular position, but irregularly [illegible] irregular. No spongin has been observed.

Spicula are slightly curved or, rarely, straight oxea, with very evenly, but not exactly, long tapering ends. The length varies from 0·33–0·43mm, but appears to be most frequently towards 0·4. The thickness is quite constant 0·013–0·0157mm. Shorter and finer spicules are seen quite singly.

Locality: Station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms, one specimen.

On account of its distinct primary fibres that support a dermal membrane without spicules, this species like the preceding one belongs to those species of *Halichondria* approaching the *Reniera*.

8. H. colossea n. sp.

Pl. III, Figs. 1–2, Pl. X, Figs. 3–7.

Of an irregular calicular, somewhat compressed form. The surface of the outside of the sponge mostly smooth, but the upper surface and that of the calicular cavity shaggy from projecting spicules. The skin provided with closely packed spicules of the smaller form, running parallel to the surface; where the skin is shaggy, this layer is pierced by projecting large spicules. Oscula are found in the calicular cavity. The skeleton consists of closely packed needles, and is without fibres; consequently the consistency is firm and hard. Spicula oxea varying in length from 0·14mm to about 2mm; they divide into two, not sharply distinct, groups of sizes, of which the smaller are found in the skin and on the membranes of the canals.

The only specimen in hand of this species is very large and of an irregular, somewhat compressed calicular form. To be sure it cannot be decided with certainty, by which part the sponge has been attached; but probably the calicular cavity has been turned upward, and the sponge has been attached by the opposite part. The specimen has a height of 30cm, a length of 50cm, and a breadth of 25cm. The cavity has a depth of about 14cm and a breadth of about 8cm, and, as shown by the picture, pl. III, fig. 1, is lying somewhat in one side of the sponge. The *surface* has irregular, flat depressions and folds, but on the outside of the sponge it is otherwise mostly rather smooth; on the upper side and in the calicular hollow, on the other hand, it is provided with projecting spicules, so that here it appears shaggy. The colour (in spirit) is gray-brown. On account of the needles that are closely packed throughout the sponge, the consistency is firm and hard. The *dermal membrane* is only with difficulty to be separated from the tissue below; it is provided with closelying spicules parallel to the surface. *Oscula* are found in the calicular cavity; they are rather large and very irregular, the larger part of the walls and bottom of the cavity being occupied by oscula and by the folds between them, and they pass so gradually into the wide canals, that no distinct boundary is to be found between osculum and canal; strictly speaking the cavity is a large groove, divided into smaller ones passing at last into the system of canals. Also outside of the calicular cavity smaller depressions with oscula may be found on the upper surface. In spite of an examination of several stained pieces of the dermal membrane, no pores have been found; on account of the dense spiculation of the membrane they are perhaps only found in particular places.

The *skeleton* consists of an exceedingly dense tissue of needles lying without any order among each other in every direction. The dermal membrane is provided with a very dense spiculation, the needles lying side by side in every direction parallel to the surface, but in such a way, that they are situated in groups in which the spicules are parallel to each other (pl. X, fig. 3). These spicules are all small, up to a length of 0.47^{mm}, and thus they belong to the smaller of the spicules occurring in the sponge. The skeleton consists otherwise of large and small spicules lying without any order among each other in every direction, and very closely packed. No fibres are found. The spicules are most closely packed towards the surface, which is, accordingly, very hard. Where the surface is smooth, the large spicules inside of the dermal membrane are seen, in a section perpendicular on the surface, to be arranged chiefly parallel to this (pl. X, fig. 6); where, on the other hand, the surface is shaggy from the projecting spicules, the section shows these, which are all large, to be arranged more or less perpendicularly on the surface and piercing the dermal layer of small spicules also present here (pl. X, fig. 7). The system of canals is lined by a membrane, provided with spicules of the same size as those of the dermal membrane, but they are not here so closely packed (pl. X, fig. 5). When the dermal membrane is examined over the edges of the oscular openings down into the canals, all degrees between the more or less close packing of the needles are found, the spicules in the membrane becoming more and more spread. The larger canals are comparatively few, and their chief direction seems to be perpendicular through the sponge from the supposed base to the oscular openings of the upper surface.

Spicula are oxea, slightly curved in the middle and exceedingly long and evenly tapering from the very middle to the ends; their sizes are exceedingly varying, from 0.14—2.02^{mm}. The middle sizes are scarce, and thus the spicules convey the impression of occuring in two groups of sizes. In the smaller ones the bending is not so distinctly in the middle as in the larger, but they are more evenly curved.

Thus the way in which the spicules occur in the sponge, is in this species about the same as in *H. genitrix*, the small oxea partly occuring throughout the tissue, partly forming the spiculation of the dermal membrane and the membranes of the canals; but contrary to the case in *H. genitrix*, the spiculation of these membranes is here exclusively formed by the smaller oxea without any admixture of the larger ones.

Topsent (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 66, pl. IX, fig. 3) describes a new species, *H. pachastrelloides*, which, as to the form and varying in length of the spicules as well as the firm consistency, agrees with the present species, but the largest length of the spicules is stated to be 1.4^{mm}, and the common length 0.93^{mm}. The species of which only one specimen is known, grew incrusting on a stone. On account of the stated difference in the size of the spicules and the fact, that Topsent does not at all mention that the smaller spicules form an outermost dermal layer, the present species must be different from *pachastrelloides*, although it is surely nearly allied to it.

Locality: Station 90, 64° 45' Lat. N., 29° 06' Long. W., depth 568 fathoms, only one specimen.

9. **Halichondria? difficilis** n. sp.

Pl. II, Fig. 7, Pl. X, Fig. 8.

Of a very irregular, most frequently tuberous or lobate form. The surface smooth. The outermost layer forming a dermal layer with closely packed spicules more or less parallel to the surface. The skeleton consists of irregularly spread needles, not closely set. Fibres are not formed. In the skeleton is found incrusted a great number of extraneous bodies. Spicula oxea 0.06—0.37^{mm}.

This species is of a very irregularly lumpy or lobate form; deep grooves or narrows may be found, and projecting lobes seem sometimes to coalesce, so that narrow hollows may arise, stretching far into the sponge. The largest specimen has a length of ca. 11^{cm} and a breadth of $8{\cdot}5^{cm}$, the smallest specimen that is of a roundish form, is ca. 4^{cm} long by a breadth of hardly 3^{cm}. Among the smaller specimens one is of a depressed form with irregular deep furrows in the edges, another is formed like a rather long staff, strongly and irregularly curved, of a length of about 7^{cm}. Whether the sponge has been attached or not, is not to be decided with certainty from the specimens in hand; most of them, to be sure, are somewhat damaged, pieces being broken off, and thus they might be supposed to have been broken off at the place of attachment; most things, however, favours the belief that the sponge has not been attached, or only loosely stuck into the bottom; neither is the upper or lower surface to be decided. The colour (in spirit) varies from dirtily dark gray or bluish gray to black violet; in the interior it is dirtily gray. Such is the colour in most specimens, but in a couple of instances it is differing; thus one specimen is grayish white, but has distinct remnants of the violet colour, and another is brown gray. Whether the more or less black violet colour is the original self-colour of the sponge, or it is due to the fact that the colour has altered in the spirit, or the sponge has been discoloured by lying in spirit together with other sponges, is now hardly to be decided. That it is the original colour of the sponge is indicated by the fact that it is most strongly pronounced in all the furrows and grooves, where the surface has not been exposed to being scraped. If in such places we cut off a thin layer of the skin and examine it under the microscope, we shall see, above the dense layer of spicules of the skin, remnants of a violet-coloured, exceedingly thin and transparent membrane, mostly wanting in the places where the colour is less pronounced; these remnants probably are remnants of the epidermis of the sponge. The consistency is rather firm, fleshy and somewhat elastic. The *surface*, as has been mentioned, shows some larger and smaller grooves and folds, but is otherwise smooth. The outermost layer of the sponge is marked off as a *dermal layer* of a thickness of ca. $0{\cdot}2^{mm}$; this layer has its origin from the fact that the spicules here are closely packed; they are lying in all directions, often, however, in such a way, that they are arranged somewhat like bundles, the spicules of which are parallel to each other; in some places this disposition may pass into a partly band-shaped arrangement; the spicules are chiefly arranged parallel to the surface, only a smaller number are placed obliquely or perpendicularly on the surface; sometimes, however, some projecting spicules may be found, but that, perhaps, is due to the contraction of the skin. *Oscula* have not been observed in the specimens in hand. The *pores* seem in most places to be rather scarce, only here and there they are seen more closely gathered in greater numbers; in such places the spicules in the skin may show a coarse, net-like arrangement, which, however, is only seen under the microscope. The sizes of the pores have been measured from $0{\cdot}03$–$0{\cdot}51^{mm}$; often they do not go perpendicularly through the skin, but more or less obliquely, and consequently they are easily overlooked, when the skin is examined from above; they continue as fine canals without any formation of larger sub-dermal cavities, but some of them may branch off under the skin as horizontal canals. If a piece of the dermal layer is cut off and examined under the microscope from the inside, a rather large number of canals are seen to be cut through, when in such a case no pores are seen by an examination of the outside of the piece, the fact is, I suppose, that they are closed, or they cannot be seen on account of their oblique direction. The mentioned canals vary in size up to ca. 0·5mm. As separate oscula are not seen, we have here probably both the incurrent and the excurrent systems of canals, so that the larger canals and pores are the excurrent ones.

The *skeleton*. Besides the above mentioned closely packed layer of spicules found in the dermal layer, the skeleton consists of spicules spread through the tissue in all directions without any order, or sometimes arranged somewhat like bundles; here and there they may be gathered into larger numbers forming something like fibres; where they are spread in the tissue, they are not close packed, for instance not nearly so close as in *H. colossea*. The membranes lining the canals, have no spicules. Besides the skeleton constructed as above described, elements are found, which certainly bear a prominent part as skeleton, the species receiving to a high degree extraneous bodies, chiefly Foraminifera and especially sponge-spicules. Thus I have found needles of Desmacidonids, Suberitids, and of several Tetractinellids, as well as pieces of skeletons of Hexactinellids[1]; they may be present in so great numbers as quite to disguise the real skeleton of the sponge.

Spicula are oxea; they are slightly curved or straight, and long tapering; a few oxea may show a swelling in the middle, and this peculiarity seems to be more frequent in some specimens than in others. The spicules are very much varying in length, from 0·37mm down to 0·06mm, the thickness varies from 0·004mm in the smallest ones to 0·008mm, in a few specimens up to 0·010mm; the thickness is generally proportionate with the length; in the shorter spicules the tapering is comparatively shorter than in the longer ones. Whether the short needles are developmental forms of the long cannot be decided with certainty, but it would seem rather probable with regard to some of them, and the very few spicules that were finer than the given measures, belonged also to the short ones; some of the short spicules, however, and especially the very shortest ones are scarcely developmental forms, to judge by the proportion between length and thickness.

This sponge shows a peculiar tissue of a vesicular structure; it consists of round, more rarely a little oval cells, lying close together with a comparatively slight intercellular substance. The cells have an average size of ca. 0·01mm. They stain rather slightly in fuchsine, and frequently show a little, more strongly stained calotte in one side, where perhaps the nucleus is found. It is no doubt a consequence of this structure of the tissue, that the sponge by drying up contracts very strongly to an unrecognisable mass, almost as hard as bone. Also the specimens kept in spirit convey, especially on account of their dermal layer being in many places wrinkled and folded, an impression of being somewhat contracted.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, four specimens and some fragments; station 90, 64° 45′ Lat. N., 29° 06′ Long. W., depth 568 fathoms, two smaller specimens.

Note. I have not thought it justifiable with certainty to refer this species to the genus *Halichondria*, to which genus it would have to be referred by its spiculation and skeletal structure. It is no doubt very closely allied to *Halichondria nigrocutis* Cart. (*Amorphina* Carter, Ann. Mag. Nat. Hist. 1886, Ser. V, vol. XVII, 50, 2. — *Halichondria?* Dendy, Proceed. Roy. Soc. Vict. 1895, vol. VII, 239)

[1] Both the stations, 78 and 90, on which the species was taken, gave exceedingly rich earnings of sponges, especially many Tetractinellids, among which accordingly the species must have grown.

from South-Australia; the spicules of this species are said by Carter to divide into two groups of a length of respectively 0·1—0·13^{mm} and 0·358^{mm}, and a thickness of 0·006^{mm}; these measures, as we have seen, agree very well with those of the spicules of the present species; the only difference is that the spicules are said to divide into two groups, of which the smaller one should be chiefly found in the skin, while in the present species spicules of all intervening sizes are found, and the smaller ones sure enough may be found in the skin, but are not chiefly found there. Dendy describes the skin as provided with „a dense feltwork of .... oxea", that may be arranged in a netlike manner on account of the pores, that is to say, a structure quite resembling that of the present species, with which, moreover, the description agrees exactly. When Dendy l. c. supposes *H. nigrocutis* to be allied with certain of the *Stellettinopsis*-species described by Carter, it seems to me to be quite justified, which is also the case with regard to the present species[1]. On the other hand the species seems to be allied to *Halichondria colossea* and the species most closely allied to this latter one. Therefore the possibility of a relationship between *Halichondria* and the Tetractinellids through *Halichondria-Stellettinopsis* (*Coppatias* Sollas), supposed by Sollas (Challeng. Report, Vol. XXV, Tetractinellida, 208), as also mentioned by Dendy, l. c., might be of some probability.

Eumastia O. Schmidt.

From an attached, thinner or thicker basal part comparatively slender papillæ rise. The skeleton consists of loose, irregular fibres and spread needles. The needles slender, long tapering oxea.

1. E. sitiens O. Schmidt.

Pl. IV, Figs. 1—6. Pl. X, Figs. 9—12.

1870. *Eumastia sitiens* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet. 42, Pl. V, fig. 12.
1887. — — Fristedt, Vega Exp. vetensk. Iakttag. IV, 426, Pl. 24, fig. 13, Pl. 27, fig. 11.
1896. — — Lambe, Sponges from the Atlant. Coast of Canada. Transact. Roy. Soc. Canada, Ser. 2, II, Sect. IV, 182, Pl. I, fig. 1.

The form different, often more or less irregular. From the attached basis rise close-standing, slender, unbranched or slightly branched papillæ, some of which bear oscula. The surface smooth. The dermal membrane is on the papillæ provided with a reticulation of spicules. The skeleton consists of loose fibres and numerous spread spicules. Spicula slender, long tapering oxea ca. [illegible]^{mm}.

This species has a rather constant form; the nethermost part is expanded on the substratum, and from this part slender, close-standing papillæ rise. In its most regular form it is of almost equal extent in all directions, but it may also be more expanded and become somewhat more irregular, and the comparative development of the lower part and the papillæ may also be somewhat different. The largest specimen has a largest extent of ca. 15^{cm}. The other specimens vary in size from ca. 2[illegible] to ca. 7^{cm}. All the specimens have been attached; the largest one has grown round the stalk and root of a Laminaria; most of the others are either attached to shells of Pecten and living specimens of Pecten (*Pecten islandicus* Müll.) or on Balanoids; a single one is attached to an old anchor. The

[1] By the boiling of the spicules of this species, I have in several instances found asters. I regard it, however, to be quite sure, that these asters that have only been found quite singly, are extraneous bodies.

papillæ are more or less close-standing, always, however, rather close; they are slender and slightly conical, decreasing in thickness upward, and they are unbranched or slightly branched. They may otherwise be rather different with regard to length and thickness, and there may be some difference in individual specimens. The papillæ are stubby at the summit and apparently closed, or they may be tapering and show an osculum. The colour (in spirit) is white and somewhat transparent, in some specimens with a slight yellowish red tint. In the middle of the transparent papillæ is seen an opaque whitish part. The consistency, especially in the lower part of the sponge, is rather firm. The *surface* is smooth, without projecting spicules. The *dermal membrane* is thin and transparent, but rather solid, and may easily be torn off to some extent; it is provided with spicules forming in the upper part of the sponge and especially in the papillæ a beautiful reticulation of fibres. The reticulation may, with regard to the width of the meshes, be somewhat different in different individuals. Towards the base of the sponge the reticulation disappears most frequently, and passes into another arrangement of the spicules, which are here lying close-packed in all directions in several layers, but parallel to the surface. In the papillæ the meshes are of the largest size, and here some of the fibres of the dermal reticulation have a marked longitudinal direction. The *pores* are found in the meshes of the dermal reticulation, often so close as to reduce the membrane to a network. The sizes of the pores are measured from 0·02—0·1^{mm}. They are chiefly found on the papillæ, and here very close, but they are also numerous on the other parts of the surface of the sponge, where nets of spicules are found in the skin; on the other hand they are wanting or only found in very small numbers on the lower part of the sponge where the spicules of the skin is close-packed. In the specimens examined they appeared to be largest on the papillæ, and to become smaller lower down, and the few pores found, where no reticulation was present, were very small. *Oscula* are found in the ends of some of the papillæ; then these papillæ are conically tapering, and the spicules are here arranged parallel to the longitudinal axis of the papilla and close together, and thus one of their ends is turned towards the oscular opening.

The structure of the papillæ. The structure of the papillæ of this species has never been exactly examined. Schmidt, however, mentions that they are hollow and thin-walled, and that a fibre goes from the skeleton into each papilla, in which it radiates in an irregular way. Fristedt says that the inner structure is very characteristic, but does not enter into further details as to these characteristic features. The papillæ are of two different kinds: pore papillæ, and oscular papillæ. Commonly they may already be distinguished by their outer appearance; the pore papillæ, at all events their upper parts, are more slender and rounded at the top. Through their middle stretches a powerful fibre from the skeleton, from which pillars branch off to the network of the skin, supporting the skin; the hollow of these papillæ is a continuation of the subdermal cavities spread over the whole surface, and the papillæ are abundantly provided with pores leading into the hollow. The oscular papillæ most frequently are somewhat thicker than the pore papillæ, and at the top they are, as has been mentioned, conically tapering, and end here with an osculum; and in this tapering part the spicules are lying close together parallel to each other and with one end turned towards the oscular opening. The papilla is hollow and thin-walled; also here a fibre from the skeleton stretches up into it, but this fibre runs along the wall, and most frequently it disappears in the uppermost part of the papilla. If the wall is examined, it is found to be abundantly provided with pores, and so it would be an obvious conclusion that these pores are leading directly into the oscular canal. A closer examination shows, however, that the oscular papilla is double-walled, or, in other terms, that the subdermal cavities continue over the oscular papillæ. These subdermal cavities are oftenest narrow, so that the wall without any closer examination may convey the impression of being single. Where the fibre passes into the oscular papilla the subdermal cavities are somewhat wider, and the fibre runs in the partition-wall between the oscular canal and the subdermal cavity, so that in a transverse section the large oscular canal is seen with some smaller cavities around it, which are subdermal cavities; sometimes these cavities are so large, that it cannot be seen immediately in the section, which of the cavities is the oscular canal; generally, however, the oscular canal is seen in the transverse section to be lying at one side and the subdermal cavities at the other, and to be arranged in such a way, that the outer wall and the partition-wall form two excentric rings, one within the other (Pl. X, fig. 10). The partition-wall is a thin, transparent membrane, not as the dermal membrane provided with a network, but supported by branches that from the fibre bend regularly into it; besides a few spicules are found spread in it. I have not been able to decide with certainty, whether the oscular papilla is always double-walled through its whole extent, that is to say, whether the subdermal cavities stretch quite round the oscular papilla, and perhaps some difference may be found in different papillæ with regard to this feature; if they go quite round, they are at all events most frequently very narrow on the side of the papilla opposite to the fibre. Besides the structure as here described, which is the plainest form, complications may occur; thus the pore-papilla and the oscular papilla may be united into one papilla, so that one osculum or a couple of oscula may be found more or less far down the side of the pore papilla; this fact alters nothing in the inner structure of the papilla, and otherwise the relation between the oscular canal and the subdermal cavities may be somewhat varying. It would seem that more or less complete partition-walls may also be found in the pore papillæ, and finally the possibility is not excluded that in many of the papillæ appearing as pore papillæ, an excurrent canal may be found, although for the present there is no visible or functionating osculum.

The *skeleton.* Besides the dermal skeleton and the skeleton of the papillæ mentioned above, the other skeleton of the sponge consists of some loose fibres and between these numerous and rather close-set spicules, lying in every direction without any order; the fibres have a somewhat irregular course, but chiefly they run from the base towards the surface; all the larger canals have the same direction. The fibres may in some places be closer than in others, and be gathered almost as bundles; they are rather thin, their thickness not exceeding 0·09^{mm}, while the fibres of the papillæ may have a thickness of up to 1·5^{mm}.

Spicula are oxea; they are very long tapering, almost from the very middle, and most frequently they are slightly curved; the curve may be even, but is often a more or less sharp bend in the middle, so that the spicules are quite like those of *Halichondria panicea*, but they reach a considerably greater length than is common in this species. The length varies from ca. 0·36—0·8^{mm}, the thickness, which is not always largest in the longest spicules, varies from 0·011—0·018^{mm}. Otherwise the size may vary somewhat in different individuals; thus in one of the specimens in hand (the largest one) the spicules reach a length of up to 1·07^{mm}, and a largest thickness of 0·02^{mm}. Shorter and finer, to quite fine spicules, developmental forms, may be found; but it is, on account of the varying of the spicules as to length and thickness, not always possible with certainty to determine the boundary between developmental forms and fully developed oxea.

In an individual of this species, from Egedesminde, were found a rather great number of a little Amphipod (*Aristias tumidus* Kr.) sitting in the oscular papillæ and most frequently at the very point, projecting with half their bodies through the oscular opening.

Locality: Djupivogur at the eastern coast of Iceland, depth 8 fathoms (H. Jónsson); Seydisfjord, depth ca. 30 fathoms (A. C. Johansen); Stykkisholm, depth 20—30 fathoms (H. Jónsson); the Davis Strait, depth 100 fathoms (Holm); Julianehaab, depth 24 fathoms (A. Jessen); Holstensborg (Traustedt); Egedesminde, depth 70—90 fathoms; Umanak, depth 50 fathoms (Moldrup, director of the colony), about 18 specimens in all.

Geogr. distr. West-Greenland (Ingegerd and Gladan, Fristedt l. c.); Gulf of St. Lawrence and the south coast of Nova Scotia, in some places on depths of ca. 48 fathoms (Lambe l. c.); Pitlekai in the Tschuktsch peninsula; the Bering Sea 65° 10′ Lat. N., 169° 50′ Long. W., depth 25 fathoms (Fristedt l. c.). When the localities from which I have had the species, are included, it is seen to be spread from ca. 10° to ca. 180° Long. W., and it proves to be a northern species, as most of the localities are found north of about 64° Lat. N.; about here the southern boundary might be put; but at the eastern coast of America it goes down to ca. 40° 30′ Lat. N.; that it is here found so far southward, I take to be due to the Polar current, which just at this place runs down to the south of Nova Scotia. With regard to the bathymetrical distribution it has been taken on depths from 8—100 fathoms.

Of the genus *Eumastia* only two species have hitherto been described, viz. besides the present species *Eumastia schmidtii* Dendy (Proceed. of the Roy. Soc. Victoria VII, 1895, 240) from Victoria. According to the descriptions it seems to be very nearly allied to *E. sitiens*, from which it is distinguished by having smaller spicules, only 0·4mm long, and by the surface being provided with projecting spicules. — The genus is very nearly allied to *Halichondria*, and is chiefly distinguished from this genus only by the papillæ. Schmidt had also some misgivings with regard to the establishing of the genus, and he says that an examination of a greater material might possibly show it to be identical with *Halichondria* (*Pellina* Schmidt). This conjecture, however, has not been borne out by the facts, and as now, moreover, one more species of the genus is known, it seems, at all events from a practical point of view, at present to be better to keep it. The species of *Halichondria*, to which *Eumastia* is most nearly allied, seems to be the *H. osculum* described above.

Reniera Nardo.

The form may be very much varying: the typical form is crust- or cushion-shaped and provided with more or fewer, higher or lower oscular tubes; but the species may also be tubular, leaf-shaped, or quite irregular. The skeleton consists of a more or less regular, most frequently rectangular, sometimes triangular network. The fibres are typically unispicular, but may also often have a thickness of several spicules, so that the primary ones are polyspicular, the secondary ones unispicular, or they may all be *polyspicular, as the skeleton upon the whole may be more irregular. The ends of the spicula are [illegible] by more or less spongin. Spicula are short oxea or more rarely strongyla.*

The typical *Reniera*-skeleton, consisting of quadratic or rectangular meshes formed by unispicular fibres, is very characteristic, but in many species the skeleton is more irregular; when this irregularity is more pronounced, the skeletal structure approaches that of some species of *Halichondria*, especially as the amount of spongin may be quite minimal; as a distinguishing character are then only left the short, less slender spicules, but they will also generally be a good criterion with regard to the referring of the species to the genus; the fact is that the *Reniera*-spicules are characteristic by being comparatively short and never so long tapering, as is most frequently the case in the *Halichondria*-species. Also another feature is of importance as a distinguishing character. Most *Reniera*-species have a dermal membrane without spicules, resting on the underlying skeleton and pierced by the ends of the primary fibres, while the *Halichondria*-species have most frequently a dermal membrane with spicules, through which no ends of fibres project; but also here transitions are found, as for instance in the above mentioned species *Halichondria oblonga* and *tenuiderma*, which with regard to this feature approach the *Reniera*. Fristedt (Vega Exp. vetensk. Iakttag. IV, 425) calls attention to a similar fact, and mentions *Halichondria (Amorphina) renieroides* as also approaching the *Reniera* in this respect. In this species, however, it is not the ends of fibres that project, but a dense spiculation is found of spicules a little projecting and perpendicular on the surface; therefore with regard to this feature the species is not especially nearly allied to the *Reniera*. From the reasons given above, species with a less regular skeleton, and with exceedingly little spongin, but with short, never especially long and evenly tapering oxea, have in the present work been referred to *Reniera*.

On the other hand *Reniera*-species, as has been mentioned under the Chalinines, may by a development of spongin approach these latter in skeletal structure, so that no sharp limit can be drawn.

1. **R. urceolus** Rathke et Vahl.

Pl. I, Fig. 6. Pl. XI, Fig. 1.

1806. *Spongia urceolus* Rathke et Vahl, O. F. Müller Zoologia danica IV, 42, Tab. CLVII, fig. 3.

1870. *?Chalinula robustior* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet. 38.

Oblong-pyriform, stalked, sometimes branched or showing several [illegible] tubes. The dermal membrane thin, without spicules; the ends of the fibres projecting and the surface [illegible] shaggy. In the upper end a large osculum leading into a wide oscular canal [illegible]. The skeleton a rather regular network of primary and secondary fibres with quadratic [illegible] unispicular. Particular polyspicular fibres are found running from the stalk longitudinally [illegible] sponge. Spicula comparatively thick, slightly curved oxea, ca. 0.208 mm.

This sponge of which we have two whole specimens and some more or less damaged fragments, is in its most regular shape oblong-pyriform, and is below produced into a short stalk, by which one specimen is attached to a little stone, while the other is torn off. The larger and more lengthened specimen has a length of 10 cm, and a greatest breath in the middle of 3 cm. The other specimen is smaller and comparatively less lengthened; it has a length of 7 cm, and a greatest breath of 2.4 cm. One of the damaged specimens consists of four coalesced tubes, two of which are of equal length, while the two others are shorter; the height of the specimen is 60^{mm}, but the lower part, probably a rather long piece, is wanting. Whether we have here a ramification, or separate individuals growing near each other and then coalesced, cannot be decided; it is perhaps more probable that it is a ramification as the oscular canal of one of the small tubes runs into that of the large tube. The consistency is soft, but not, however, very fragile. The colour (in spirit) is grayish yellow. The *surface* is finely shaggy from the projecting ends of the fibres protruding to the length of a spicule. The *dermal membrane* is thin and without spicules, it is supported by the underlying skeleton and pierced by the ends of the fibres, and it is not separable. The *pores* are measured of a size of $0{\cdot}029$—$0{\cdot}089^{mm}$. On the top of the sponge a circular *osculum* is found, which in one specimen has a slightly prominent margin; it has a diameter of 5—7^{mm}. This osculum leads into an oscular canal continuing through the sponge quite down into the stalk; the canal is through its whole length of about the same width as the osculum, only in the lower end it is somewhat narrowed. On the inside of the oscular canal the excurrent canals open rather close to each other, the size of the openings is about 1—$2^1/_2{}^{mm}$; no special arrangement of the openings is to be traced. The system of canals is highly developed, and the sponge very cavernous. The chief canals have otherwise a very regular course, all beginning from the base or from a spot near the outside, and running parallel to each other arcuately upward and inward towards the oscular canal; consequently all the openings in this canal are turned upward, and therefore in a longitudinal section of the sponge a certain concentricity due to the course of the canals, is seen. All over the outside of the sponge below the surface small, roundish subdermal cavities are found, which by being seen through the skin, give the sponge a netlike appearance.

The *skeleton* consists of a rather regular net of fibres forming meshes, most of which are quadratic, but some may also be triangular or pentagonal; by far the greatest part of these fibres are unispicular. Of the fibres those only, running from the middle of the sponge towards the periphery arcuately upwards (the primary ones), are distinct and complete, while the fibres running at a right angle to the former ones, and thus more or less parallel to the surface, are indistinct and incomplete. A certain relation between the canals, at all events the chief canals, and the skeleton cannot here be overlooked; for, the larger canals, as before mentioned, running upward and inward, while the skeletal fibres are running upward and outward towards the periphery, these primary fibres will always be at right angles to the canals, while the spicules of the secondary fibres are partly parallel to the canals. Besides the fibres forming the net of meshes, some comparatively thick, polyspicular fibres are found; they begin in the lower part of the stalk, which is almost exclusively formed by such fibres, and then they radiate up through the sponge branching off. The needles forming the net of meshes, are at the ends united by a distinct mass of spongin. Scattered in the tissue some needles smaller and finer than those forming the skeleton, are found, but only in small numbers.

Spicula are oxea, rather thick and only very slightly curved; their length is rather constant, on an average $0{\cdot}208^{mm}$, but varying a little to both sides, and may go down to $0{\cdot}178^{mm}$, the thickness varies between $0{\cdot}016$ and $0{\cdot}012^{mm}$, the shortest ones being commonly the thickest; as before mentioned a small number of shorter and finer needles are found, but they are by transitional forms evenly connected with the others, and so they may certainly be regarded as developmental forms.

Of the smaller fragments one is a specimen, the lower part of which is wanting; it is much smaller than the specimens mentioned above, the length being 21^{mm}, the breath 13^{mm}; the osculum is 4^{mm}. Further may be noted that the spicules of this fragment are a little smaller than those of the larger specimens, their length being on an average $0{\cdot}19^{mm}$, and their thickness $0{\cdot}012^{mm}$.

The determination of this species as *R. urceolus* may no doubt be regarded as certain; to be sure, the description cited is very short, but as well the description as the picture agrees very well with the present species; the description cited is by Rathke, and the plate by Vahl, and consequently O. F. Müller cannot be cited as the author of the species. Johnston (British Sponges and Lithophytes, 1842, 175) supposes *Spongia urceolus* to be a variety of *Grantia compressa*; but already the size and also the form show that such cannot be the case.

Chalinula robustior which, with a query, I have referred to this species, was established by Schmidt l. c. on two small fragments from Iceland, found in our museum. The examination of these fragments has shown that their spicules agree completely with those of the present species, and I think it rather sure that they are stalk-pieces of *R. urceolus*. The polyspicular longitudinal fibres that are rather well developed in the stalk, have been the cause why Schmidt has thought to have to do with a Chalinine.

Locality: Iceland, two whole specimens (Steincke); Eastern Iceland, depth 38 fathoms, a little specimen (Horring); the northern coast of Iceland, depth 52 fathoms, a fragment (Wandel); the Faröe Islands, 6 miles to the northwest of Kalsö, depth 60 fathoms, one specimen (Th. Mortensen).

From Jacobshavn in Greenland (assistant Olsen) we have three specimens, which I take to belong to this species. They grow on the roots of a Laminaria; with regard to the form and size of the spicules and the structure of the skeleton, they quite agree with *R. urceolus*, but the two specimens have no definite form, and are incrusting; they are rather small, their greatest length being ca. 20^{mm}; the third specimen, on the contrary, forms a pyriform tube like the form of *urceolus*; this specimen has a height of 20^{mm}. Whether these specimens be really *R. urceolus*, I cannot decide with certainty; but if so, the small incrusting specimens are presumably quite young, and the species cannot be supposed to rise to a tubulous form, until it becomes older; in reality the three specimens in hand form a characteristic series: the first specimen is absolutely incrusting, and has a greatest height of 6, the second rises from an incrusting plate to a semiglobular cushion, and has a height of 10, neither of these specimens show any osculum; the third specimen rises to a short-stalked tube of a height of 20^{mm} with an osculum on the summit.

Geogr. distr. In the place quoted from Zoologia danica, the species is mentioned from northern Norway.

2. **R. parenchyma** n. sp.

Pl. VII, Fig. 1, Pl. XI, Figs. 2–4.

Erect, leafshaped, oblong-oval. The dermal membrane thin, without spicules; the ends of the fibres projecting, and the surface consequently finely shaggy. Oscula small, only occurring on one side. The skeleton a regular network of primary and secondary fibres, the fibres unispicular. Particular polyspicular fibres are found running longitudinally through the sponge from the base. Spicula slightly curved, sharply pointed oxea, ca. $0{\cdot}238^{mm}$.

This species is erect, and forms an oval leaf narrowed below at the place of attachment. The height is 18^{cm}, the breadth has been ca. 10^{cm} (the specimen is somewhat damaged), and the thickness of the leaf is in the middle ca. 4^{cm}, but it becomes somewhat thinner towards the edge which is rounded. The leaf is slightly arcuate from the middle towards the edge, so that one side is somewhat convex, the other somewhat concave. The consistency is soft and flexible. The *surface* is everywhere finely shaggy from the projecting spicules. The *dermal membrane* is thin, transparent, and without spicules, it rests on the skeleton below, and is pierced by the ends of the fibres; accordingly there is no special dermal skeleton. The colour (in spirit) is almost white, and the sponge is rather transparent, only the longitudinal fibres are at the base seen to be yellowish. (The sponge is from a considerable depth, and a large part of the tissue has probably been destroyed or quite washed away by the hauling up). *Pores* are found rather densely on both sides as round openings; they are very much varying in size, from 0.029—0.23^{mm}. With regard to *oscula* it has not been possible with certainty to establish their behaviour, as the skin of the sponge only in few places is undamaged, and I have not been able positively to decide, whether they are to be found on both sides or only on one of them. In the skeletal net cylindric holes or canals of a diameter of 0.5—1^{mm} are seen, lying rather close to each other; they go in a horizontal direction almost through the whole sponge. If the sponge is viewed under a magnifying glass, the oscular canals are seen to shine through on both sides, but they appear on both sides to be closed by the outermost net of spicules; according to this we should have to suppose that the oscular openings are found on both sides either as one or as several pore-like openings for each oscular canal; in this case there would be no difference of size between the largest pores and the oscula. If, however, the layer of the skeleton closest to the surface is cut off on both sides and examined, we shall here find a little difference between the two sides of the sponge, one side showing openings in the net; these openings are situated over the oscular canals; I have not seen them surrounded by the dermal membrane as distinctly limited oscula, but this I take to be due to the fact that the skin of the specimen is not undamaged. In the specimen in hand these openings are situated on the convex side. If they are the oscular openings, these openings are thus exclusively, or at all events almost exclusively, found on one side of the sponge, and considering the fact in the two following species there can scarcely be any doubt that they are oscula.

The *skeleton* forms a rather regular network with more or less rectangular or cubic meshes. It consists chiefly of fibres running from the interior of the sponge arcuately upward and outward towards the surface, which they meet at about a right angle. Accordingly the fibres spread in a fanshaped manner both towards the surfaces and the edges of the sponge. The skeletal tissue forming the inner or middle part of the leaf-shaped sponge, is, on account of this structure, less regular than the part towards the surface. The mentioned fibres are unispicular; they are connected by spicules that are more or less at a right angle to them, and only form incomplete fibres, which accordingly run rather parallel to the surface. The first mentioned fibres pierce the surface to the length of a spicule, and consequently the surface is finely shaggy, and there is, as has been mentioned, no particular dermal skeleton. Besides by this regular skeleton, the sponge is also supported by thicker, polyspicular fibres which from the base, where their thickness is greatest, branch up through the sponge; they run as well in the middle plan of the sponge as towards the surface often crossing each other, the fibres near one surface having another direction than those near the other surface; upon the whole their course is rather irregular. In the nodes the skeleton is united by a clear, slightly yellowish mass of spongin; in the polyspicular fibres the spicules are arranged in bundles, so that the ends of spicules lying alongside of each other, are in the same place; accordingly the spongin uniting these ends, form yellowish transversal bands across the fibres.

Spicula are oxea, sharply, almost hastately pointed, with a fairly long point; they are slightly and evenly curved or more rarely straight; a characteristic feature is that most frequently they are a little thinner in the middle than towards the ends, by which the pointing becomes more hastate. The length is rather constant ca. 0·238mm, deviating a little to both sides; the thickness varies between 0·009 and 0·012mm.

Locality: Of this beautiful species, so characteristic as well by its exterior as its spicules, we have one specimen, not quite complete, from station 91, 64°44′ Lat. N., 31°00′ Long. W., depth 1236 fathoms.

From station 36, 61°50′ Lat. N., 56°21′ Long. W., depth 1435 fathoms, and station 73, 62°58′ Lat. N., 23°28′ Long. W., depth 486 fathoms, the collection contains some small specimens, which I dare not with certainty refer to the present species; they agree with this with regard to the form and size of the spicules, as also with regard to the main features of the skeletal structure; only the oscular canals seem to be less marked; but as these specimens, which are considerably smaller than the described one, are surely young ones, this difference may perhaps be due to this fact; therefore I think it probable that they belong to this species. — From station 89, 64°45′ Lat. N., 27°20′ Long. W., depth 310 fathoms, and station 105, 65°34′ Lat. N., 7°31′ Long. W., depth 762 fathoms are further found a few small fragments of the same skeletal structure as *parenchyma*, but the spicules have most frequently a length of ca. 0·26mm and a thickness of 0·011mm; thus they are a little longer than in the specimen described, but otherwise they are of the same form, and as the spicules of *parenchyma* may reach the given length, it is rather probable that they may belong to this species; the fragments, which are both basal parts, are too small to admit of a certain derternination.

3. **R. folium** n. sp.

Pl. V, Fig. 5, Pl. XI, Fig. 5.

Erect, irregularly leafshaped, the leaves may be irregularly coalesced. The dermal membrane is thin, without spicules; the ends of the fibres project making the surface finely shaggy. Oscula small, [illegible] only found on one side. The skeleton forms a regular network of primary and secondary fibres; the fibres are unispicular. Particular polyspicular fibres running longitudinally, are found. Spicula are slightly curved, rather gradually tapering oxea, 0·19—0·21mm.

Of this species there are in the collection six lamellæ, which, however, are more or less damaged, and they are likely to be fragments of only a couple of specimens. The sponge is formed as erect, irregularly leafshaped lamellæ, which may be irregularly coalesced reciprocally, and, judging by the material, they have been attached with a broad base. The specimens in hand have a height of ca. 100mm, and the thickness of the lamellæ is in the middle up to 5mm, but decreases towards the margin. The consistency is rather soft and flexible. Here and there the *surface* has irregular, slightly projecting ridges, and is somewhat grooved; it is finely shaggy from the projecting spicules. The *dermal membrane* is thin, transparent, and without spicules; it rests on the skeleton, and is pierced by the ends of the fibres, so that no particular dermal skeleton is found. The colour (in spirit) is dirtily grayish yellow. The whole sponge is filled with sand to a high degree, what has, perhaps, taken place in the trawl. The features of this sponge with regard to *oscula* and *pores* seem to be the same as those, supposed to be found in the preceding species. Pores are found in large numbers on both sides, they have been measured to a size of from ca. 0·05—0·17^{mm}. In the skeleton oscular canals are found, somewhat smaller than in the preceding species, viz. ca. 0·5^{mm}; they are very close to each other, and go horizontally almost quite through the sponge. These oscular canals open on one side of the sponge with apertures that are seen to be rather well bounded in the skeleton; the apertures are of the same diameter as the oscular canals; but as I have seen no osculum distinctly bounded by the dermal membrane, I cannot give the real size of the oscular aperture; the whole structure implies, however, that the osculum formed by the skeleton, is not narrowed by the dermal membrane. The projecting spicules that are situated on the margin of the osculum, project partly over it, in such a way as pictured in the following species. Thus oscula are only found on one side of the sponge; to be sure similar openings may be seen here and there on the other side, but then they seem to be due to a damaging of the surface, so that this has been broken through to the oscular canal.

The *skeleton* of this species is constructed in quite the same way as that of the preceding one, and here are also found irregularly running, polyspicular longitudinal fibres; these may, on their way upward, bend out towards the sides, and thus they may go in directions very different from that of the longitudinal axis. The ends of the spicules are as usual united by spongin.

Spicula are oxea, evenly and rather gradually tapering; they are slightly curved, sometimes almost straight. The length is very constant, between 0·19 og 0·21^{mm}, but is most frequently 0·208^{mm}; also the thickness is constant, 0·013—0·014^{mm}. Shorter and finer spicules are only seen quite singly.

Locality: Station 46, 61° 32′ Lat. N., 11° 36′ Long. W., depth 720 fathoms; station 21, 58° 01′ Lat. N., 44° 45′ Long. W., depth 1330 fathoms, a very small fragment.

4. **R. ventilabrum** Frstdt.

Pl. XI, Figs. 6—7.

1887. *Reniera ventilabrum* Fristedt, Vega Exp. vetensk. Iakttag. IV 420, Pl. 24, fig. 3, Pl. 27, fig. 8.

Erect, leaf- or fan-shaped. The dermal membrane thin, without spicules; the ends of the fibres project, and so the surface is finely shaggy. Oscula numerous, small, only found on one side. The skeleton is a regular network of primary and secondary fibres; the fibres unispicular. Particular polyspicular fibres issuing from the base and running longitudinally, are found in large numbers. Spicula are evenly tapering, slightly curved oxea 0·21—0.25^{mm}.

Of this sponge we have a specimen, which is all but fanshaped, increasing in breadth upward from a base that seems to have been a short stalk. The somewhat damaged specimen has a height of ca. 18^{cm} by a greatest breath of ca. 15^{cm}, the thickness is ca. 4^{mm}. The consistency is rather fragile, only the base is considerably harder on account of the numerous longitudinal fibres. Here and there the *surface* shows slight depressions, but is otherwise even, and everywhere finely shaggy from the projecting spicules. The *dermal membrane* is thin and without spicules; it is resting on the skeleton below, and is pierced by the ends of the fibres; no particular dermal skeleton is found. The colour (in spirit) is brown. The *pores* and *oscula* are as in the two preceding species, but may here be more distinctly observed; pores are found in large numbers on both sides, they have a size from 0·02—0·23^{mm}. Oscula are only found on one side of the sponge; they are present in large numbers, and are round openings in the skeletal net of a diameter of ca. 0·5^{mm}; of the projecting spicules of the surface those that are situated on the margin of the oscular opening, project obliquely over this opening (Pl. XI, fig. 7). The oscular opening leads into an oscular canal of the same diameter, which in a chiefly horizontal direction stretches almost throughout the sponge.

The *skeleton* is constructed as in the two preceding species, with the only difference that in the present species there are many more and more powerful longitudinal fibres giving the sponge some firmness in spite of the otherwise rather fragile consistency. The base of the sponge consists almost exclusively of these longitudinal fibres that are here more or less coalesced, and consequently the sponge is at the base hard and firm. The spicules of the fibres are as usual cemented by spongin, but not quite imbedded in spongin. From the base the fibres branch up through the sponge, growing thinner in their course, and most frequently several fibres run alongside and intercross in the thickness of the sponge. The other parts of the skeleton have unispicular fibres; only the fibres issuing in a fanshaped way from the middle towards the surface, may sometimes show a couple of spicules alongside in the outermost part.

Spicula are oxea; they are evenly pointed and slightly bent or quite straight. The length varies between 0·214—0·25^{mm}, but appears most frequently to be 0·238^{mm}, the thickness is 0·012—0·014^{mm}.

This species, as will be seen, agrees, as to the length of the spicules, with *R. parenchyma*; but there is, besides the features given in the description, also a difference to be noted in the spicules, these being thinner in *R. parenchyma* than in the present species, neither are they in the latter so hastately pointed nor are they thinner in the middle than towards the ends.

As I have had a piece of Fristedt's original specimen of *R. ventilabrum*, I have been able to decide that the form and size of the spicules, as well as the construction of the skeleton, agree completely with his species, and therefore I regard the identification as sure. The only difference is that in the original specimen the oscula and oscular canals are generally a little larger than in the described specimen. The very short description by Fristedt does not afford much hold for the determination; thus he does not mention that oscula are only found on one side. I do not quite understand his description of the skeleton; he says: The fibres radiating from the middle of the blade, are arcuated towards the surfaces ; by this it would seem that he can only mean the fibres running from the interior of the sponge arcuately and obliquely upward and outward, and piercing the surface, but he continues: These fibres are multi-spiculated — . This, however, is not the case, these fibres are unispicular, only now and then may be found in their outermost part a couple of spicules alongside. On the other hand he does not at all mention the polyspicular longitudinal fibres, for it cannot well be supposed that they are meant in the first quoted sentence, as they have a quite different course.

Locality: The species has only been taken in one specimen, station 28, 65° 14' Lat. N., 55° 42' Long. W., depth 420 fathoms.

Geogr. distr. Fristedt has the species from Spitzbergen from a depth of 280 fathoms.

Note. This sponge shows a particular feature, which I have not been able to interpret with complete certainty. On one side, the side on which only the pores are found, a large number of excrescences of a more or less regular subglobular or almost globular form are found, sometimes coalesced, and forming irregular bodies. The size of these excrescences is from that of a pea to that of a hazel nut. They are quite regularly constructed, fibres radiating from the place of attachment in a fanshaped way to all sides and piercing the surface; and then these fibres are connected to a net by incomplete fibres parallel to the surface; thus this skeletal construction is upon quite the same principle as that of the sponge itself, and the skin is also provided with pores. These excrescences appear to be due to a worm (a Syllidian?); at all events one or more of these were found in holes in those excrescences that were cut through.

5. **R. hyalina** n. sp.

Pl. XI, Fig. 8.

Erect, leaf-shaped. The dermal membrane without spicules; the ends of the fibres projecting, and the surface consequently finely shaggy. Oscula? The skeleton a regular network of primary and secondary fibres, the fibres unispicular. Particular polyspicular longitudinal fibres are found. Spicula are sligtly curved, evenly tapering oxea, 0·268—0·31^{mm}.

Of this sponge we have only one specimen, which is, moreover, a fragment; but as it shows characteristic differences from the preceding three lamelliform *Reniera*-species, I have thought it best to describe it. I take the fragment to be the upper part of a specimen, and with regard to the form of this specimen can consequently only be said that it is a thin lamella. The specimen in hand has a height of 27^{mm}, a breadth of 48^{mm}, and a thickness of scarcely 2^{mm}. The consistency is rather firm, but the leaf is flexible. The *surface* is smooth and everywhere finely shaggy from the projecting spicules. The *dermal membrane* is thin and transparent and without spicules; it rests on the skeleton below, and is pierced by the ends of the fibres, so that no dermal skeleton is found. The colour (in spirit) is whitish, and the sponge is hyaline. As to *pores* and *oscula*, this sponge shows other features than the three preceding ones. No oscular canals are found here as those mentioned in the descriptions above; on the contrary roundish openings in the dermal membrane are found in large numbers on both sides of the sponge, varying in size between 0·023^{mm} and ca. 0·298^{mm}. All degrees of intermediate sizes are found, so that it is impossible by means of the size to distinguish between pores and oscula; perhaps the larger ones act as oscula, the smaller as pores [1].

The *skeleton* is constructed in quite the same way as in the preceding species with the only exception that no oscular canals are found in it; the polyspicular longitudinal fibres are (in the fragment in hand) only little conspicuous. The spicules are in the skeletal net and in the polyspicular longitudinal fibres united in the common way by a clear mass of spongin.

Spicula are oxea; they are evenly pointed and slightly curved, sometimes the curving is somewhat more pronounced, and then it is also sharper; the length is 0·268—0·315^{mm}, but the greatest length

[1] The fragment being the upper part of a sponge, it may also be possible that the oscula have not reached so far up, and that fact may be the reason why no oscular canals or distinct oscula are found.

is of no frequent occurrence; the length occurring most frequently is 0·298mm; the thickness varies from 0·01—0·014mm.

Locality: Station 138, 63° 26' Lat. N., 7° 56' Long. W., depth 471 fathoms, one fragment. The bottom-temperature on this station was below zero, viz. —0°·6.

6. R. clavata Levinsen?

Pl. XI, Fig. 9.

1886. *Reniera clavata* Levinsen, Dijmphna Togtets zool. bot. Udbytte 351, 10, Tab. XXIX, fig. 5, Tab. XXX, fig. 3.

There are in the collection two small, lengthily pyriform specimens, one having a length of 27mm, the other of 19mm. With regard to their appearance, outer structure, and skeleton they seem to agree very well with *R. clavata*; I am, however, inclined to regard the determination as doubtful, because the spicules have an average length of 0·29mm, and a thickness of 0·014—0·015mm, while in *clavata* the length of the spicules is most frequently ca. 0·23mm, and rarely reaches 0·26mm; the thickness is the same. Otherwise the skeleton is of the same structure, being regularly unispicular, and consisting of primary fibres, radiating arcuately upward and outward towards the surface, and connected by transverse fibres; besides some thicker, polyspicular fibres are found branching from the stalk up into the sponge.

Locality: East-Greenland, 72° 40' Lat. N., ca. 20° Long. W., depth 100 fathoms, two specimens (The East-Greenland expedition 1891—92).

Geogr. distr. Reniera clavata is known in one specimen from the Kara Sea from a depth of 74 fathoms.

Vanhöffen (Grönl. Exp. d. Gesellsch. für Erdkunde zu Berlin, II, 1. 1897, 248) enumerates *R. clavata* from Karajakfjord, North-Greenland. I have had occasion to examine the spicules of the species; they have an average length of 0·22mm, and the thickness is 0·012—0·014mm; thus the spicules are a little thinner than in the original; the skeleton is a unispicular network. Without a closer examination it is impossible to decide whether the species is really *clavata*, but it seems rather probable. Vanhöffen thinks *R. clavata* and *R. simplex* Arm. Hans. to be identical; this, however, is not the case, as will appear later under *R. voeringii mihi* = *R. simplex* Arm. Hans.

7. R. cinerea Grant.

Pl. XI, Fig. 10.

1827. *Spongia cinerea* Grant, Edinb. New Philos. Journ. II, 204.

1842. *Halichondria cinerea* Johnston, Brit. Spong. and Lithophytes 110, Pl. IV, fig. 4.

1866. *Isodictya cinerea* Bowerbank, Mon. Brit. Spongiadæ II, 241, 1, III, Pl. XLVIII, figs. 1—5.

1870. *Reniera cinerea* O. Schmidt, Spongienf. Atlant. Gebiet. 77.

1885. — — Fristedt, Kgl. Svensk. Vet. Akad. Handl. B. 21, Nr. 6, 26.

1887. — — Fristedt, Vega Exp. vetensk. Iakttag. IV, 419.

1887. — — Ridley and Dendy, Challeng. Report, Monaxonida, Vol. XX, 15.

Of this species we have some dried specimens, all growing on a branched *Lithothamnion*; they are cushion-shaped, more or less roundish, and in their dried state of a light yellow colour, a few of the specimens have a somewhat darker colour. The largest specimen has a greatest extent of ca. 20^{mm}. The spicules are somewhat varying in length, the average length being ca. $0{\cdot}14^{mm}$; they are also rather varying in thickness, the average thickness may be given as $0{\cdot}006^{mm}$, but it may be somewhat greater, and it may go down to $0{\cdot}003^{mm}$.

Locality: All the specimens are from Julianehaab (inspector Ryberg). From the Swedish Riksmuseum we have received a specimen growing on a Balanoid, taken on the expedition of Ingegerd and Gladan 1871 in the Davis Strait 63° 47′ Lat. N., 52° 26′ Long. W., depth 35 fathoms.

Geogr. distr. This species seems to be almost cosmopolitan having been found between 80° and 10° Lat. N.; it is, however, not to be forgotten that the determinations cannot always be regarded as reliable. Besides in the Davis Strait it has been taken at Spitzbergen, depth about 12 fathoms (Fristedt l. c.); it occurs further at the coast of Bohuslän (Fristedt l. c.); it is common on the English coasts and on the French side of the English Channel; by the Challenger Expedition it is mentioned from the Philippine Islands, on a depth of 95 fathoms; finally it is mentioned from British Colombia (Lambe: Sponges from the Pacific Coast of Canada. Transact. Roy. Soc. Canada XI, 1893, sect. IV, 26); this determination, however, is doubtful, as the length of the spicules is given to be $0{\cdot}111$—$0{\cdot}098^{mm}$.

8. **R. tubulosa** Frstdt.

Pl. II, Fig. 5, Pl. XI, Fig. 11 a, b, c, Fig. 12.

1887. *Reniera tubulosa* Fristedt, Vega Exp. vetensk. Iakttag. IV, 419, Pl. 24, fig. 1.

The sponge is typically formed as rather thick incrustations, crusts, or cushions, provided with more or fewer, higher or lower, conical oscular tubes: but the form may be quite irregular. The dermal membrane is thin, without spicules, the ends of the fibres project, and therefore the surface is finely shaggy. Oscula are found on the summit of the oscular cones. The skeleton consists of a somewhat irregular network of polyspicular fibres running towards the surface, and transverse spicules standing singly. Spicula are slender, somewhat curved oxea with a tapering of varying length, and they may be rounded; the length is $0{\cdot}17$—$0{\cdot}208^{mm}$.

The specimens in hand of this species form more or less irregular incrustations on *Alcyonidium gelatinosum*, shells, Balanoids, and Sabella-tubes; they are provided, at all events the larger specimens, with one or several, rather regular, conical tubes, which, however, are often very low. The largest specimens have a greatest extent of ca. 60^{mm}, and the greatest height of the tubes is ca. 18^{mm}. In one of the specimens on the other hand, which is of a similar size, the tubes have only a height of ca. 6^{mm}. When several tubes are found, there may be great difference with regard to their distance from each other, and they are more or less steep in proportion to this distance being greater or smaller; thus in a specimen with a greatest extent of 33^{mm}, we find seven tubes, and the distance between them is 5—9^{mm}, from one osculum to the other, but generally the distance is greater. The consistency sometimes is rather soft, sometimes more firm. The colour (in spirit) is light grayish-yellow, and the surface has the netlike appearance, characteristic in so many *Reniera*-species, on account of the many small, close-set, round subdermal cavities. The *surface* is finely shaggy from the projecting spicules. The *dermal membrane* is thin, without spicules; no special dermal skeleton is found, but the membrane is supported by the skeleton below, and pierced by the ends of the fibres. The *pores* are small, most frequently oval openings in the dermal membrane; they are measured to a size of 0·029—0·09^{mm}. *Oscula* are found on the top of the cones, they have a diameter of 2—4^{mm}; each osculum leads into a shorter or longer oscular canal, on the inside of which the excurrent canals open, and which passes below into wide canals. From the oscular opening and downward in the tube the openings of the canals increase in size.

The *skeleton* consists of a network, less regular than in the *Reniera*-species with a typical unispicular skeleton. Polyspicular fibres consisting of about 4—6 spicules alongside run more or less perpendicularly on the surface. These fibres (the primary ones) run in the oscular cones arcuately upward and outward towards the surface which they pierce. The distance between these fibres has about the length of one spicule; the fibres are connected to a rather irregular network by spicules being tolerably perpendicular on the fibres, and consequently chiefly parallel to the surface, but these spicules are most frequently found single, and do not form, or form only slightly marked fibres; they may, however, here and there form coherent, comparatively thick fibres. In the polyspicular fibres the spicules are not lying in such a way as to have their ends in the same place of the fibre, that is to say, they are not arranged in a bundle-like manner. Spongin is only present in a very slight degree, and scarcely to be distinguished.

Spicula are oxea; they are rather slender, and somewhat curved in the middle; a characteristic feature of the species is that the ends are very much varying in form, from long tapering, often with the point marked off, to quite shortly pointed, and even quite rounded; in a few specimens spicules with rounded ends are frequent. The length varies between 0·17—0·208^{mm}; a few still longer spicules may be found; the thickness is also somewhat different, from 0·005—0·008^{mm}. Shorter and finer needles may be found, but in comparatively small numbers; these finer needles are very long tapering, but all transitions to the other needles may be found, and consequently they may be taken to be stages of growth; during the growth the ends will thus increase comparatively more in thickness than the middle part of the needle so that the fully developed spicule becomes less long tapering. Thus this species is rather well characterized by its thin, most frequently rather sharply curved needles, which vary very much with regard to their pointing, and whose ends often show a rounding or a tendency to such a one.

I have had one of Fristedt's original specimens for comparison, and therefore I have been able with certainty to identify the species. Fristedt also gives the size of his largest specimen to be 60^{mm}, but the largest tube of his specimen was 30^{mm} high, and the osculum had a diameter of 6^{mm}. Fristedt says that the spicules appear in two thicknesses in the proportion 1 : 2. The fact, according to my examination, is that the spicules vary evenly from ca. 0·005—0·008^{mm}, and besides some finer spicules are found.

Locality: This species seems to be rather common, and has been taken at West-Greenland: Julianehaab (inspector Ryberg), Holstensborg (Bergendal), Egedesminde (Traustedt), and by the Ingolf expedition at station 33, 67° 57′ Lat. N., 55° 30′ Long. W., depth 35 fathoms; further it has been taken at Iceland: Ofjord, depth 11 fathoms (H. Jónsson), Önundarfjord, depth 10 fathoms (the author), Eyjafjord, depth 14 fathoms (Hörring); finally it has been taken at the Faröe Islands: to the east of Nolsö, depth 30 fathoms, and at Klaksvig, depth 11 fathoms (Th. Mortensen).

Geogr. distr. Fristedt mentions the species from Spitzbergen, on a depth of 15—25 fathoms. The species seems to be found exclusively in more shallow water.

We have a fragment, a tube of a length of 11^{mm} and a breadth of 4^{mm}, from Iceland, Breidasound, depth 30 fathoms (H. Jónsson). It has a polyspicular skeleton constructed as that of *tubulosa*, and the spicules have a similar form, most frequently with a more or less sharp curve, but they are somewhat smaller, the length is ca. $0{\cdot}15^{mm}$, and the average thickness $0{\cdot}0057^{mm}$.

Note. *Reniera tubulosa* Arm. Hans. The Norwegian North-Atlantic Expedition XIII, 4, 1885, will have to be dropped, as it is identical with *Oceanapia robusta* Bow. (see under this species).

9. **R. laxa** n. sp.

Pl. II, Fig. 6, Pl. XI, Fig. 13.

The form is the typical one: from an extended, more or less crust-shaped base more or fewer cylindric or conical, sometimes somewhat compressed oscular tubes rise, which may now and then be coalesced. The dermal membrane is thin, without spicules, the ends of the fibres project, and so the surface is finely shaggy. Oscula are found on the top of the oscular cones. The skeleton is a somewhat irregular network of polyspicular fibres running towards the surface, and single transverse spicules, connecting the former. Spicula are evenly tapering, slightly curved oxea of a length from $0{\cdot}18$—$0{\cdot}208^{mm}$.

The specimens in hand of this species grow on Bryozoa, Balanoids, etc. More or fewer cylindric or fusiform tubes rise from the base; they are rather low, and may be more or less coalesced, and sometimes they are a little compressed. The largest specimen has a length of 60^{mm}, and a greatest height of 30^{mm}. The smallest specimen, which is presumably quite young, is of an almost semiglobular form with an osculum on the top of it. It has at the base a diameter of 12^{mm}, and a height of 8^{mm}; its oscular canal is very short, and leads almost directly into the excurrent canals. The consistency is very loose and soft, and the sponge is therefore very fragile and little coherent. The colour (in spirit) is whitish or slightly yellowish, and the surface has the common netlike appearance. The *surface* is finely shaggy from the projecting spicules. The *dermal membrane* is thin, transparent, and without spicules or special dermal skeleton; it rests on the skeleton below, and is pierced by the ends of the fibres. The *pores* are found in the dermal membrane, and especially on the tubes they are exceedingly close-set, so that the skin here becomes a sieve; in the other parts of the surface of the sponge they seem to be much more spread; they are somewhat varying in size, and are measured to $0{\cdot}017$—$0{\cdot}089^{mm}$. *Oscula* are found on the summit of the tubes, and have a diameter of ca. 2—4^{mm}; they have a rather sharp edge; from the osculum an oscular canal of the same width leads down through the tube, and the inside of the tube is in the general way provided with openings for the excurrent canals; below it passes into the system of canals.

The *skeleton* is chiefly constructed as in *tubulosa*. Polyspicular fibres run towards the surface and in the oscular tubes upward and arcuately towards the surface; they are somewhat varying in thickness and in the number of spicules, but the number seems most frequently to be about 3—6 spicules alongside. The distance between these primary fibres is generally of the length of a spicule; the spicules running perpendicularly on the former, form no distinct fibres, and they are most frequently single, only rarely a few alongside. The whole structure forms a somewhat irregular reticular work with more or less quadratic meshes. The ends of the spicules are united by a not copious mass of spongin, exceedingly clear and therefore difficult to observe.

Spicula are oxea; they are evenly tapering, and very evenly and slightly curved; they vary in length from 0·18—0·205^{mm}, the thickness is oftenest 0·011^{mm}, but may decrease to 0·008^{mm}; shorter and much finer spicules occur in small numbers, and are by transitional sizes shown to be developmental forms.

This species, by its skeletal structure, is nearly allied to the preceding one, but is distinguished from this latter as well by its looser consistency as by its thicker, evenly and slightly curved needles. A couple of specimens from the Davis Strait have a still looser construction than the other ones.

Locality: Station 127, north of Iceland, 66° 33′ Lat. N., 20° 05′ Long. W., depth 44 fathoms; Iceland (Jap. Steenstrup); the Davis Strait, depth ca. 100 fathoms (Holm); nine specimens or fragments in all.

10. R. heterofibrosa n. sp.

Pl. II, Fig. 8, Pl. XI, Fig. 14.

The form is the typical one, an irregular cushion with a number of low, very little projecting oscular cones. The dermal membrane thin, without spicules, the ends of the fibres projecting, so that the surface is finely shaggy. Oscula are found on the summit of the oscular tubes. The skeleton is a somewhat irregular network of mostly polyspicular fibres running towards the surface, and these fibres are connected by transverse spicules, single or in bundles. In the deeper parts of the sponge the skeleton is more irregular. The spicules evenly curved oxea of a length of 0·16—0·178^{mm}.

Of this species we have one specimen, forming an irregular, lengthy cushion, which rises into a number of low oscular tubes (in the specimen 8). The length of the specimen is 29^{mm}, and the greatest height 15^{mm}. The colour (in spirit) is yellowish brown. The *surface* is finely shaggy from the projecting spicules. The *dermal membrane* is thin, without spicules, and pierced by the ends of the fibres. The circular *oscula* which are found on the top of the low cones, have a diameter of 1—2^{mm}. The *pores* are oval or round openings in the dermal membrane, they have a diameter of 0·017—0·06^{mm}. The oscula lead into oscular canals of the same width, on the inside of which the excurrent canals open, and which pass below into wide canals.

The *skeleton* consists of a somewhat irregular network of fibres, the structure being mostly as in *tubulosa* and *laxa*. Most of the fibres running towards the surface, are polyspicular; they vary somewhat with regard to the number of spicules of which they are composed, and upon the whole they appear to be thickest and consist of most spicules in the deeper and older parts of the sponge, while towards the surface they are thinner, and often consist of only a single series of spicules. The spicules that are perpendicular on these fibres, do not form, or form only to a small degree coherent fibres; most frequently they are single, but sometimes some may be put together in bundles. In the deeper and older parts of the sponge where the fibres are thicker, the skeleton is more irregular, and the difference between primary and secondary fibres is here effaced, so that the skeleton becomes an irregular net of fibres with a rather large number of spicules alongside. The ends of the spicules are united by a not copious mass of spongin. Outside the skeleton some finer and shorter needles are found in the tissue.

Spicula are oxea; most frequently they are evenly curved; more rarely the curve may be sharp; the length varies between 0·16—0·178mm, the thickness varies comparatively much, from 0·005—0·010mm. Shorter and finer needles are found in small numbers.

Locality: There is in the collection only one specimen of the species from Seydisfjord in Iceland (H. Jónsson), from a depth of 7—8 fathoms.

11. R. calamus n. sp.

Pl. V, Figs. 1—2, Pl. XI, Fig. 15 a, b, Fig. 16.

Erect, tubular, or formed like a thick-walled cylinder. The dermal membrane thin, without spicules; the surface finely shaggy? The skeleton consists of a rather regular network of primary fibres running towards the surface, and mostly single transverse spicules, placed irregularly, connecting the fibres. Spicula oxea, dividing into two different groups of sizes: the larger ones evenly tapering and evenly curved, 0·235—0·268mm; the smaller ones more bent, 0·107—0·15mm.

Of this species we have one specimen, formed completely like a cylindric tube. The specimen, however, has been broken in the middle, and both ends are damaged or broken, so that it cannot be decided, in what way the sponge has been attached, or how the upper end has been formed; on the other hand, the sponge, no doubt, has been erect, and the form has probably been as a cylinder with a simply rounded upper end. The length of the specimen in its present state is 55mm, and the breadth 20mm. The colour (in spirit) is light gray-brown. The consistency is comparatively hard and firm. The *surface*, as in most *Reniera*-species, seems to be finely shaggy from the projecting ends of the primary fibres; I have not been able, however, with certainty to decide this feature, as the dermal membrane has only been kept in few places. When the sponge was taken up, it was filled, to an exceedingly high degree, with mud and extraneous sponge spicules[1]. The *dermal membrane*, where it is kept, is thin, transparent, and without spicules. The *pores* are found in the dermal membrane as round or oval openings; they have been measured to a size of from 0·017mm to about 0·3mm, most frequently they are about 0·05mm. Through the middle of the sponge a cylindric canal runs, of equal width in its whole length, which canal must be regarded as an oscular canal; but the upper end being damaged the structure of the mouth of the tube, the osculum, cannot be decided. The canal has a width of 5·5mm, and the thickness of the wall is between 7 and 8mm. The excurrent canals open into the oscular canal; their course through the wall of the sponge is obliquely upward and inward; the openings are varying in size; the largest ones are ca. 1·5mm. The larger openings lie here and there in transverse or oblique series; but otherwise no distinct arrangement is found. From these openings the canals branch off into the wall of the sponge, and end in the many small subdermal cavities, which are found close to each other on the outside of the sponge.

The *skeleton*. From the inside of the oscular tube, fibres run very regularly arcuately upward and outward towards the surface on which they are about perpendicular. These primary fibres are polyspicular, and consist most frequently of 3—6 spicules, and sometimes of still more, alongside.

[1] This filling, however, had probably taken place in the trawl.

They are on an average placed at a distance of the length of one spicule from each other. They are connected by spicules placed more or less perpendicularly on the fibres, and at such a distance from each other, that the whole thing forms a reticular work with more or less quadratic, often rather irregular meshes. The spicules connecting the primary fibres, are far from being arranged so regularly as those fibres; they form no coherent fibres, and are most frequently found single, but several may also be found together in bundles; far from being always perpendicular on the primary fibres, they are often placed in an oblique direction with regard to those fibres. Spongin has not been observed, and does not appear to be present.

Spicula are Oxea, found in two different sizes, rather distinctly separated; the larger ones are comparatively long oxea; they are evenly, but not long tapering, and generally evenly, but sometimes more sharply, curved, more rarely straight; the length varies between 0·235—0·268^{mm}, or a little longer; a few shorter ones may be found, and they may go down so far in size as to form a transition to the smaller ones. The thickness is only little varying, most frequently it is 0·011^{mm}. The small spicules have a length of 0·107—ca. 0·15^{mm}, and a thickness of ca. 0·007^{mm}; they are comparatively more curved than the large ones, and also sometimes sharply bent. We may, as mentioned, also find spicules occupying, with regard to size, a position between the larger and the smaller ones; but the small spicules cannot be taken to be developmental forms of the large ones, for as such forms the longer, finer needles occurring in small numbers, must be taken. The small spicules are found in far smaller numbers than the large ones, and they do not appear to be restricted to certain parts of the sponge.

This interesting species seems to be allied to *R. subglobosa* Ridley and Dendy (Challeng. Report, Monaxonida, XX, 17, Pl. I, figs. 3, 3a, Pl. II, fig. 17), but among other things it is distinguished from this species by the spicules, which are in the latter one 0·3^{mm} long. Neither is there any mentioning of the spicules being of two sizes, and the species is stated to be possessed of a particular dermal skeleton.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, a small fragment; station 90, 64° 45′ Lat. N., 29° 06′ Long. W., depth 568 fathoms, one specimen. On this latter station the species was taken together with a great many other sponges, especially Tetractinellids.

Besides the mentioned species we have further some fragments of *Reniera*-species, which it has not been possible to determine:

Reniera sp. a.

Pl. XI, Fig. 17.

From Scoresby Sound, from a depth between 10 and 60 fathoms, we have a little specimen, which seems to have been lengthily pyriform; its length is 25^{mm}. The skeleton consists of unispicular fibres. The spicules have a length of 0·20—0·23^{mm}, and oftenest a thickness of 0·010^{mm}. Thus the species, with regard to the skeleton and the spicules, recalls *R. parenchyma*, the spicules, however, being on the whole a little smaller.

With this species may perhaps be classed some more or less cylindrical, partly hollow fragments from Talknafjord in Iceland, of a length of up to 37^{mm}, and a thickness of ca. 10^{mm}; their skeleton is likewise unispicular, and the spicules are of the same form, but a little shorter, not exceeding $0·20^{mm}$, and most frequently a little shorter; they vary a little more in thickness, increasing to $0·0128^{mm}$; otherwise they are of the same form, and are also most frequently slightly curved in the middle.

Reniera sp. b.

Pl. XII, fig. 1.

From station 3, 63° 35′ Lat. N., 10° 24′ Long. W., depth 272 fathoms, we have a very small fragment; it is, however, sufficient to show that it has belonged to a flat sponge; the skeleton is regular, formed by unispicular fibres, and the surface is finely shaggy. In the fragment are further seen a few polyspicular longitudinal fibres. According to this the sponge must have had a structure resembling that of the above described species *parenchyma*, *folium*, and *ventilabrum*. The spicules are characteristic by their size, being of a length of $0·3$—$0·327^{mm}$, and a thickness of ca. $0·027^{mm}$; they are regularly and evenly tapering, and slightly curved or straight.

Reniera sp. c.

Pl. XII, fig. 2.

From Hekla Harbour we have some fragments brought home by the East Greenland expedition 1891—92; they have a unispicular skeleton, and may, as to their exterior, remind of *R. clavata*, but the spicules are quite different, being very slender and longer tapering; their length is $0·208$—$0·238^{mm}$, but the thickness only $0·008^{mm}$. This species might also, with regard to its form and skeletal structure, recall the *R. simplex*, established by Armauer Hansen in the Norwegian North-Atlantic Expedition, which cannot, however, be seen from the description; however, there is the difference that the spicules of the species of Armauer Hansen are somewhat thicker, $0·010^{mm}$, and their ends are more stubby.

As I have had before me one of the original specimens of Armauer Hansen, I shall give a short description of the species. It will, however, have to get another name, as Bowerbank in 1866 etablished a *Reniera (Isodictya) simplex*; I accordingly alter the name to *Voeringii*.

12. **R. Voeringii** Ldbk.

Pl. XII, Fig. 3.

1885. *Reniera simplex* Armauer Hansen (non Bow.), The Norwegian North-Atlantic Expedition XIII, 3, Tab. 6, Fig. 1.

Lengthily pyriform, longstalked. The dermal membrane thin, without spicules; the ends of the fibres projecting, and the surface accordingly finely shaggy. The skeleton an irregular network of primary and secondary fibres. The fibres unispicular. Particular polyspicular longitudinal fibres issuing from the stalk, are present. The spicules are slender, rather sharply curved oxea of a length of $0·22$—$0·238^{mm}$.

The sponge, as pictured l. c., is lengthily pyriform with a rather long stalk; as the upper end has been broken off, it cannot be seen, however, how long the sponge has been, neither can the structure of the upper end be decided. Through the middle of the thick part a cylindric oscular canal runs, which has most likely ended in an osculum on the top. The length of the specimen is ca. 55^{mm}, of which the stalk is 30^{mm}, the greatest breadth is 10^{mm}, and the diameter of the oscular canal is a few millimetres. The consistency is soft; the *surface* is finely shaggy from the projecting spicules, and the colour (in spirit) is light grayish yellow. The *dermal membrane* is thin, transparent, without spicules, and is pierced by the ends of the fibres.

The *skeleton* is unispicular (not formed by bundles of needles, as stated by Armauer Hansen), and consists of primary fibres running regularly upward and arcuately outward towards the surface, and of spicules placed at right angles to these fibres, but forming themselves no distinct fibres; besides some thicker, polyspicular fibres run from the stalk up through the sponge. In the nodes the spicules are united by a clear mass of spongin.

Spicula are slender oxea, rather sharply curved in the middle, of a length of $0{\cdot}22$—$0{\cdot}238^{mm}$, and a thickness of $0{\cdot}009$–$0{\cdot}010^{mm}$; they are of equal thickness through their whole length, and have a rather short, but very sharp point.

This species, as will be seen, has spicules of a similar size as those in *R. parenchyma*; they may, however, easily be distinguished from the spicules of this latter species, partly by their being more sharply curved, and especially by their ends, the point being bounded by curved lines, while in *parenchyma* it is longer and bounded by straight lines. The species is allied to *clavata*, but may be distinguished from this species by its thinner and more curved spicules.

Locality: The species was taken by the Norwegian North-Atlantic Expedition on station 255, Vestfjord, 68° 12′ Lat. N., 15° 40′ Long. W., depth 341 fathoms; two specimens.

Remarks: This species is the only *Reniera*-species taken by the Norwegian North-Atlantic Expedition, *oblonga* and *velamentosa*, as has been shown above, being *Halichondria*-species, while *tubulosa*, *membranacea*, *nivea*, and *inflata* belong in quite other places, and the rest are Axinellids.

Note. Vanhöffen, in the work quoted before, p. 248, enumerates a *Pachychalina oblonga* Arm. Hans., which, to judge by a preparation sent to me, is no *Pachychalina*, nor *Halichondria oblonga* Arm. Hans., but a *Reniera*-species; it is impossible to determine the species after the preparation in hand, as the skeletal structure cannot be seen. To judge by the spicules the species might possibly be *R. ventilabrum*, but the outer form is by Vanhöffen stated to be quite different from that of this species.

The *Reniera*-species described in the foregoing, divide into two groups: forms with unispicular skeleton, and forms with polyspicular skeleton. All the forms with the regular unispicular skeleton, as far as they are erect forms, have, besides this regular skeleton, a greater or smaller number of polyspicular fibres issuing from the base, where they are thickest and closely gathered, and from where they branch up through the sponge in a more or less regular manner, and without any decided relation to the other skeleton. This reminds of the fact described by Topsent by the establishing of the genus *Cladocroce* with the species *fibrosa* (Résultats des campagnes scientifiques du Prince de Monaco, Fasc. II, 72, Pl. III, Fig. 1–2), and the other description of the structure of this species seems also to agree with the structure of the lamelliform species described in the present work. Topsent, in the place quoted, also says that the genus is most closely allied to *Reniera*, but later he seems to have changed his opinion, in so far as he in 1894 (Une réforme dans la classific. des Halichondrina, Mém. de la Soc. Zool. de Fr. VII, 9) places it in the subfamily *Gelliodinæ*. I must suppose, however, that *Cladocroce fibrosa* is closely allied to the lamelliform *Reniera*-species treated of here, and I think it doubtful whether this genus can be kept apart from *Reniera*. *Cladocroce fibrosa* has spicules of a length of 0·6mm, which is a considerably greater length than is reached by the spicules of the species described here, but in this respect it is well to notice that in the R. sp. b. mentioned before, the spicules reach a length of 0·327mm.

Metschnikowia Grimm.

The form varying, as thinner or thicker crusts, or erect, more or less regularly cylindric or irregularly lobate. The skeleton forms a similar network as that in Reniera. The ends of the spicules are united by a most frequently very slight mass of spongin. Spicula are oxea or strongyla, everywhere or for the greater part set with small spines.

1. **M. spinispiculum** Cart.

Pl. XII, Fig. 4 a—b.

1876. *Isodictya spinispiculum* Carter, Descript. and Figures of Deep-Sea Sponges etc. on board »Porcupine«, Ann. Mag. of Nat. Hist. Ser. IV, Vol. XVIII, 310, Pl. XV, fig. 42.

The form irregularly roundish or lobate, sometimes erect and irregularly cylindric. The surface with small, projecting prominences, caused by the skeleton. The skeleton consists of a chiefly unispicular network of triangular or tetrahedral meshes. Spicula spined strongyla with curved ends, the length 0·208—0·238mm.

Of this species there are in the collection five specimens, none of which are attached, but they appear all to have been broken off. With regard to the three specimens the form is erect and more or less irregularly cylindric; one shows a beginning division into two branches; the fourth specimen forms a little oblong cushion, and the fifth is irregularly lobate. The largest of the erect specimens has a height of 22mm, and the irregular lobate specimen has a greatest extent of 23mm. The consistency is rather firm. The *surface* shows, especially under a magnifying glass, small prominences, but is not shaggy or provided with projecting spicules. The colour (in spirit) is whitish yellow. The *dermal membrane* is thin and transparent, and no particular dermal skeleton is found, but the membrane is resting on the skeleton below; the nodes of this skeleton projecting a little, small prominences are formed. The small, round subdermal cavities shine through the skin. The *pores* are round, and have been measured of sizes from 0·098—0·119mm; the greater part is situated in the meshes made by the skeleton below. With regard to *oscula*, round openings, to be sure, are found here and there; but these openings, at all events the greater part of them, are scarcely anything else than subdermal cavities, over which the skin has been torn off; on the other hand, openings of a diameter of ca. 1mm are found in a few of the specimens, leading into a cavity which continues some way just below the skin and only covered by it; from this cavity canals go down into the sponge.

The *skeleton* consists of a chiefly unispicular network the meshes of which are triangular, or, to put it more exactly, tetrahedral; therefore there is no question of primary or secondary fibres. The form of the ends of the spicules makes them to fit well into each other. In the nodes, in which, according to the construction of the skeleton of tetrahedral meshes, a greater number of spicules meet, these spicules are united by a very small amount of exceedingly clear spongin which is difficult to observe.

Spicula are spined strongyla (acanthostrongyla) of a peculiar form; they are of equal thickness in their whole length, and have rounded ends; the ends are bent rather suddenly to a more or less high degree; they may both be bent in one direction, or in opposite directions in the same plan, and they may finally be bent in different plans. Sometimes the bending is minimal. They are set with small, scattered spines, only the ends are smooth. The length varies between 0·208—0·238^{mm}, which agrees with the measure given by Carter, l. c., viz. about $\frac{50}{6000}$ inch = 0·211^{mm}. The thickness varies between 0·010—0·012^{mm}. Finer spicules, developmental forms, occur in small numbers; these spicules are of interest as furnishing a distinct proof that the spicules are begun in full length; the fact is that the finest are of the same length as the fully developed ones, so that a growth only takes places as to thickness; the finest are of quite the same form as the fully developed ones, but are quite smooth, while the somewhat thicker ones begin to get quite minute spines; accordingly the spines appear first during the growth.

To get a clear understanding of the growth of the spicules, it is of importance here to notice that the spicules of this species, which during the growth only increase in length to a very slight degree, are strongyla; a laying on of new parts parallel to the surface of the spicule will only lengthen such a spicule to an almost imperceptible degree. The fact vill be quite different when the question is of long tapering spicules as oxea; in these spicules a laying on of parallel layers will lengthen the spicule considerably, so that a spicule growing to the double thickness, may also reach about the double length. The annexed sketch illustrates as an example the difference in the increasing of length in strongyla and oxea. Developmental forms of oxea, therefore, are always more or less shorter than the fully developed needles. When, what is often the case, the ends of the spicule during the development become more shortly tapering, than they are in the younger forms, the increasing of length is also comparatively smaller.

Locality: We have five specimens of this characteristic species: east of Iceland, 64° 07′ Lat. N., 11° 41′ Long. W., depth 168 fathoms, two specimens (Wandel); Ingolf, the Denmark Strait, station 80, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms, three specimens.

Geogr. distr. Of this species only one specimen had been taken before by the "Porcupine"-expedition 1870, station 25, 37° 11′ Lat. N., 9° 07′ Long. W., close to the north of cape St. Vincent, depth 374 fathoms (Carter, l. c.). According to Topsent (Éponges nouvelles des Azores. Mém. de la Soc. Zool. XI, 1898, 226), it was taken during the cruise of "Princesse-Alice" 1895—97 at the Azores.

The genus *Metschnikowia* now, after the addition of this interesting species, counts, as far as I am able to see, five species in all; of the other four species the three, *intermedia* Grimm, *intermedia*

Grimm, and *flava* Grimm, have only been found in the Caspian Sea (Dybowski: Studien über Spong. des russ. Reiches, Mém. de l'Acad. imp. des Sciences de St. Pétersb. Sér. 7, Tom. 27, Nr. 6); the fourth, *M. Filholi* Topsent (Résultats des camp. scient. du Prince de Monaco, Fasc. II, 70, Pl. IV, Fig. 7, Pl. IX Fig. 6) is from the Azores.

Petrosia Vosmaer.

(Schmidtia Balsamo Crivelli.)

The form varying. The consistency very hard, almost stony. Generally several, sometimes numerous, circular, sharply defined oscula. The skeleton consisting of a close reticulation of thick fibres or more or less diffuse. Spongin (sometimes) present to a small degree. Spicula oxea or strongyla, most frequently short and thick.

P. crassa Cart.

Pl. IV, Figs. 7—9. Pl. XII, Fig. 5 a, b, c.

1876. *Reniera crassa* Carter, Descript. and Figures of Deep-Sea Sponges etc. on board Porcupine, Ann. Mag. of Nat. Hist. Ser. IV, Vol. XVIII, 132.

The form more or less irregularly roundish, tuberous or lobate. The skin with a dense reticulation of spiculo-fibres. Oscula scattered, circular with a sharp edge. The skeleton consists of a more or less regular network of polyspicular fibres, and besides some scattered spicules. Spongin present to a small degree. Spicula oxea, dividing into two rather well separated groups of size; the length of the larger 0·2—0·35^{mm}, of the smaller ca. 0·08—0·17^{mm}. Further quite short oxea, strongyla, and other forms are found.

This sponge is of an irregularly tuberous or lobate form. Most frequently it is attached to a small stone, from which it spreads, sometimes more in height, sometimes more to the sides, assuming a tuberous or lobate form. The smaller specimens are more roundish, the larger more irregularly lobate. The largest specimens reach a greatest extent of 13^{cm}. The consistency, as in the genus *Petrosia* upon the whole, is hard, almost stony, the tissue, however, being brittle. The colour (in spirit) is whitish or more or less yellowish. The *surface* is smooth. The *skin* scales off easily, and is provided with a close reticulation of spicules, in some places closer than in others. *Oscula* are, in the specimens in hand, found to a number of from two to five. They are very much varying in size, of a diameter of 2—11^{mm}; they are always almost circular, and the skin surrounds them with a sharp edge. Otherwise their structure is very characteristic. They may be deeper or more flattened, and the excurrent canals open into them very close to each other, the openings being rather regularly arranged in a ring-like manner. The arrangement of the system of canals is connected with this feature, as the canals appear to be arranged into two systems, as mentioned by Vosmaer (Porifera 132, Tab. VI, Fig. 9). To be sure, in specimens cut through, the arrangement is not seen so distinctly prominent as in the figure of Vosmaer; but this may probably be owing to the fact that the arrangement is somewhat modified by the irregular form of the present species. It may, however, be seen rather distinctly (Pl. IV, fig. 9) that the excurrent canals meet in the osculum in a radiate way; a system of canals at right angles to the latter, is, on the contrary, only indistinctly seen. Immediately below the skin a great many canals are seen, which shine through as winding and branching lines, and which I take to belong to the incurrent system. Vosmaer, l. c., takes the regular arrangement of the canals to be characteristic of the genus, which is also rather probable, but, strange to tell, it has not been mentioned by the later authors.

This species not unfrequently shows a tendency to separate into concentric layers, not only the skin, but also a series of layers inside the skin sealing off easily; this feature, perhaps, may be connected with the arrangement of the canals.

The *pores* are found in the meshes of the dermal reticulation, and have a size of 0·08—0·17^{mm}.

The *skeleton* consists of a more or less regular network of fibres; the fibres appear chiefly to have two directions, running towards the surface, and parallel to the surface. Generally the fibres running parallel to the surface, are the more distinct ones. The fibres contain rather many spicules, and have a thickness of about 0·1^{mm}; the meshes may be much varying in size, but most frequently they were measured to a size of 0·45^{mm}. Outside of the fibres spicules occur scattered in every direction, but these spicules are all shorter and finer than those forming the fibres. Spongin is present, but only to a very small amount; it is only seen here and there uniting the ends of the spicules. As before mentioned, a close reticulation of meshes is found in the skin, the meshes of which are on an average considerably smaller than those of the other parts of the skeleton; outside of this network are moreover found scattered smaller and finer spicules of the same size as those occurring in the sponge outside of the fibres.

Spicula are oxea; they are evenly, sometimes somewhat irregularly curved, of equal thickness through their whole length, and rather abruptly pointed. Their length varies between 0·08—0·35^{mm}. Although all transitions between these sizes may be found, the intermediate sizes are so scarce that the spicules may be said to divide into two groups that are also of different occurrence in the sponge. The large spicules have a length of about 0·2—0·35^{mm}, but by far the most frequent size is 0·3^{mm}; the thickness is 0·017^{mm}; these spicules form the skeletal fibres and the dermal reticulation. The small spicules on the other hand, occur scattered in the skin, outside of the reticulation proper, as well as throughout the sponge scattered in the tissue outside the fibres; they reach a length of up to 0·17^{mm}, and they are comparatively finer than the large ones, of an average thickness of 0·007^{mm}, but the two groups, as has been mentioned, are not quite sharply separated. Besides these spicules not a small number of small, short and thick, curved oxea and strongyla may be found, and also other different forms (Pl. VII, fig. 5 c).

This species seems to be closely allied to *P. dura* Nardo, but it is distinguished from the latter species by its longer spicules (the spicules of a specimen of *P. dura* in the museum of Copenhagen measure 0·26^{mm}); moreover, its fibres are not by far so thick or consist of so many spicules as the fibres of *P. dura*.

Locality: Station 1, 62° 30' Lat. N., 8° 21' Long. W., depth 132 fathoms, 10 specimens.

Geogr. distr. Carter, l. c., has the species from about the same locality, that is, a little south of the Faröe Islands, depth 167 fathoms ("Porcupine"). The occurrence of the species on this latitude is rather interesting, the genus not being hitherto known as northern, but only from the Mediterranean and more southern regions.

Phlæodictyon Carter.

The form more or less roundish, sometimes lengthened or becoming quite irregular. The sponge provided with shorter or longer tubular processes, so-called fistulæ. The external layer marked off as a harder bark, highly provided with spicules. The other skeleton may be different, formed of fibres, or of a net of single spicules or of irregularly situated spicules. Spicula are oxea, most frequently shortly pointed, sometimes strongyla; most frequently they are somewhat curved. Spongin (often) present, but not to any considerable degree.

Carter, in 1882 (Ann. and Mag. of Nat. Hist. Ser. V, Vol. 10) established a new group *Phlæodictyina*, which he chiefly characterized by the outer form and the presence of processes (which might, however, also be wanting) as well as by a particular lamellar structure (structure essentially laminated and concentric); he describes more particularly, how there are two different layers that may alternate with each other several times, but his description of this structure is not quite clear. To this group he refers *Oceanapia robusta* Bow., *Rhizochalina oleracea* and *carotta* Schmidt (1870, Spong. atlant. Gebiet., 35), *Rhizochalina fistulosa* Bow., and some new established species. The group thus established by Carter, has since been kept up as a subfamily to about the same extent given it by Carter, and with slight modifications in the definition. In the meantime a number of new species have been described under the genus *Rhizochalina* — Dendy comprises this genus and *Oceanapia* under the name *Rhizochalina* — but many of these species agree only badly with the definition of the group given by Carter, having of the characters stated by him only the external hard layer, and being more or less provided with fistulæ; among others this restriction holds good with regard to *Rh. elongata* Topsent, *Rh. media* Thiele, and several others. At the same time several authors have called attention to the relationship with *Petrosia*, for instance Ridley (Report on Zool. Coll. Alert 420), and Thiele plainly regards his *Rh. media* as an intermediate form between *Rhizochalina* and *Petrosia* (Stud. über pazif. Spong., Zoologica. X, 1897—99, Heft 24, II, 19, Tab. IV, Fig. 2, Tab. V, Fig. 11). It is also scarcely to be doubted that the genus *Rhizochalina* must be referred to the *Renierinæ* nearest to *Petrosia*, where it has also to be referred according to its spiculation. Also in *Petrosia* a somewhat lamellar structure may be found, as mentioned before under *P. crassa*; but this structure is far from being found in all *Rhizochalina*-species, and moreover it is probably a phenomenon connected with the growth of the sponge.

As mentioned above, *Rhizochalina oleracea* and *carotta* Schmidt are found among the species, referred by Carter to *Phlæodictyina*. The original specimens of both these species are in the museum of Copenhagen, and by the examination of these specimens it has been seen that these two species have to be referred to the *Chalininæ*, as has also been done by Schmidt; the fact is that they have solid spongin-fibres filled with a large number of very small oxea. The concentric structure mentioned by Schmidt, and which has presumably been a chief reason why Carter has referred the species to *Phlæodictyina*, is the same phenomenon, generally found in the *Chalininæ*, and which I take to indicate periods of growth. With regard to the other species, after the exclusion of *oleracea* and *carotta*, for which species Schmidt established the genus *Rhizochalina*, another name must be chosen, and here Carter's name *Phlæodictyon* ought to be used, which I have adopted accordingly.

The other genus of the supposed subfamily *Phlœodictyinæ* is *Oceanapia*. When *Ph* [illegible] is dissolved, and *Phlœodictyon* is referred to the *Renierinæ*, *Oceanapia* will have to pass to *G* [illegible] where it belongs according to its spiculation, and then it must be nearly allied to *Ge* [illegible] from which it is only distinguished by its form and the external layer of bark. The genus must be taken to have its natural place here, and in this respect it is rather characteristic that Topsent has described loose fistulæ of *Oceanapia* just as belonging to the genus *Gellodes* (*G. ramicornis*; see otherwise for further particulars under *Oceanapia robusta*).

The result accordingly is that the hitherto admitted subfamily *Phlœodictyinæ*[1] is dissolved, the genus *Phlœodictyon* (= *Rhizochalina* olim after the exclusion of *oleracea* and [illegible]) is referred to the *Renierinæ* close to *Petrosia*, and the genus *Oceanapia* to the *Gellinæ* close to *Gellius*.

It may easily be understood that the subfamily *Phlœodictyinæ* has been kept up for some time, as the forms comprised in it show some congruity. The three *Phlœodictyon*-species enumerated here, the two *Gellius*-species, *luridus* and *microtoxa* to be described hereafter, and *Oceanapia* [illegible] thus correspond in the presence of fistulæ, and of an external, bark-like layer, and some of them have the mentioned lamellar skeletal structure. Moreover these forms show all the so-called "Cellules sphéruleuses", even if these cells are somewhat different. I think, however, that we cannot, at all events at the present position of systematism, ascribe any importance to these characters. Thus fistulæ and a hard external layer of skin are also found in the genus *Histoderma*. — Lindgren (Zool. Jahrb. XI, 1898, 297, Tab. 19, Fig. 11 a—b) has also referred a *Histoderma*-species to the genus *Rhizochalina* (the species is wrongly determined as *Rh. singaporensis* Cart.), and if the lamellar skeletal structure is a phenomenon of growth, no importance can be attached to it. Neither can any importance be attached to the occurrence of "Cellules sphéruleuses", as long as their physiological significance is not sufficiently known; besides I have found quite similar forms of these cells in a *Histoderma* or a Desmacidonid-species closely allied to *Histoderma*. Strange to say, these cells would thus seem to be especially developed and conspicuous in forms with an external bark-layer. — Altered points of view in systematism may possibly alter the collocation of the forms here mentioned, but at present I think the dissolution of Carter's *Phlœodictyinæ* that I here have made, to be necessary.

1. **Ph. tuber** n. sp.

Pl. VI, Figs. 11—13, Pl. XII, Fig. 6 a, b, Fig. 7.

The form roundish, more or less irregular; only few fistulæ. The surface [illegible] *projecting spicules. Outermost a hard layer of skin with irregularly placed spicules parallel* [illegible] *face. The inner skeleton is an irregular tissue of spicules without fibres;* [illegible] *centric layers of close-set spicules parallel to the surface. Spongin present* [illegible] *curved oxea of a length of 0.28—0.35mm.*

This species may be of a somewhat varying form; but it is, however, in all the specimens in hand, more or less roundish or tuberous, and the sponge is provided with one or a few fistulæ. The largest specimen is lengthy; it has a greatest length of 28 [illegible], and a greatest breadth of ca. 13 [illegible]. It

[1] Carter for his group used the name of *Phlœodictyina*.

skeleton are united by a clear [illegible] layer where the spicules are close together, [illegible] spicules, but also in other places where the [illegible] regard to the skeleton it has still to be noticed that the [illegible] bodies, large sponge-spicules being especially frequently [illegible]

Spicula are somewhat curved oxea, the curve is most [illegible] also be more or less sharp, and sometimes it is somewhat irregular, the [illegible] best be termed shortly pointed. Their length is between [illegible] the thickness [illegible] 0·012—0·014 [illegible]. Shorter and finer, down to quite fine oxea, developmental [illegible] small numbers; the finest ones have a length of ca. 20[illegible], and thus the [illegible] the fully developed ones; they are very long tapering, and consequently the short pointing [illegible] only during the growth.

Locality. Station 78, 6[illegible]°37' Lat. N., 27°52' Long. W., depth 700 fathoms, one specimen; [illegible] 81, 61°44' Lat. N., 27°[illegible]' Long. W., depth 485 fathoms, two small specimens; station [illegible] Lat. N., 29°06' Long. W., depth 568 fathoms, two larger and two smaller specimens. The stations [illegible] the Denmark Strait, or somewhat south of it.

2. Ph. elongatum Tops.

Pl. VI, Figs. 3 [illegible]; Pl. XII, Fig. [illegible]

1892. *Rh[illegible]* Topsent, Résultats des Campagnes scient. du Prince [illegible] 73, Pl. IV, figs. [illegible], Pl. IX, fig. 1.

[illegible] roundish [illegible] in several layers parallel [illegible] dermal layer [illegible] prominences, through which [illegible] The interior skeleton consists [illegible] irregularly [illegible] in the dermal layer. Spicula are comparatively thick and [illegible] *0·16—0·19mm.*

Of this species we have two specimens, which I determine as [illegible] Tops. [illegible] partly in form and especially with regard to the spicules, agree completely with this species. [illegible] specimens are of a roundish form, and the surface is warty from larger [illegible] smaller roundish [illegible], as is also shown in the figure of Topsent l. c. The larger specimen has a length [illegible] of 15[illegible]. It is provided with three fistulae, of which two seems to [illegible] off at the base. The two entire ones are of about the same length [illegible] scarcely 2[illegible]. This specimen is especially highly incrusted with [illegible] is a little smaller, it has a greatest extent of 17[illegible] and [illegible] placed close to each other, but both broken off. On account [illegible] firm, but the consistency of the interior is loose and soft. The [illegible] a slight yellowish tint. The [illegible] that is apparently [illegible] and by a closer examination it is seen to be slightly and sparingly spinulous from singly placed, slightly projecting spicules. On account of the close-set spicules, the external part of the sponge, which is marked off as a *dermal layer*, is very firm and hard. I have not observed *pores* in the exceedingly close-spiculed skin. *Oscula:* In one specimen, in which two fistulæ are found that are likely to be whole, these fistulæ are open at the summit, and the openings must be taken to be oscula. One fistula has the opening at the very top, while in the other the opening is in the side just below the top.

The *skeleton*. As has been mentioned, the species has outermost a part formed as a dermal layer; this dermal layer is very hard, and provided with exceedingly close-set spicules lying in several layers; the dermal layer has a thickness of somewhat more than $0{\cdot}1^{mm}$. The spicules of this layer are parallel to the surface, and their arrangement, as the curved spicules form angles with each other, shows a pattern recalling the kind of engraving frequent on the back of watches, the so-called guilloche. The spicules, to be sure, are chiefly parallel to the surface, but at certain intervals the whole layer of spicules rises into low, conical processes, through the midst of which a spicule projects a little, so that the surface is slightly spinulous. The skeleton in the soft interior of the sponge, as far as I have been able to decide from the material in hand, consists of spicules lying scattered in the tissue without any order, and without forming any reticulation or fibres; neither seem, as in the preceding species, any lamellæ to be found. On the other hand, the membrane lining, at all events the larger canals, is provided with a spiculation of about the same kind as that of the dermal layer, but considerably more open, so that a kind of network is formed. In the inner body no spongin is observed in the skeleton; on the other hand spongin is found uniting the spicules of the dermal layer and of the membranes; the spongin is exceedingly white and clear, and consequently not easily seen. As in the preceding species, and to a still higher degree, a large number of extraneous bodies are also found in the present one; in one specimen externally highly incrusted with sand, the sand is also found in the interior together with sponge-needles; in the other specimen large sponge-needles are almost exclusively found crossing the sponge in every direction.

Spicula are comparatively short and thick oxea, rather highly bent; the bending may be even, but most frequently it is rather sharp; the spicules are shortly pointed with a rather stubby point, under higher magnifying powers the point shows outermost a little apex especially marked off. Sometimes, but rather rarely, the ends are rounded; Topsent mentions this fact to be of frequent occurrence in his specimens. The length of the oxea varies from $0{\cdot}16$—$0{\cdot}19^{mm}$, the thickness from $0{\cdot}012$—$0{\cdot}018^{mm}$. Developmental forms, down to quite fine ones, occur, but in rather small numbers; the finest have a length of $0{\cdot}142^{mm}$. The fine needles are long tapering, and consequently the short point appears only during the growth.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, one specimen; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms, one specimen. Both stations are situated a little to the south of the Denmark Strait, station 81 on the Reykjanæs-ridge, station 78 on the eastward slope of this ridge.

Geogr. distr. The species has been established on four specimens taken on the expedition of the Prince of Monaco with l'Hirondelle in 1888 at the Azores on a depth of about 138 fathoms (Topsent l. c.).

Remarks. In these two species, but especially pronounced and in large numbers in the latter, some peculiar bodies are found; they are round, of a radiated structure, are refringent, and by a certain adjustment they show a darker part or appear to be possessed of a cavity, which fact, however, I suppose to be due only to the refraction. The radiated structure may be so pronounced as to continue into the periphery, so that they appear to be spined. They may reach a rather considerable size, and vary from 0·014—0·035mm. I take these bodies to be cells storing some substance or other, and to belong to the category, called by Topsent *cellules sphéruleuses*; I think them so much the more to be such cells, as we find a large number of round cells, filled with refringent granules, which quite certainly correspond to the *cellules sphéruleuses* Tops., and between these latter and the former transitions are found in the form of cells filled with granules, beginning to show the radiated structure; the radiated form then is probably the fully developed phase of the cell.

3. **Ph. irregulare** n. sp.

Pl. VI, Figs. 9—10. Pl. XII, Fig. 10 a, b.

The form irregular, sometimes lengthened and somewhat cylindric, but twisted [illegible]. Only few fistulæ. The surface smooth. Outermost a thin, hard dermal layer with very close-set spicules lying in an irregular way, but parallel to the surface. The interior skeleton formed of irregularly scattered spicules. Spongin present, but only to a small degree. Spicula curved oxea with a short, [illegible] apex, 0·178—0·24mm.

Of this species we have four very small specimens of a quite irregular form. The largest specimen has a greatest extent of ca. 13mm; it appears to have been attached with one surface; it has a quite irregular, twisted form, and shows marks of three broken off fistulæ. The other specimens are lengthened, somewhat nodulous and bent, of a length of ca. 10mm, and each has had two or three fistulæ. The colour (in spirit) is yellowish white. The consistency is like that of the preceding species, internally the sponge is very cavernous. The *surface* is smooth, setting aside its nodules. *Pores* and *oscula:* I have not observed pores in the dense-spiculed *skin* covering the body. As the fistulæ have been broken off, nothing can be said as to their having been open or closed; only a single fistula appears to be whole, though not quite undamaged; it is quite short, and appears to have been closed at the end, and it shows in its outermost part a particular structure, the close-set spicules of the skin here lying more openly, and passing into a somewhat netlike arrangement, and here pores are found. The course of the canals I have not been able to examine, but I suppose these pores to be excurrent openings.

The *skeleton.* Outermost is found a part formed as a dermal layer, in which the spicules are closely packed, considerably closer than in *Ph. tuber.* The spicules are lying in every direction, parallel to the surface. The dermal layer is thin containing not much more than one layer of spicules, and the very highest thickness to which it reaches, is 0·03mm. As far as I have been able to decide by the material in hand, the inner skeleton, as in the preceding species, consists of irregularly scattered spicules forming no fibres. As well in the skin as in the inner skeleton the spicules are united by a not copious and very clear mass of spongin; in the close-spiculed dermal layer the spongin is found in all points of contact. Also in this species some extraneous bodies are found incrusted, but to a far slighter degree than in the preceding species.

Spicula are curved oxea, of equal thickness throughout their length; their point is short and stubby, sometimes with a little outermost apex especially marked off. The spicules are rather varying in length, from 0·178—0·24^{mm}, and also the thickness is somewhat varying, from ca. 0·008—0·012^{mm}, the longest ones being far from always the thickest. Developmental forms, down to quite fine ones occur, but in small numbers; the finest have a length of ca. 0·166^{mm}. The developmental forms are long tapering, but by and by, as the thickness increases, the points become shorter.

Locality: Station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms, four specimens.

Remarks. In this species cells filled with granules are found, but in smaller numbers and of considerably smaller size than in the preceding ones; forms with radiated structure were not found.

Fam. II. Heterorrhaphidæ.

Subfam. 1. Gelliinæ.

Gellius Gray.

The form exceedingly varying: it may be quite irregular, but it may also be definite and regular, for instance leaf-shaped, calicular, or pyriform. The skeleton is a more or less regular network or quite irregular, of renieroid or halichondroid structure, and long fibres are not found. The mass of spongin is rather small, and does not quite surround the spicules or the fibres. Spicula: Megasclera diactinal, oxea or strongyla: microsclera sigmata, sigmata and toxa, toxa, sigmata and raphides, or raphides alone.

The genus is chiefly distinguished from *Gelliodes* by a more reticular skeleton without long fibres; the relation, therefore, between *Gellius* and *Gelliodes* is about like that between *Biemma* and *Desmacella*.

1. G. arcoferus Vosm.

Pl. XII, Fig. 11 a, b, c.

1885. *Gellius arcoferus* Vosmaer, The sponge of the Willem Barents Exp. 1880—81. Bijdragen tot de Dierk., 12te Aflev. 3 Ged. 29, Pl. IV, fig. 18, Pl. V, figs. 87—90.

1887. — — Fristedt, Vega Exp. vetensk. Iakttag. IV, 430, Pl. 24, fig. 29—31, Pl. 28, fig. 16.

1896. — — Lambe, Sponges from the Atlant. Coast of Canada. Transact. Roy. Soc. of Canada, Ser. 2, II. Sect. IV, 184, Pl. I, fig. 3, 3 a—b.

Leaf-shaped? Spicula: Megasclera oxea 0·42^{mm}; microsclera toxa 0·057—0·178^{mm}, sigmata 0·012—0·019^{mm}.

Of this species we have only a little fragment; its form is compressed, and its one undamaged edge is rounded, so that it might be a piece of an erect, flat sponge; its colour (in spirit) is yellowish gray. Although Vosmaer gives no measures of the spicules in *Gellius arcoferus*, there can scarcely be any doubt that the present species is the same; it agrees also with the description by Fristedt and Lambe of the specimens, by those authors referred to *G. arcoferus*. *Spicula* in my specimen are of the following forms and dimensions: a. *Megasclera* are oxea, straight or slightly bent, and evenly and rather long pointed; their length is rather constant, and on an average 0·42^{mm}, the thickness, on the contrary, is rather varying, 0·015—0·022^{mm} [1]); shorter and finer oxea are found in small numbers, and are certainly developmental forms; b. *Microsclera*: 1) Toxa; these vary much in thickness, and also somewhat in length, but the thinner and shorter ones I suppose to be developmental forms; they seem to be begun in about their full length, and chiefly to grow only in thickness. They are more or less curved in the middle, and just at the point the ends have a little bend the opposite way; in the finest of the bows the bend at the ends is often wanting. The length (which is somewhat dependent on the size of the curve) varies from 0·057—0·178^{mm}, the thickness varies from 0·0014—0·007^{mm}; these are the limits between which the sizes of all the bows are found, but also the bows, the thickness of which in proportion to their length shows them to be quite developed, are somewhat varying, about from 0·119—0·178^{mm}, and the thickness from 0·005—0·007^{mm}. 2) Sigmata; these are small, of a length from 0·012—0·019^{mm}, the thickness is about 0·001^{mm}.

With regard to the skeletal structure it is to be noticed that the ends of the spicules are united by a distinctly observable mass of spongin.

Locality: The only specimen, a little fragment, is from East-Greenland, ca. 72° 40′ Lat. N., 20° 00′ Long. W., depth 100 fathoms. (The East-Greenland expedition 1891—92).

Geogr. distr. Barents Sea, depths 140 and 170 fathoms (Vosmaer); to the north-east of the eastern Taimur peninsula, 76° 52′ Lat. N., 116° 00′ Long. E., depth 36 fathoms; Greenland 59° 33′ Lat. N., 43° 25′ Long. W., depth 120 fathoms (Fristedt); the Gulf of St. Lawrence (Lambe). Accordingly the species is widely spread in longitude, from 116° Long. E. to ca. 70° Long. W., but it has not been taken south of ca. 45° Lat. N.

2. G. angulatus Bow.?

Pl. XII, Fig. 12 a, b, c, d.

1866. *Halichondria angulata* Bowerbank, Mon. of Brit. Spong. II, 233, III, Tab. XLI, figs. 4—8.
1880. *Desmacodes angulatus* Vosmaer, Notes from Leyden Museum II, 107.
1887. *Gellius angulatus* Ridley and Dendy, Challeng. Report. Monaxonida, Vol. XX, 2, 44.
1892. — — Topsent, Résultats des Campagn. scient. du Prince de Monaco. Fasc II, 70.

Of this species we have some roundish fragments, the largest of which has a greatest extent of 43^{mm}, but we have no whole specimen. I have not ventured to regard the determination as certain, especially as the species has never been satisfactorily described, and the spicules have not been figured since in Bowerbank, with the exception that Topsent (Contrib. à l'étude des Clionides. Arch. de Zool. expériment. et gén. Sér. 2, Tom. V, bis, Pl. VI, Fig. 15) figures them, but with regard to the bows his figure does not agree well with that of Bowerbank, and the given measures do not agree with

1) The spicules may also in different specimens be of different thickness, as already mentioned by Vosmaer; in a specimen before me from Greenland, sent from the Riksmuseum in Stockholm, the greatest thickness of oxea is thus 0·015^{mm}.

those given by Ridley and Dendy for the specimen of Bowerbank; Topsent also states that the spicules project through the skin, while Bowerbank describes the surface as smooth.

The species in hand has a thin *dermal membrane* that cannot, however, be torn off; no particular dermal skeleton is found; but if a thin section is cut off parallel to the surface, this section shows an irregular network, which is polyspicular, but here and there also formed of single spicules. Spicules and bundles of spicules project through the skin, so that the surface is not smooth. The *pores* are round, and are situated in the meshes of the dermal membrane; they are measured of a size of 0·008—0·148^{mm}.

The *skeleton*, as far as I have been able to examine it, has a somewhat halichondroid structure consisting of loose, little marked fibres, among which, however, in many places, a unispicular reticulation is found. The ends of the spicules are united by a distinct, but clear mass of spongin.

Spicula: a. *Megasclera* are oxea, more or less curved in the middle, gradually tapering to the point, which is most frequently somewhat marked off, and the very outermost point is oftenest more or less shortly pointed; this structure, however, is not always pronounced; the length varies between 0·32—0·388^{mm}, and the thickness is 0·009—0·012^{mm}. Shorter and finer oxea are only seen in very small numbers. b. *Microsclera:* 1) Toxa; with regard to form they resemble the bows of the preceding species, but they are smaller and especially thinner; the curve in the middle is sometimes so sharp, that the branches form a right angle; as in *arcoferus* the bending at the ends consists only of a little point inclined backwards. The length of the bows is between 0·12—0·064^{mm}, and the thickness is from 0·002^{mm} down to 0·001^{mm}. 2) Sigmata; these are rather small, of an average length of 0·021^{mm}, and a thickness of 0·001^{mm}. — Besides these sigmata a very few much larger ones are found, of a length of about 0·078^{mm} and a thickness of 0·005^{mm}. These sigmata are often of a somewhat monstrous form, with one or both ends rounded or showing other irregularities. As has been said, they are only found quite singly, but they are constantly found, so that they cannot be taken to be extraneous. They are not seen by transitions in sizes to be connected with the small sigmata. — In a specimen from Egedesminde, the spicules of which were upon the whole of the largest of the sizes given above, the sigmata were a little larger than those mentioned above, of a length of 0·028^{mm} and a thickness of 0·002^{mm}.

Locality: Adelvig on the north-western coast of Iceland, depth 6—15 fathoms, some fragments which have apparently belonged to one specimen (the author); Egedesminde, a few small fragments (Bergendahl).

Geogr. distr. *Gellius angulatus* is common in the English Channel (Topsent), and has further been taken at the Azores (Challenger, Topsent) in the latter place on depths of up to 450 fathoms.

3. **G. luridus** n. sp.

Pl. VI, Figs. 5—8, Pl. XIII, Fig. 1 a—c, Figs. 2—8.

Free; oblong pyriform, more or less irregular, sometimes roundish or lobate. The surface smooth. Outermost a bark consisting of a thinner or thicker layer with close-packed spicules lying in all directions, but parallel to the surface. The skeleton consists of a rather irregular, mostly unispicular network; it is crossed by concentric lamellæ of a similar structure as the dermal layer. Spi-

cula: Megasclera oxea, 0·38—0·47^{mm}*; Microsclera toxa, rather small, greatest length* [illegible] *of a particular form with the shaft bent into an angle* 0·014—0·05^{mm}.

This species is lengthily, but oftenest somewhat irregularly pyriform; the smaller specimens are more roundish, a single one somewhat lobate. It must have been growing freely on the bottom, as no place of attachment is found, but the sponge which is narrowing below, is here rounded, and ends often with a larger or smaller knob, especially marked off. The largest specimen has a height of 60^{mm}, and a diameter in the middle of 17^{mm}; then a series of specimens is found decreasing in size; the smallest specimen has a height of 9^{mm}. The colour (in spirit) in most specimens is dirtily yellow, but in a few it passes into a darker colour[1]). On account of the external rind-layer the consistency is rather firm. The *surface* is even and smooth, with here and there flat eminences and depressions. The sponge is surrounded by a hard and firm *dermal layer*, provided with spicules lying in every direction and exceedingly close-packed, but all parallel to the surface; this part that is marked off as a separate layer, may be of a somewhat varying thickness, as will be more particularly mentioned below. Outermost a thin dermal membrane is found, which, however, is not separable, and which I have only observed in a few places, so that it seems for the greater part to be destroyed. In this membrane the *pores* are found in the intervals left between the close-packed spicules; they are small, from 0·007^{mm} up to 0·029^{mm}, or, but rarely, somewhat larger. With regard to *oscula* only one is found, in the upper end of the sponge; but I cannot give its structure and size, as the upper end is damaged in all the specimens. The sponge is probably somewhat tapering above, or rather, as indicated by one of the least damaged specimens shown in the figure Pl. VI, fig. 5, it is here produced into a tube, in the end of which the osculum is then found; the presence of such a thin-walled tube would explain the fact that this fragile part has been broken off in all the specimens. Two oscular canals of equal width, running side by side, and only separated by a thin membrane, lead in all the specimens from the upper end towards the lower end of the sponge (Pl. VI, fig. 8); in the largest specimen they have a width above of 4—5^{mm}. Into these oscular canals the excurrent canals open; they have a rather regular course running from the outside obliquely upward and inward towards the oscular canals and at the same time converging to wider canals.

The *skeleton.* As mentioned the sponge is surrounded by a hard and firm part marked off as a dermal layer. The firmness of this layer is due to very closely packed spicules, lying in all directions in several layers, but parallel to the surface. The thickness may be somewhat varying, but is greatest in the lower part of the sponge, and decreases upward; in the lower part it may be somewhat more than 1^{mm}. Where a knob-like lowermost part is especially marked off, this part consists almost completely of this skeletal tissue, which may here reach a thickness of up to 5^{mm}. When the dermal layer in the lower part of the sponge is rather thick, it consists also of heterogenous layers, layers with close-packed spicules parallel to the surface alternating with layers, in which the spicules are arranged in a more netlike manner, and are not parallel to the surface. The other skeleton has a rather peculiar, lamellar structure, consisting of thin lamellae, more or less parallel to the surface; these lamellae consist of close-packed spicules parallel to the surface, as in the dermal layer; between the lamellae

[1]) A couple of the specimens are quite grayish black; this colour I take, however, to be due to colouring by other sponges, together with which they have been lying in spirit.

mostly unispicular network is found. The lamellæ orginate from the dermal layer and continue upward, bending into the sponge (Pl. XIII, fig. 2), and they appear to form continuous layers all round the sponge. They consist of a dense feltwork of spicules lying in all directions parallel to the surface, but the spicules are not quite so close-packed as in the layer of spicules closest to the dermal membrane. The lamellæ are pierced by the canals, and therefore they show a great many round holes. As mentioned, a network is found between the lamellæ. This network is rather irregular, its most regular feature is fibres running vertically on the lamellæ towards the surface; these fibres are most frequently polyspicular; the other network is unispicular und irregular. — This particular lamellar structure, which is found as well in the thicker parts of the dermal layer of the sponge, as also especially marked off in the other skeleton, is not easily explained, but I suppose it to be connected with the way of growth of the sponge.

The spicules of the skeleton are in the points of intersection united by a clear, but distinctly observable mass of spongin; the spongin is developed, not only at the ends of the spicules, but wherever the spicules are in contact with each other; therefore in the outer skin and in the lamellæ, where spicules intercross in all directions, the spongin is present in all the points of contact, and imparts a great firmness to this skeleton. It is therefore frequently seen, when isolated spicules are examined that they are provided with coats of spongin in several places, where they have been in contact with other spicules (Pl. XIII, figs. 7, 8).

Spicula: a. *Microsclera* are evenly curved oxea, only rarely they are a little more sharply bent in the middle; sometimes the curve is a little irregular; they are of greatest thickness in the middle, and taper somewhat towards the ends, the point itself, however, being only of a middle length; the length varies between 0·387–0·476^{mm}; the thickness varies between 0·010—0·0128^{mm}. Shorter and finer oxea are only found in small numbers. b. *Megasclera.* 1. Toxa; these are rather small, obtuse-angled, and the ends are inclined backwards; they are of greatest thickness in the middle, and taper evenly towards the ends. The full-grown and largest forms reach a length of 0·06^{mm}, and a thickness in the middle of ca. 0·0028^{mm}, but from this size downward all sizes and developmental forms are found down to so small a size as hardly to be observed; thus they have been measured down to a length of 0·005^{mm}. According to this these bows appear during the growth not only to increase in thickness, but also to grow very much in length; the small forms, however, are always inscribable in the larger ones, when the angle is the same; and a growth by mere apposition of parallel layers will increase the length of the bows to a rather high degree; a growth in length by apposition, however, must certainly also take place, during which the inclined ends appear; these ends are not found in the smallest forms. 2. Sigmata. They are of a particular form, having in the middle a sharp, but obtuse-angled curve, and the first part from here outward is straight, but then the ends continue arcuately and taper to long points. Thus the middlemost part of this sigma reminds as to its form of a bow; the form may, however, be somewhat varying, and is sometimes rather irregular, which influences the length of the sigma, measured after the greater axis. The length varies from 0·014—0·05^{mm}, the thickness in the middle is ca. 0·001^{mm} in the larger, and a little less in the smaller ones.

Remarks. In this species granulous cells — *cellules sphéruleuses* Topsent[1]) — were found

1) These cells, no doubt, correspond to Topsent's *cellules sphéruleuses*; but in naming them so, I do not mean anything as to their physiological signification. They are well known, and have often been mentioned, and different

in rather large numbers throughout the tissue; they are roundish, of a deep yellow colour (in spirit), filled with granules, and of an average size of 0.011^{mm}.

Embryos. In one of the specimens which was cut through, a cavity of a diameter of 5—6 was found in the lower third part of the sponge, in the tissue, between the oscular canal and the outer surface. In this cavity also the skeleton, even the skeletal lamellæ were away, and its walls were lined by a thin membrane. In the cavity was found a number (ca. 20?) of roundish embryos of a diameter of about 1^{mm}. They were presumably each surrounded by a thin membrane, as fragments of such a one adhered to them when they were taken out. To judge by an examination of a couple of the embryos, they seemed only to contain bows and sigmata, which were found copiously, and of the same size as in the fullgrown sponge, but no megasclera.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 90, 64° 45′ Lat. N., 29° 06′ Long. W., depth 568 fathoms, 9 specimens in all. The mentioned stations were both very rich in sponges, station 78 even the richest of all the stations.

4. G. microtoxa n. sp.

Pl. XIII, Fig. 9 a—d, Fig. 10.

Oblong-pyriform. Outermost a rind-like, but comparatively thin dermal layer with rather close-packed spicules lying in every direction, but parallel to the surface; here and there this layer rises to small prominences, so that the surface is not smooth. The inner skeleton forms an irregular, polyspicular reticulation (probably with concentric lamellæ). Spicula: Megasclera oxea 0.62—0.68^{mm}; microsclera: toxa, very small, 0.01—0.02^{mm}, sigmata of the common form, but sometimes with the shaft somewhat bent so as to form an angle, 0.035—0.078^{mm}.

Of this species we have only a single, highly damaged specimen, mostly consisting of the outer layer of the sponge while the interior is wanting. To judge by this specimen the species has a similar form as that of the preceding one. The species has a length of 35^{mm}, and a greatest breadth in the middle of 15^{mm}. The colour (in spirit) is yellowish white. The *surface* is not quite smooth, as the spicules of the skin parallel to the surface, appear as a slightly conspicuous, irregular reticulation; besides the surface has rather close-set, low, knob-like prominences. As in the preceding species, the sponge is surrounded by a firm *dermal layer* provided with spicules lying in all directions parallel to the surface, but they are not so close-set as in the preceding species; the dermal layer is also much thinner than that of the preceding species. In the membrane the *pores* are scattered in the intervals between the spicules; they are measured of a size from 0.029—0.16^{mm}. As the sponge is so much damaged, and the inner tissue is wanting, nothing can be said with regard to oscula and canals.

The *skeleton.* As stated above, the sponge has outermost a firm dermal layer provided with spicules lying irregularly in all directions, but parallel to the surface; these spicules, however, are not by far so close-packed as in the preceding species, and the dermal layer is much thinner. In certain places some spicules rise pyramidically, their ends meeting, and consequently the skin is raised into

authors ascribe to them different functions; evidently it is also these cells which Ridley and Dendy (Challeng. Report Monaxonida, XX, p. XXII, pl. XLIX, figs. 1, 1 a, 2 a) interpret as spongoblasts.

the low prominences mentioned above. As to the other skeletal structure, I have not been able to decide with certainty, whether concentric lamellæ are found here as in *G. luridus*; but it would seem so, as a layer, constructed in the same way as the dermal layer, is found a little way within this latter. The other inner skeleton, as far as I have been able to decide, consists of an irregularly polyspicular reticulation. As in *G. luridus*, the spicules of the dermal layer and of the lamellæ inside are, at the points of intersection, and not only at the ends, united by spongin; but in the present species the spongin is only found to a very slight degree; the amount of spongin is also very slight in the other parts of the skeleton.

Spicula: a. *Megasclera* are oxea, slightly, sometimes a little irregularly curved, and rather shortly pointed; the length is very constant, and is between 0·62—0·68^{mm}, the thickness is 0·014—0·017^{mm}, finer, to very fine oxea are found, but only in very small numbers. b. *Microsclera:* 1. Toxa; these are exceedingly small and fine; their form is obtuse-angled to rectangular, and they have, at all events the larger ones, a little recurved point; upon the whole they resemble the small toxa in the preceding species, being only more frequently rectangular or about so. Their length is 0·01—0·02^{mm}, the thickness is less than 0·001^{mm}. 2. Sigmata; while in the present species the toxa are smaller than in *luridus*, the sigmata are larger; they have the common form, but sometimes they have a sharp curve in the middle, and so they resemble the sigmata of *luridus*; upon the whole they are often somewhat irregular and angular in the curve. The length is somewhat varying, from 0·035—0·078^{mm}, and the thickness is in proportion 0·0018—0·003^{mm}. In this species I have found developmental forms of sigmata; as was to be expected beforehand, the sigma is begun in about its full length, and it grows only in thickness and so far in length, as the recurved ends are formed and get their full length. The developmental forms I have found, which are only very few, are characterized as such by being fine, and not, or only to a small degree, having the ends bent in a hook-like manner; the length may be varying, and has, for instance, been measured to 0·05^{mm}. It is accordingly seen that the growth only takes place by apposition, and so it is proved that the small sigmata that are fully developed as to form, are not developmental forms of the larger ones, but are sizes that are present together with the larger ones. As well sigmata as toxa are present in large numbers throughout the sponge; besides sigmata are seen in rather large numbers in the skin, while toxa are not found there.

Remarks: As in *G. luridus* cellules sphéruleuses Topsent are found in large numbers in the present species, but here they are only found in the dermal layer — and in the layer inside the skin mentioned in the description —; their occurrence in the dermal layer is rather peculiar; that is to say they are partly found scattered, but partly also closely gathered into bandshaped groups with a direction longitudinally of the sponge. These bands are distinctly visible to the naked eye or through a lens, and they convey an impression of being spiculo-fibres; it is only under the microscope that they are seen to be formed by the close-gathered cells (Pl. XIII, fig. 10). The average breadth of the bands is about 0·11—0·15^{mm}. The cells are roundish, elongated, or fusiform, sometimes produced at both ends to fine processes. Their colour (in spirit) is light yellow; averagely they are larger and with larger, more refringent granules than those of *luridus*. The roundish ones have an average size of 0·008—0·017^{mm}, the elongated ones reach a length of ca. 0·035^{mm}. Those scattered in the skin, are the greatest, and they are most frequently elongated; those gathered together into bands, are smaller and most frequently round.

Locality: Station 76, 60° 50′ Lat. N., 26° 50′ Long. W., depth 806 fathoms; only one damaged specimen.

Note. The two species now described, *G. luridus* and *microtoxa*, as well by their spiculation as the whole other structure, thus, I suppose, also by their numerous and distinct "cellules sphéruleuses", appear to be very nearly related; but on the other hand characteristic differences are found, both in spiculation and other structure; thus with regard to the spiculation, the sizes of the spicules and the reciprocal proportion of their sizes, as also the different structure of sigmata. In the skeletal structure is especially to be noted the difference that the spiculation of the dermal layer — and of the layer inside constructed in a similar manner — is far more dense in one than in the other, and also the amount of spongin is different. Finally is to be noted the difference with regard to "cellules sphéruleuses" and their occurrence.

On account of the rind-like dermal layer and the lamellar structure of the skeleton, as also on account of both species presumably having been provided with a "fistula", these two species might be referred to the genus *Oceanapia*, but then this genus would have to be extended so as also to comprise species with toxa; if with Dendy we should prefer to unite it with *Rhizochalina* (*Phloeodictyon* mihi), it would accordingly contain species without microsclera, species with sigmata, and species with both sigmata and toxa. In the present work, however, I have only kept the genus *Oceanapia* for the species *robusta* (for particulars see under this species and the introduction to the genus *Phloeodictyon*).

5. G. primitivus n. sp.

Pl. XIII, Fig. 11 a—b.

Crust-shaped, thinner or thicker. The skeleton is a rather regular network; for a great part it is unispicular, but polyspicular fibres are found, especially running towards the surface. Spicules: Megasclera curved oxea 0·137—0·160 mm; microsclera fine toxa 0·028—0·107 mm.

We have only this species in more or less damaged specimens, and in dry state, so that the description must chiefly be restricted to the spicules. The species grows incrusting on a branched Lithothamnion, one of the specimens shows a tube. The greatest extension reached by any of the specimens, is ca. 14 mm. The colour in the dried state is yellow. As far as I have been able to judge from the specimens in hand, the surface is shaggy, the dermal membrane being pierced by the ends of the spicules.

The *skeleton* consists of a rather regular network, partly unispicular, but also polyspicular fibres are found in it, especially running in the direction towards the surface. The skeletal meshes are more or less rectangular. Especially the fibres running towards the surface (the primary ones) are distinct, while the fibres running vertically on these are less conspicuous. In the nodes of the skeleton the spicules are united by a distinct and rather copious mass of spongin.

Spicula: a. *Megasclera* are oxea; they are more or less, most frequently rather strongly, and sometimes irregularly curved; they are of about equal thickness in their whole length; the points are somewhat varying in length, but are always rather short. The length of the oxea is between 0·137—0·166^{mm}, and may in a few cases reach 0·178^{mm}. The thickness is rather varying, and the longest ones are not the thickest; it varies between 0·003—0·007^{mm}, the thicker ones being most frequently met with. b. *Microsclera*; only one form of microsclera is found, viz. toxa; they are all fine, but very much varying in length, and also their form is somewhat varying, and rather frequently somewhat irregular; their curve varies very much, so that they may be from almost straight to rectangular; in many of them the ends are a little inclined backwards, while in others this inclining is wanting. They are of equal thickness in their whole length, and upon the whole their appearance is very simple. Their length is from ca. 0·028 up to 0·107^{mm}. The thickness is ca. 0·001^{mm} or somewhat more in proportion to the size [1].

Locality: Julianehaab (inspector Ryberg). We have in all seven specimens or fragments, all growing on a branched Lithothamnion.

6. **G. proximus** n. sp.
Pl. XIII, Fig. 12 a—b.

Crust-shaped, incrusting. The dermal membrane thin, the nodes of the skeleton below make it slightly granulous, and it is slightly shaggy from projecting spicules. The skeleton (or by far the greatest part of it) is unispicular, and forms triangular or irregular meshes. Spicula: Megasclera oxea 0·140—0·184^{mm}; microsclera fine toxa 0·028—0·107^{mm}.

Of this species we have only two small specimens growing as incrustations on Balanoid shells; the greatest extension is 17^{mm}, but the specimens are scarcely quite whole; the thickness is ca. 4^{mm}. The *surface* is slightly granulous, and spicules project. The colour (in spirit) is a light gray. The *dermal membrane* is thin and transparent, and the spicules below it form a reticulation of mostly triangular meshes; the nodes rise a little which is the cause of the granulous appearance of the surface; besides spicules from the skeleton project through the skin, and so it is slightly shaggy. *Pores* are found in large numbers in the meshes, and are measured of a size from 0·017—0·18^{mm}.

The *skeleton* is unispicular, and consists of triangular or irregular meshes, polyspicular fibres are perhaps also found. The part of the skeleton immediately below the skin forms rather regular, triangular meshes that may be seen through the skin as a reticulation. The ends of the spicules are united by a clear, copious mass of spongin.

Spicula: a. *Megasclera* are oxea; they are slightly curved, sometimes almost straight, of equal thickness in their whole length, and more or less shortly pointed; the points are often rounded, and then sometimes provided with a little mucro. The length is between 0·149—0·184^{mm}; they are rather thick, the thickness varying from ca. 0·006—0·01^{mm}. Finer needles, developmental forms, occur in small numbers. b. *Microsclera:* only one form of microsclera is found, viz. toxa; they are of quite the same form as the bows in the preceding species, and they are also very fine, and vary in size and form;

[1] As the bows vary very much with regard to the degree of their curving, and as also the megasclera are sometimes rather strongly curved, spicules may be found, with regard to which it cannot be decided, whether they are bows or developmental forms of oxea.

the length is the same as in the preceding species, and is between 0·028—0·107mm. In the largest one the thickness reaches to 0·002mm; but in the smaller it is somewhat less.

Locality: Egedesminde (Bergendal), depth 15 fathoms, one specimen; the mouth of the Ameralik fjord (Ingolf) one specimen; both specimens grow on Balanoid shells.

Although I have only had so slight a material of these two species I have thought it best to describe them, as their spiculation is interesting, and separates them very well from the other *Gellius*-species. Of the hitherto known *Gellius*-species provided with toxa, *G. angulatus* Bow., *arcoferus* Vosm., and *flabelliformis* Ridley and Dendy, have also sigmata; only *G. pumiceus* Frstdt. (Kgl. Sv. Vetensk. Akad. Handl. Bd. 21, no. 6, p. 29, T. II, fig. 9 a—d), and *G. toxius* Tops. (Rev. Suisse de Zool. IV, 1897, 470) have a spiculation consisting of oxea and toxa without sigmata; but in *pumiceus* oxea have a length of 0.9mm, and toxa have another form; neither seems *G. toxius*, of whose spicules we, unfortunately, have no figures, to agree with any of the species described here.

Note. According to what is stated above, the genus *Gellius* may have the following combinations of spicules: oxea and sigmata (the most common case); oxea, sigmata and toxa; oxea, sigmata and rhaphides, in bundles or scattered (*massa* Cart., *macrosigma* Tops., *G.* sp. (*pyriformis*) Ridley and Dendy, Challeng. Report, Monaxonida, 46, and *phillipensis* Dendy, Proc. Roy. Soc. Victoria VII, 1895, 247); oxea and rhaphides (*Lacazei* Tops., Arch. de Zool. exp. et gén. Ser. I, 1, 1893), and finally oxea and toxa. I think it doubtful whether the genus *Rhaphisia* Tops. the spiculation of which consists of oxea and rhaphides or trichodragmata (*anonyma* Cart., *laxa* Tops.), or of oxea, trichodragmata and toxa (*spissa* Tops.), can be kept up, as the character given by Topsent, of the skeleton forming no regular network, is scarcely sufficient to make good the establishing of the genus; and it must therefore, I think, be referred to *Gellius*. The bows figured by Topsent for *Rhaphisia spissa* (Mém. de la Soc. Zool. de Fr. XI, 1898, 232, fig. 2 c) remind of the bows in the two species described above, but they are larger.

7. G. flagellifer Ridley and Dendy.

Pl. II, Fig. 9, Pl. XIV, Fig. 1 a—d.

1886. *Gellius flagellifer* Ridley and Dendy, Ann. Mag. Nat. Hist. Ser. 5, XVIII, 333.
1887. — Ridley and Dendy, Challeng. Report, Monaxonida, XX, 42, Pl. XIII, figs. 5 and 10.

Oblong-cushionshaped. The surface somewhat shaggy. The dermal membrane [illegible] the subjacent reticulation of polyspicular fibres. The skeleton consists [illegible] polyspicular fibres. Spicula: Megasclera oxea 0·417—0·447mm; microsclera [illegible] flagellate sigmata 0·078—0·09mm.

Of this species we have one specimen agreeing both in outer form, structure and spiculation very well with the quoted descriptions. The form of the specimen is as an oblong cushion, and it appears to have been attached. It has a length of 34mm, a breadth of 20mm, and a thickness of ca. 13mm. The colour (in spirit) is yellowish white. The *surface* is somewhat shaggy from projecting spicules. The *dermal membrane* is thin and transparent, and rests on the subjacent skeleton which forms, below the skin, a coarse reticulation of polyspicular fibres. From the nodes spicules or bundles of spicules arise, and give to the surface its shaggy appearance[1]). In the meshes of the reticulation numerous round or most frequently oval *pores* are found, measured to a size of 0·017—0·119mm. In the dermal membrane sigmata of the common form are copiously found.

The *skeleton*, as stated by Ridley and Dendy, consists of an irregular reticulation of polyspicular fibres; especially the fibres running towards the surface (the primary ones) are distinct, while the others are indistinct, lying irregularly, or dissolved into single spicules. The primary fibres have an average reciprocal distance of the length of one spicule. The number of spicules in the primary fibres may be somewhat varying, but most frequently it appears to be 4—6. As mentioned, a coarse and irregular reticulation is seen under the skin, and this reticulation is accordingly formed by secondary fibres, but in the nodes the ends of the primary fibres project making the surface slightly shaggy. Spongin uniting the spicules is found, but to a rather slight degree; besides it is clear, and therefore not easily observable.

Spicula: a. *Megasclera* are oxea, slightly and evenly curved, more rarely with a somewhat sharper curve, with evenly, but not long tapering ends. The length is rather constant 0·416—0·447mm; only rarely it goes down to 0·38mm, or rises to 0·476mm; also the thickness is rather constant, and is between 0·016 and 0·012mm. Shorter and finer spicules are found in very small numbers. b. *Microsclera:* 1. Sigmata of the common form; these sigmata have a regular form, they are rather varying in length, from 0·02—0·07mm; the latter size, however, is only rarely attained, the average size being about 0·04mm; they are rather fine and have an average thickness in the middle of ca. 0·0018mm; the greatest ones may reach a thickness of up to 0·0026mm. These sigmata are frequent throughout the sponge, and occur in especially large numbers in the dermal membrane. 2. Flagellate sigmata; these sigmata are long ones, so highly curved in the middle as to get two more or less parallel arms; the ends are evenly pointed, and are bent inward in an almost rectangular or acute-angled way and with a rather sharp curve; most frequently, but not in all instances, one arm is somewhat longer than the other, and the short arm has the largest hook. With regard to the size, the greater axis of the sigma is 0·078—0·09mm, and the smaller axis about 0·057mm. The thickness is between 0·0028—0·0035mm. These sigmata are rather numerous through the whole sponge, although not so numerous as the small ones, and they are not found in the dermal membrane.

The flagellate sigma of my specimen shows a little difference from the figure in Ridley and Dendy; this difference, however, consists only in the fact that the hook of the short arm has not in the figure of Ridley and Dendy the sharp curve described by me; there is, however, no reason to put any stress upon this fact, as these sigmata upon the whole are somewhat varying in form, and Ridley and Dendy have only figured a single individual. The measures of these authors agree with my measures, when we notice the fact that they give the length from the shortest arm to the curve; a remeasuring of their figure gives the length of 0·08mm for the greater axis.

Of the small sigmata the said authors say: possibly young forms of the others ; this opinion is a consequence of the way in which they explain the growth of the chelæ, since they, with regard to these spicules, also interpret the small forms as developmental phases of the larger ones. In order

[1]) Ridley and Dendy say: Surface . . . . slightly rough, probably owing to the dermal membrane having been in most parts rubbed off. The surface, however, as will appear from the description above, is also shaggy when undamaged.

to make this fact possible, a growth would have to take place involving a complete transformation of the form of the spicule, because the small sigmata are not inscribable in the flagellate ones; now it has later been proved by Levinsen (Vidensk. Meddel. fra Nat. Foren. i Kobenhavn for 1893, 11) that the growth of the chelæ exclusively takes place by apposition; of course the same fact must be supposed to be the case with regard to the sigmata, so that the small sigmata and the flagellate ones are different bodies without any connection with each other. Neither is any transition found between these two forms, as also flagellate sigmata are found in the following species without being accompanied by common sigmata[1]). I must add, however, that I have found no developmental forms of the flagellate sigmata.

Vosmaer (The sponges of the Willem Barents Exp. 1880—81, Bijdragen tot de Dierkunde, 12. Aflevering, 3. Ged. 29, Pl. IV, figs. 35, 37, 38) mentions as *Gellius vagabundus* var. γ a species with both flagellate sigmata and sigmata of the common form. To judge from the figures of as well oxea as sigmata, and as the species has both kinds of sigmata, it is rather probable that the species is *G. flagellifer*, but as Vosmaer gives no measures it cannot be decided with certainty.

Locality: Station 52, 63° 57′ Lat. N., 13° 32′ Long. W., depth 420 fathoms. Only one specimen.

Geogr. distr. Off Marion Island in the South Sea, depth 50—75 fathoms (Challenger). The form mentioned by Vosmaer is from the Barents Sea. Accordingly the species appears to be very widely spread.

8. G. porosus Frstdt.

Pl. XIV, Fig. 2 a—c.

1887. *Desmacella porosa* Fristedt, Vega Exp. vetensk. Iakttag. IV, 440, Pl. 24, figs. 30—37, Pl. 28, fig. 18.

1896. *Gellius flagellifer* Lambe, Sponges from the Atl. Coast of Canada, Transact. of the Roy. Soc. of Canada, Ser. 2, II, Sect. IV, 185, Pl. I, fig. 4—4 d.

1896. ? *Gellius flagellifer* Topsent, Campagne de Caudan dans le Golfe de Gascogne, Annales de l'Univ. de Lyon, XXVI, 280, Pl. VIII, fig. 4.

Tuberous, or rounded, more or less irregular. The surface shaggy; the dermal membrane ... The skeleton a somewhat irregular network with triangular or quadratic meshes. Spicules: Megasclera oxea 0·25—0·32^{mm}; microsclera (common sigmata?), flagellate sigmata 0·07—0·1^{mm}.

Of this species we have one specimen, of an irregular, roundish form; it is, however, somewhat damaged, and perhaps it is only a fragment; by far the greatest part of the skin is wanting. The greatest extent of the specimen is ca. 30^{mm}. The colour (in spirit) is gray; with regard to consistency the specimen is very brittle; it is perforated by numerous larger and smaller canals. The sponge is throughout highly interwoven with sand and extraneous silicious bodies. The surface, as far as I have been able to decide, seems to be slightly shaggy from projecting spicules.

The *skeleton* consists of a rather irregular, unispicular network of triangular and quadratic

[1]) In sigmata of the common form the fact is also that the smaller ones cannot be, while the finer ones may be developmental phases, as most of the smaller have their final form, and an apposition would only make them thicker; if an apposition worth mentioning took place in the longitudinal direction, deviating forms would appear. For further particulars of the growth of sigmata see under *G. microtoxa*, p. 68.

meshes; here and there polyspicular fibres are found that seem especially to run towards the surface. In the nodes the spicules are united by an only little conspicuous mass of spongin.

Spicula: a. *Megasclera* are oxea, evenly or a little more sharply curved, and evenly tapering; sometimes they are rather long tapering. The length is somewhat varying, in the specimen in hand from 0·25—0·32mm; the thickness is ca. 0·01—0·011mm. b. *Microsclera;* these are flagellate sigmata of a similar form as those of the preceding species, but somewhat varying in form (Pl. XIV, fig. 2 b); in the most typical form one arm is curved, and much shorter than the other; the greater axis measures 0·07—0·1mm, and the smaller axis ca. 0·05—0·057mm; the thickness is about 0·0028mm. Besides the flagellate sigmata, other sigmata are also found singly, of about the common form, but with the ends highly recurved; they are rather large, the length being 0·05—0·08mm; as they only occur in very small numbers, and as the flagellate sigmata are much varying in form, they might be taken to be only a variety of the latter; against this supposition, however, their thickness appears to tell, it being somewhat greater than in the typical flagellate sigmata, viz. ca. 0·004mm (Pl. XIV, fig. 2 c); this fact, however, does not exclude the possibility of their being varieties, perhaps monstrous varieties, of the flagellate sigma, of which irregular, monstrous forms are not rarely found, reaching a colossal thickness, viz. 0·007mm.

This species is distinguished from the preceding one, besides by differences in the length of oxea, chiefly by its unispicular skeleton, and by the want (or the scarcity and form) of common sigmata.

As I have had before me a piece of the original specimen of Fristedt, I have been able with certainty to decide the species, which otherwise agrees very well with his description; Fristedt gives the length of oxea to be constantly 0·35mm; my measurings of his original specimen, however, give the same measures as stated above for my specimen. Neither does Fristedt mention sigmata of the common form, which he is likely to have overlooked on account of their scarcity, but they are to be found in his specimen.

I think the referring to the present species of the *G. flagellifer* mentioned by Lambe l. c. to be rather certain; he also mentions that common sigmata are found in small numbers. On the other hand it is more doubtful, whether the *G. flagellifer* mentioned by Topsent l. c., is the present species. Topsent says that the spicules are the same as those in *G. flagellifer* R. and D., but besides oxea he only mentions and figures flagellate sigmata, and as the measures agree rather well with those of the present species, and the skeleton is described in the term „lignes unispiculées", I must suppose it to be identical with the present species; at all events it seems impossible that it can be *G. flagellifer* R. and D.

Locality: Skagestrand Bay on the northern coast of Iceland, depth 119 fathoms, one specimen; 63° 15' Lat. N., 9° 35' Long. W., a little fragment (Wandel).

Geogr. distr. The Davis Strait, depth 70 fathoms (Fristedt); the Gulf of St. Lawrence, depths 37—80 fathoms (Lambe); ?Gascony Bay, depth ca. 200 fathoms („Caudan").

Note. Thus it appears that at all events two distinct species with flagellate sigmata are found; these species have been intermingled, the existence of a flagellate sigma obviously having been regarded as a proof of the identity of the species. The first author, who mentions and figures such a sigma, is O. Schmidt (Spongienfauna des atlant. Gebiet. 1870, 53, Tab. V, Fig. 15). He mentions it under his *Desmacella vagabunda*, which has been the cause that Vosmaer has referred the species before him to *Gellius vagabundus* as a variety. The species of Schmidt is from Florida from a depth of 228 fathoms, but as no nearer description or measures are given it cannot be decided, whether the species is either of the species mentioned here, or perhaps a third species. The flagellate sigma is of a peculiar form, but we cannot lay much stress upon that, especially as we do not know, whether the figured form is the typical one.

Gelliodes Ridley.

The form somewhat varying, sometimes irregular, but often well defined, erectly cylindric, leaf- or funnel-shaped. The skeleton has always well developed, often long fibres, with more or less, but most frequently rather little spongin. The fibres may form a network, or be arranged in a more dendritic manner. Spicula: Megasclera diactinal, oxea; microsclera sigmata or sigmata and toxa.

1. **G. plexa** n. sp.

Pl. V, Figs. 3—4, Pl. XIV, Fig. 3 a—d, Figs. 4—5.

Erect, funnel-shaped (probably always so). The dermal membrane thin, resting on the subjacent, irregular network; spicules and bundles of spicules project, and therefore the surface is finely spinulous. Oscula only found on the inside, numerous and small. The skeleton consists of numerous powerful, polyspicular fibres branching from the base, which is almost exclusively formed by these fibres, up through the sponge, and forming a very solid skeleton. Rather little spongin. Spicula: Megasclera oxea 0·47—0·53^{mm}, microsclera toxa 0·11—0·10^{mm}; sigmata 0·0128—0·015^{mm}.

The specimens in hand of this species have been somewhat damaged in the trawl, so that there may be some doubt as to the outer form of the species, at all events with regard to the limits between which it may vary. We have two pieces of a form as erect leaves narrowing below, but here they are broken off. In both pieces one surface is a little convex, the other a little concave. On the other hand a third, somewhat smaller specimen has a calicular form, and narrows also below; but also this specimen is broken off here. According to these facts it is probable that the two first-mentioned pieces are parts of a likewise calicular sponge, and that the form of the species is as a perhaps short-stalked cup with a wide opening. Of the two mentioned pieces one has a greatest height of 130^{mm} and a breadth of ca. 90^{mm}; the thickness in the middle is 10—12^{mm}; it is greatest below, and decreases towards the upper edge; thus where the sponge is broken off, it is ca. 22^{mm}. The calicular specimen which is also much damaged, is somewhat smaller, it has a height of 75^{mm}; the width of the funnel cannot be given with certainty, as the edge is broken off, but may be estimated at ca. 45^{mm}, and the thickness below where the specimen is broken off, is about 18^{mm}. The colour in spirit is grayish white or somewhat darker grayish. On account of the many strong longitudinal fibres the consistency is rather firm. The *surface* where it is undamaged, is finely spinulous on account of the projecting spicules and bundles of spicules. The *dermal membrane* is thin, and rests on the subjacent irregular network of fibres. *Oscula* and *pores:* As the skin is only kept to a small extent, the facts with regard to the situation of oscula and pores have only been discernible in a few places; especially the skin of the outer surface has only been kept in a few spots. As far as I have been able to examine the facts they are as follows: On the inside of the cup distinct, sharply defined circular oscula may be seen with the naked eye in abundant numbers. They are of a somewhat different size, of a diameter from ca. 1—2^{mm}. When a piece of the skin is examined under the microscope many smaller openings are seen decreasing in size quite down to 0·12^{mm}. On the outer side no greater openings visible to the naked eye, are seen, but under a lens or a microscope numerous openings are found, of sizes measured from 0·029—0·3^{mm}. The small openings of a size of about 0·029^{mm} are the most numerous, and are generally gathered into groups. While thus the openings of the inside upon the whole are greater than those of the outside, they are, as is seen from the above, not sharply separated with regard to size, the greatest openings on the outside being greater than the smaller ones on the inside. The openings of the outside, I suppose, act as pores and those of the inside as oscula. Numerous canals of an average diameter of 2—3^{mm} go more or less horizontally through the wall of the sponge; they have the greatest width towards the outside. They are distinctly seen, when the skin and the skeletal tissue supporting it is removed. The oscula of the inside, at all events the larger ones, are direct openings of these canals.

The *skeleton* consists of powerful polyspicular fibres branching up through the sponge from the base where they are so closely pressed together as to form a compact mass. They are thickest below, and may here be coalesced into bundles of a thickness of a few millimetres; upward they become thinner. They branch in a dendritic way up through the sponge frequently anastomosing and coalescing with each other. As the fibres are numerous and placed close together the whole thing forms a very strong skeleton crossed by the horizontal canals mentioned above, which run in the intervals between the fibres; the sponge is otherwise so closely interwoven with these fibres that the soft parts are only little conspicuous. The finest fibres form a close, irregular network filling out the intervals between the principal fibres. On either side of the sponge an irregular network is also found on which the skin is resting; from the nodes of this network the bundles of spicules arise that make the surface finely spinulous. The fibres are firm and solid; their spicules are united by a clear mass of spongin which is not, however, so copious that it may be distinctly seen to coat the whole fibre, even if it is perhaps completely or for the greater part lined with a thin layer.

Spicula: a. *Megasclera* are oxea, very evenly tapering, and evenly and slightly curved, sometimes straight, more rarely they are somewhat sharper curved; the length is between 0·417—0·53^{mm}, most frequently it is 0·44—0·47^{mm}. The thickness is ca. 0·018—0·024^{mm}, the thickest ones being generally not the longest. In a specimen (from East-Greenland) the most frequent length of the needles is 0·417^{mm}, and may be even less, and they do not reach 0·47^{mm}. Shorter and finer needles are found, but only in very small numbers. b. *Microsclera:* 1. Toxa; these are rather large, regularly formed bows forming an obtuse angle; only rarely it is somewhat sharper. The ends form short, recurved points. They are thickest in the middle, and decrease, but only slightly, in thickness outward. Their length is between 0·11 and 0·16^{mm}, and the thickness in the middle is between 0·004—0·007^{mm}. Besides these fully developed bows, some finer, to exceedingly fine ones, are found; these latter are on an average not much shorter than the thicker ones, only the very finest go down to a length of 0·057^{mm}.

These fine bows I suppose to be developmental forms; to be sure, they are possessed of the recurved points, but there seems to be no objection to the supposition that by a growth by mere apposition they may attain the same form and size as the large ones. 2. Sigmata: these are small and of a rather constant size; the length is 0·0128—0·015mm, and may in a few cases reach 0·018mm; the thickness is about 0·001mm. Toxa and sigmata occur throughout the sponge, but are especially abundant in the dermis.

Locality: Station 2, 63° 04′ Lat. N., 9° 22′ Long. W., depth 262 fathoms, a calicular specimen; station 3, 63° 35′ Lat. N., 10° 24′ Long. W., depth 272 fathoms, two leaf-shaped fragments; 63° 15′ Lat. N., 9° 35′ Long. W., depth 270 fathoms, a little fragment (Wandel); 72° 40′ Lat. N., ca. 20° Long. W., depth 100 fathoms, a little fragment (the East-Greenland Expedition 1891—92). Accordingly the species has been taken to the northwest of the Faröe Islands and off the northern East-Greenland.

2. **G. consimilis** n. sp.

Pl. XIV, Fig. 6 a—e.

(Leaf- or funnel-shaped?). The skeleton consisting of numerous solid polyspicular fibres branching through the sponge and forming a solid skeleton. Rather small amount of spongin. Spicula: Megasclera oxea 0·528—0·66mm; microsclera toxa 0·119—0·19mm, sigmata 0·018—0·0268mm.

Of this species we have only a small fragment of a greatest extent of ca. 20mm; the fragment is flat, of a thickness of 5—6mm, and it must have belonged to an erect, flat, i. e. leaf-shaped or calicular sponge. The structure of the fragment, otherwise, is like that of the preceding species; the same solid, branched fibres are found, arranged in the same way, and the sponge is also pierced by horizontal canals of a similar size. The skin is wanting, so that nothing can be said with regard to oscula and pores; on one side, however, one single, naturally bounded osculum is seen, of a diameter something more than 1mm.

The *skeleton*, as has been mentioned, is of quite the same structure as in the preceding species, and consists of solid, branching, and anastomosing fibres, the intervals between which are filled by an irregular polyspicular network. The spicules of the fibres are cemented by a clear mass of spongin which is not seen here neither to form a distinct layer round the spicules.

Spicula: The combination of the spicules is the same as in the preceding species, but the distinguishing character is to be found in the form and sizes of the spicules. a. *Megasclera* are oxea; these are slender, and evenly and long tapering; they are slightly curved, but rather frequently the curving is rather sharp, and then they may in form remind somewhat of the spicules of *Halichondria panicea.* The length is between 0·528—0·66mm, and the thickness 0·012—0·0178mm. A few shorter and finer needles are seen. b. *Microsclera:* 1. Toxa; these are of the same form as in the preceding species; the length varies from ca. 0·119—0·19mm, the thickness from ca. 0·004—0·005mm; fine bows, developmental forms, are also seen, but only in quite small numbers. 2. Sigmata; these are of a length of 0·018—0·0268mm, the thickness is ca. 0·001mm.

Both with regard to structure and spiculation this species appears to be very closely related to the preceding one; but it is very well distinguished from this latter species by the size of the spicules and especially by the form of the oxea, which is quite different from that in *G. plexa*; for the fact that the sizes of all three forms of spicules are above those in *G. plexa*, can scarcely by itself be regarded as a sure mark of separation between the two species.

Locality: Station 113, 69° 31' Lat. N., 7° 06' Long. W., depth 1309 fathoms (temperature — 1·0 C.), one fragment.

These two *Gelliodes*-species differ from the hitherto known species by being possessed of toxa. Thus they show an approaching to the genus *Toxochalina*, but in this genus no sigmata should be found. Ridley and Dendy (Challeng. Report, Monaxonida, XX, 47) say that *Gelliodes* is only different from *Toxochalina* by the presence of sigmata in stead of toxa, and they continue: It is perhaps doubtful whether the last character (sigma instead of toxa) is of generic value, and whether *Toxochalina* and *Gelliodes* should not be merged in one genus, but as no species is yet known, whose spicular complement comprises both toxa and sigmata, they may at present be kept apart. Now the two species described here show just this combination of toxa and sigmata, and consequently the genus *Toxochalina*, I suppose, must be merged in *Gelliodes*. I shall, hovewer, call attention to the fact that in the diagnosis of *Toxachalina* the fibres are said to be rectangularly arranged, while, in the two species described here, they are irregularly branched, what seems upon the whole to be predominant in the *Gelliodes*-species.

Oceanapia Norman.

The sponge consisting of a round body from which more or fewer, branched or unbranched fistulæ arise, which are closed at the ends. Outermost the body is surrounded by a hard, rindlike layer. Spongin present. Spicula: Megasclera diactinal, oxea; microsclera sigmata.

As mentioned under *Phlœodictyon*, I place *Oceanapia* under the *Gelliinæ*, as I regard it to be closely allied to *Gelliodes*. The character that separates it from this genus, would even seem chiefly to be the form only; but nevertheless the genus may, at all events for the present, be kept up.

At present perhaps only the one species is known, as the only one of the three *Oceanapia*-species described by Dendy that is possessed of sigmata (Proc. of the Roy. Soc. Victoria VII, 1895, 248), *O. mollis*, according to its skeletal structure, is more likely to be a *Gellius*, what Dendy himself so far directs the attention to, as he says that it is very closely related to *Gellius*. Of the two species established by Topsent (Rev. Suisse de Zool. IV, 1897, 467, Pl. XIX, fig. 13, Pl. XXI, fig. 29; 469, Pl. XIX, fig. 17), *amboenensis* and *fragilis*, the external form is not known, and both may perhaps be referred to *Gelliodes*. Of the *Rhizochalina fibulata* established by Schmidt (Spong. Meerbus. v. Mexico, 76), nothing can be said on account of the incompleteness of the description[1].

1. **O. robusta** Bow.

Pl. XV, Fig. 1 a—c, Figs. 2—4.

1866. *Isodictya robusta* Bowerbank, Mon. Brit. Spong. II, 304, 20.

1866. *Desmacidon Jeffreysii* Bowerbank, Mon. Brit. Spong. II, 347, 2.

[1] On the other hand, as will be seen hereafter, there is a possibility that Ridley and Dendy's *O. robusta* is not identical with the species of Bowerbank. The footnote of these authors under *Rhizochalina fistulosa* might likewise make it possible that here we had still another species of *Oceanapia*.

1869. *Oceanapia Jeffreysii* Norman, Report Brit. Assoc. for 1868, 334.

1874. *Desmacidon Jeffreysii* Bowerbank, Mon. Brit. Spong. III, 157, Pl. LXII.

1882. — — Carter, Ann. Mag. Nat. Hist. Ser. 5, X, 121.

1885. *Reniera tubulosa* Armauer Hansen (non Fristedt), The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 4.

1887. ?*Oceanapia robusta* Ridley and Dendy, Challeng. Report, Monaxonida, XX, 36, Pl. IX, fig. 3.

1887. *Desmacidon Jeffreysii* Fristedt, Vega Exp. vetensk. Iakttag. IV, 442.

1892. *Gelliodes cavicornis* Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 78, Pl. III, figs. 4 et 9, Pl. IX, fig. 12.

The sponge consisting of a round body with more or fewer digitate, branched or unbranched fistulæ, which are closed at the ends. The surface slightly shaggy from projecting spicules. Outermost a hard, rindlike layer. The skeleton of the external layer an irregular network, chiefly of thick polyspicular fibres. In the interior the skeleton consists of scattered needles. Spongin is found to a small degree in the fibres of the rind-layer. Spicula: Megasclera oxea $0{\cdot}20—0{\cdot}268^{mm}$; *microsclera sigmata* $0{\cdot}014^{mm}$.

This species which, as is well known, is formed as a globular body from the surface of which branched or unbranched fistulæ arise, is in the collection only found in fragments, partly pieces of the external hard rind of the globular body, partly broken off fistulæ. The largest piece which quite appears to be part of a globular surface, has a greatest extent of ca. 20^{cm}; it is only convex to a slight degree, and must accordingly be a piece of a very large specimen. It has had several fistulæ, but they are broken off; at their base they have had a diameter of $40-50^{mm}$. The thickness of the rind-layer is somewhat varying, about $10-15^{mm}$. In fragments of smaller specimens the rind is considerably thinner, about $2—3^{mm}$. Of the torn off fistulæ (belonging to the large specimen), some are unbranched, while others are divided into at most 4 or 5 digitate branches. The long fistulæ have a length of ca. 13^{cm}; towards the ends they are generally somewhat compressed. The diameters of the unbranched fistulæ are at most ca. 20^{mm}; but the branched ones are considerably thicker at the base. All the undamaged fistulæ are closed as the ends, so that it seems that the fistulæ are always closed. The colour of the sponge (in spirit) is light yellow. In the earlier descriptions the *surface* is stated to be smooth; this, however, is incorrect; it is even, but slightly shaggy from projecting spicules. As the specimens in hand chiefly consist of pieces of the rind-layer, we have only comparatively little of the interior body. This interior consists of a peculiar, loose and pappy substance of a yellowish white colour; when this substance is dried it contracts to a very high degree, becomes dark yellow and semi-transparent, reminding, as stated by Norman l. c., of wax, although not in consistency, as it is very hard.

The *pores* are found copiously as well on the body as on the fistulæ in the intervals between the spicules; they are measured to a size of about $0{\cdot}014-0{\cdot}057^{mm}$. No *oscula* are found, and it is doubtful how the facts are with regard to the excurrent canals. As mentioned the fistulæ are closed at the ends, but here and in their whole outer part they show a peculiar structure, the dermal membrane wanting or being reduced, so that holes appear of the same size as the meshes in the skeleton below; I am, however, inclined to think that this fact is due only to damaging, and if so, the pores of the skin must act both as incurrent and as excurrent openings. On account of the arrangement of the canal system, I suppose, that it is the pores of the fistulæ that act as excurrent openings.

The *nal system.* In the outermost part of the rind subdermal cavities are found, often as horizontal canals into which the pores lead, and from these cavities canals go in through the rind; they are rather numerous, so that a great many round holes, generally of a diameter of 1—3^{mm}, are seen on the inside of the rind-layer, when this layer is separated from the inner tissue[1]. These canals are lined by a thin membrane the spicules of which are gathered into bands or fibres running parallel with each other, sometimes in the longitudinal direction of the canals, sometimes obliquely on, or across this direction. The canals continue through the interior body, the direction apparently being chiefly towards the centre; in the soft tissue they are surrounded by a membrane, so that, when the tissue is washed away, they appear as membranous tubes. This membrane is provided with a spicula-net of loose fibres, and innermost it is lined with the membrane mentioned above. Other canals, presumably the excurrent ones, come together and open into the fistulæ, in the base of which they converge, and they continue in the inner cavity of the fistulæ. The walls of the fistulæ are provided with a dense plait of fibres; the wall is easily separated into two lamellæ, of which the inner one is provided with the same kind of spicula-net of loose fibres as is found in the membrane surrounding the canals. The fistulæ are inmost lined with the same membrane as that lining the canals, and it is provided with spicules in the same manner.

The *skeleton.* In the rind-layer the skeleton consists of a network of rather thick, polyspicular fibres forming irregular, most frequently polygonal meshes (Pl. XV, fig. 2). The thickness of the fibres is somewhat varying, but generally it is from 0·05—$0{\cdot}1^{mm}$. The meshes of this network vary very much in size in different places, and they are smallest inward; in these meshes are seen thinner polyspicular, or quite unispicular fibres with an irregular course, and also forming an irregular network. In the network no distinction can be made between fibres running towards the surface, and fibres running parallel to it; here and there longer and most frequently a little thicker fibres are seen, but they have also a quite irregular course. The spicules of this network are cemented by a clear, not copious mass of spongin; it is especially observable where it unites the ends of the spicules, but in the fibres it unites the spicules in their whole length. Outermost a layer of spicules are found at right angles to the surface, and projecting a little, so that the surface of the sponge becomes slightly shaggy; these spicules frequently show a somewhat fanlike arrangement. Between the perpendicular spicules others are interwoven partly oblique to, partly parallel to, the surface; therefore the skin, when seen from the surface, shows a rather dense, irregular network of spicules intercrossing in all directions, and from which needles rise in a vertical direction. The dermal membrane rests on this network; it cannot be separated by itself, but the whole layer with the vertical needles is easily peeled off. This network is also cemented by a mass of spongin, not only found at the ends of the spicules, but in all places where the spicules touch each other. Inwardly the skeleton of the rind is absolutely sharply bounded from the tissue inside of it. In the interior body the skeleton only consists of scattered needles without any visible order; they impart no firmness to this tissue, neither is any spongin found here. As mentioned above, the canals crossing the interior body, are surrounded by a membrane; this membrane has a skeleton of very loose fibres forming a network, the longest fibres of which run in the longitudinal direction of the canal (Pl. XV, fig. 3); also in this network the spicules are united

[1] It is these holes which are called oscula by **Bowerbank** l. c. 304, as he had only fragments of the sponge at that time.

by spongin which seems only, however, to unite their ends. The membrane forming the inmost lining of the canals, as before mentioned, has spicules loosely gathered into bands, the direction of which in relation to the canals may be varying (Pl. XV, fig. 4); no spongin is found here. When we have got a clear understanding of the structure of the skeleton of the rind and the walls of the canals, the skeletal structure of the fistulæ is easily understood; the fact is that their external part is formed by the rind, or, to put it more exactly, by the outer layer of the rind which passes into the outer layer of the fistulæ, and their interior layer is formed by the membrane surrounding the canals with its skeletal net of loose fibres. These two parts are comparatively loosely joined, and may easily be separated. The external layer of the fistulæ has a thickness of about 2mm; here the fibres are comparatively powerful, and especially powerful ones appear running longitudinally; the meshes formed by the fibres, are also averagely larger than in the rind-layer of the body, so that fistulæ upon the whole consist of a comparatively open plait of fibres. Outermost the same layer with vertically projecting spicules is found as on the other parts of the body. The inner layer of the fistulæ is constructed in quite the same way as is the case in the canals, and innermost it is lined with the same membrane as these. The fistulæ consist almost exclusively of fibres and membranes without any other tissue. The outer and inner layers are in the upper end more firmly joined, and here the inner membrane shows a great many holes, so that it is reduced to a network; by this feature the pores on the fistulæ are made to lead more or less directly into the inner cavity. It is not difficult to understand that these fistulæ can act as oscula, for the water streaming forth through the excurrent canals, is poured into their inner cavity, and from the upper part of this cavity it is emptied out through a great many pores; thus the whole collection of pores serves to remove the quantity of water which would else have to be removed through a single osculum.

Spicula: a. *Megasclera* are oxea, slightly, not rarely a little irregularly curved, with sharp, not long points, most frequently bounded by straight lines. Their length is generally between 0·20—0·268mm, but it seems to be somewhat varying, as in a specimen from station 83 the length frequently is 0·208mm, the most common length is 0·23—0·26mm. Ridley and Dendy, l. c., state the length of oxea in Bowerbank's original specimen to be 0·19—0·25mm. The thickness is 0·008—0·0128mm. Shorter and finer needles occur, but only singly; in the interior tissue, however, they are in some places seen in no small numbers. b. *Microsclera:* only one form, viz. sigmata; these are very small and of a rather constant size; the length is averagely 0·014mm, sometimes up to 0·017mm, the thickness in the middle is about 0·001mm. Boverbank gives the length as $\frac{1}{2143}$ inch = 0·012mm. Ridley and Dendy, on the other hand, give the length of the sigma to be 0·038mm, and the thickness 0·0032mm; this size of the sigmata would almost seem to make it doubtful, whether Ridley and Dendy's species is *Oceanapia robusta*, or perhaps an allied species. Sigmata are found throughout the sponge, but are especially frequent in the membranes, as well the dermal membrane as the membranes of the canals, and also in the inner tissue.

As Topsent has sent me a piece (fragment and fistulæ) of the *Gelliodes cavicornis* established by him l. c., I have been able with certainly to decide that it is *Oceanapia robusta*. Professor Topsent has also in a letter declared that he thinks the two species to be identical. As I have had occasion to examine a piece of the specimen mentioned by Fristedt l. c. which, with some misgivings, he refers here, on account, as it would seem, of his not having seen the spicules, I have been able with certainty to decide that it is *Oceanapia robusta.*

Remarks. In this species we find the so-called "cellules sphéruleuses" to be especially conspicuous, partly because they occur in large numbers, and partly on account of their being rather large. They are especially found in the interior body, and on the membrane that lines the inmost part of the canals (Pl. XV, fig. 4). They have an average size of 0·021^{mm}. Their form is most frequently roundish, but they are not rarely produced at one end so as to become pyriform, or at both ends, being then more or less fusiform. They are filled with clear, somewhat refringent granules, and are (in spirit) of a light yellow colour. Most frequently they are very conspicuous, and have therefore also been observed by Bowerbank, who calls them "gemmules", and mentions them l. c. II, 349 and more fully in 1874, l. c. III, 160 where he mentions that they are filled with granules, and gives their size to $\frac{1}{1500}$ inch = 0·017^{mm}.

Locality: Station 1, 62° 30' Lat. N., 8° 21' Long. W., depth 132 fathoms (fragments and fistulæ of a very large specimen); station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms (fragments of a smaller specimen); station 78, 60° 37' Lat. N., 27° 52' Long. W., depth 799 fathoms, and station 83, 62° 25' Lat. N., 28° 30' Long. W., depth 912 fathoms (a few torn off fistulæ).

Geogr. distr. Originally this species was only known from the Shetland Islands from a depth of 70—90 fathoms. Later it has been taken in Sognefjord on the western coast of Norway, depth 650 fathoms (The Norwegian North-Atlantic Expedition); the fact is that I have been able, as I have had Armauer Hansen's original specimen, with certainty to refer to the present species the *Reniera tubulosa* mentioned by him l. c. Armauer Hansen perceives the resemblance himself, but says that his species has no sigmata; these however, he must have failed to see, as they are found copiously in his specimen. Further it has been taken at East-Greenland, depth 180 fathoms (Fristedt). — Including the localities in which the species has been taken by the Ingolf, it has now been found across the Atlantic, as we have the places Sognefjord, the Shetland Islands, the Faröe Islands, south and west of Iceland, and at East-Greenland. The species, however, reaches far more to the southward having been taken at the Azores, depth ca. 70 fathoms (*Gelliodes cavicornis* Topsent l. c.).

Ridley and Dendy in Challenger Report mention it from Bermuda or Bahia (the locality is uncertain), but, as before said, there is some doubt of the identity of the species.

Subfam. 2. **Desmacellinæ.**

Biemma Gray.

The form varying, irregular, but often compressed, or more or less leaf-shaped. The skeleton consists of a more or less irregular network of spicules, or of fibres that are most frequently not very marked, and reach no great length. Spongin (most frequently or always) wanting. Spicula: Megasclera monactinal, tylostyli or subtylostyli; microsclera sigmata, or sigmata and toxa.

1. **B. rosea** Frstdt.

Pl. VI, Figs. 1—2, Pl. XV, Fig. 5 a—d, Figs. 6—9.

1887. *Desmacella rosea* Fristedt, Vega Exp. vetensk. Iakttag. IV, 439, Pl. 24, figs. 32—35, Pl. 28, fig. 13.

1892. *Biemma Dautzenbergi* Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 83, Pl. III, fig. 5, Pl. IX, fig. 16.

More or less irregularly leaf-shaped. The dermal membrane thin, without spicules, resting on spicules spreading in a penicillate way and projecting. The surface accordingly finely shaggy. Oscula numerous, small, only on one side. The skeleton an irregular network of spicules and loose fibres, from which short fibres go vertically to the surface. Spongin wanting. Spicula: Megasclera long, slender tylostyli or subtylostyli, 0·203—0·89^{mm}; microsclera contort sigmata 0·017—0·03^{mm}.

Of this species we have no complete specimen, but a great many larger or smaller fragments which give, however, mainly information as to the external form of the species. By far the greatest number of the fragments are plate- or leaf-shaped, and generally somewhat arcuate, often in an irregular way; only a few are quite irregular, and then they show a concave and a convex side, being of a somewhat calicular form. The largest specimen has an extent of 12^{cm} in one direction by 8—9^{cm} in the other. A comparison of the separate fragments conveys the decided impression that this leaf-shaped sponge has been spread more or less horizontally; the irregular, somewhat calicular pieces are, no doubt, the middle parts, and by these the sponge has been attached; a single one of these pieces even shows a short stalk, which is seen to have been attached. Then from these middle parts the sponge has extended in a disc-like manner, more or less horizontally; thus, perhaps, it has assumed a very flat calicular form. The before mentioned largest piece conveys the impression of being a cut from about the middle to the edge; if so, this specimen would have been of a diameter of about 20^{cm}. The thickness varies between about 10 and 3^{mm}; it is greatest towards the middle, and decreases towards the edge; the irregular middle parts may be somewhat thicker. A little specimen from station 89 has a different form, as a very thin incrustation on a Hexactinellid-skeleton; this specimen the greatest extent of which is ca. 20^{mm}, I take to be a quite young individual. The *surface* is quite finely shaggy from the projecting spicules. The consistency is rather firm. The colour (in spirit) varies between yellow and brown[1]. The *dermal membrane* is thin and transparent, and is supported by spicules spreading in a penicillate way, and piercing it. *Oscula* and *pores*: Where the surface is quite undamaged and the dermal membrane consequently present, close-set, most frequently circular openings may be seen on one side of the sponge with the naked eye, or by means of a magnifying glass; their size is a little varying, generally it is 0·5—1^{mm}. The dermal membrane rises a little round these openings, and shows a circlet of projecting spicules. On the other side of the sponge no openings are seen. The mentioned openings are oscula which accordingly are only found on one side. When this oscular side is examined under the microscope, the openings are seen to be of very different sizes, and they have been measured quite down to 0·029^{mm}; but this fact is obviously only due to a different degree of closing, the fact being that the smaller the opening appears, the broader is the thin membrane that surrounds the osculum and shuts the canal, of which the osculum is the excurrent opening. There is, however, some constant difference in the size of the oscular opening, which difference is dependent on the width of the canal. The

[1] All the pieces from station 10, and most of those from station 89 are almost quite black. This fact I suppose to be due to a staining, but as they are not known to have been in spirit together with animals from which they might have got the colour, it would seem that the sponge may sometimes get the black colour in spirit.

other side of the sponge that has no oscula, is the pore-side. The pores are here very close-set, they are more or less circular, and are lying in groups in the fields formed between the bundles of spicules that are spread in a penicillate manner. Their size is between 0·03—0·09^{mm}. In this species pores and oscula are thus execlusively localized each to their own side, and in connection with this fact the two sides show a somewhat different structure of the skeleton. To judge by the specimens in hand it seems to be the more or less convex side that is provided with oscula; it was to be expected that the convex side was the one turned downward or outward, and then oscula would be found on the outside; but whether this be the fact cannot be decided, until a whole specimen is obtained for examination.

The *skeleton* consists of an irregular network of spicules crossing each other in every direction, and between them loose fibres are found. Spongin is not observed. Towards its two surfaces the skeleton, however, has a particular structure, short fibres being found here running more or less vertically on the surface; in the outer end of these fibres the spicules spread in a penicillate or funnel-shaped way, and pierce the dermal membrane. When these fibres are not vertical on the surface, they generally bend a little arcuately outward towards the outer edge of the sponge. As said before, there is some difference between the two sides; on the oscular side these fibres which support the dermal membrane as columns, are shorter and thinner, accordingly they generally consist of fewer spicules, and they are closer together than on the pore-side. On this side where the columns are somewhat longer and farther from each other, we therefore see in a transverse section just below the skin a great many subdermal cavities separated by the columns; in reality they all form presumably one large subdermal cavity. Also on the oscular side the skin is supported by the columns, so that we also here find a cavity, but a much smaller one, below the skin (Pl. XV, figs. 8—9). The skin on the pore side comes off very easily, and when it is off the numerous incurrent canals are seen; they are of the same width as the excurrent canals, and in pieces where the dermal membrane is wanting, we may easily be led to suppose that oscula are found on both sides. The incurrent canals and the excurrent ones go, each from their side of the sponge, through it almost to the opposite side; they are often somewhat bent, and also often branched; they are of the same width, in the principal canals it is ca. 1^{mm}. In the irregular middle parts of the sponge the canals have also a more irregular course.

Spicula: a. *Megasclera.* These are long and slender subtylostyli or tylostyli. Sometimes they are straight, but more frequently slightly curved; the curve may be somewhat varying, and is not rarely found nearest to the head end. The head may be marked off to a different degree from a scarcely perceptible swelling to a fully developed, round head, so that the needle becomes a marked tylostylus; sometimes the swelling is found a little before the end. The other end is evenly produced to a long, rather fine point. The needle is thickest in the middle, also tapering somewhat towards the head end. The size of the needles is very much varying; the most common length seems to lie between 0·65^{mm} and 0·77^{mm}, but it may increase to 0·89^{mm} and go quite down to 0·203^{mm}, which is the smallest size I have measured. Like the length the thickness is also very much varying; the largest spicules have in the middle a thickness of 0·017^{mm}, and the smallest go down to 0·004^{mm}. Upon the whole the thickness is in proportion to the length, but among the longer forms rather thin ones may also be found. Quite fine spicules, developmental forms, are found of different lengths, but in small numbers. b. *Microsclera.* Only one form, sigmata, is found. These are rather thin and almost always contort, up to a quarter of a turn. Their length is between 0·017—0·028^{mm}, sometimes they may reach 0·03^{mm}; the thickness is 0·001^{mm} in the larger ones, the smaller are a little finer.

As I have had a piece of the original specimen of Fristedt, I have been able to identify the species with certainty. Fristedt gives the length of the tylostyli to 0·5^{mm}, but in the original specimen before me I have measured it to 0·77^{mm}. Fristedt does not mention an oscular side and a pore-side, the reason being, I suppose, that the dermal membrane has been wanting on the pore side of his specimen. With regard to the columns supporting the dermal membrane he says: "The dermis is furnished with numerous funnel-like depressions, which by degrees are closed, forming a fibre". From the above description I suppose it will be possible to understand, what is meant by this peculiar, not quite correct mode of expression. — The *Biemma Dautzenbergi* established by Topsent l. c. must, according to the description, be identical with *B. rosea.* Topsent to whom I have sent a piece, declares also in a letter that he supposes them to be identical.

Locality: Of this rather interesting species the Ingolf Expedition has brought home a great many larger and smaller fragments, probably, however, only representing few specimens. Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 10, 64° 24′ Lat. N., 28° 50′ Long. W., depth 788 fathoms; station 73, 62° 58′ Lat. N., 23° 28′ Long. W., depth 486 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms. All these stations are off the southwestern coast of Iceland.

Geogr. distr. Fristedt has the species from East-Greenland, depth 125 fathoms; thus as arctic it has hitherto only been found in the Denmark Strait with a bathymetrical range from 125—788 fathoms, but this species also belongs to those found farther southward, having been taken on the expedition of the Prince of Monaco in 1888 (Topsent l. c. *B. Dautzenbergi*) at the Azores on a depth of ca. 735 fathoms.

2. **B. annexa** O. Schmidt.

Pl. IV, Fig. 14, Pl. XVII, Fig. 3 a—f.

1870. *Desmacella vagabunda* var. *annexa* O. Schmidt, Spongienf. atlant. Gebiet 53.

1874. *Desmacella pumilio* Carter, Ann. Mag. Nat. Hist. Ser. 4, Vol. XIV, 250, Pl. XV, fig. 42 a, b, c.

1875. *Desmacella vagabunda* var. *annexa* O. Schmidt, Jahresber. d. Comm. zur wissenschaftlichen Unters. d. deutschen Meere in Kiel für 1872—73, 1875, 117.

1880. *Desmacodes vagabundus* var. *annexa* Vosmaer, Notes from the Leyden Mus. II, 108, 15.

1887. *Desmacella annexa* Ridley and Dendy, Challeng. Report, Monaxonida, Vol. XX, 50.

1890. *Biemma Chevreuxi* Topsent, Bull. de la Soc. de France, Vol. XV, 32.

1892. *Desmacella annexa* Topsent, Résultats d. Campagn. scient. du Prince de Monaco, Fasc. II, 84, Pl. IX, fig. 18.

1896. *Desmacella annexa* Topsent, Campagne de "Caudan" dans le Golf de Gascogne. Ann. de l'Université de Lyon, XXVI, 281, Pl. 8, figs. 5—6.

Of an irregular form, incrusting, or more or less massive. The dermal membrane thin, without spicules, resting on the projecting spicules that are spread in a penicillate way. The surface accordingly finely shaggy. The skeleton consists of short fibres chiefly running towards the surface and *scattered spicules. Spongin wanting. Spicula: Megasclera long, slender tylostyli 0·22—1·05*^{mm}*; microsclera trichoform toxa 0·085—0·114*^{mm}*, sigmata of two sizes, 0·025—0·028*^{mm} *and 0·014*^{mm}.

Of this species we have a rather whole specimen and two smaller fragments. The whole specimen is all but leaf-shaped, but with irregular smaller folds, and irregularly arcuate, so that one side is somewhat concave. The outline of the specimen is about triangular; one edge has been attached, while the two free edges are somewhat irregularly lobed and bent towards the concave side. The height of the specimen is somewhat more than 50^{mm}, and the thickness that is somewhat varying, reaches to 10^{mm}. The colour (in spirit) is light grayish. As in the preceding species the *dermal membrane* is supported by projecting, penicillate bundles of spicules, and consequently the *surface* is finely shaggy. As the surface is damaged in most places, I can say nothing definite with regard to the distribution of *oscula* and *pores*; the pores seem to be found on both sides, but the specimen shows no oscula.

The *skeleton* is somewhat more richly provided with fibres than in the preceding species; it consists of fibres chiefly running upward and bending towards the surface, so that they never grow long; between the fibres needles are found scattered in all directions. The ends of the fibres spread in a penicillate way, and pierce the dermal membrane which they support, as in the preceding species. Topsent says l. c., 1896, p. 283: .....membrane spiculeuse réticulée....., but the dermal membrane itself has no spicules (with the exception of microsclera), it is only supported by the above mentioned bundles of spicules. Often these bundles are not situated vertically on the surface, but, as a consequence of the direction of the fibres, they are directed upward towards the upper end of the sponge, so that, when the dermal membrane is viewed from above, fan-shaped, somewhat decumbent bundles are seen. No spongin is observed in the skeleton.

Spicula: a. *Megasclera:* these are long, slender tylostyli, almost always a little curved, especially towards the head end. Generally the head is distinctly marked and rather round; the opposite end tapers to a rather long and fine point. The length of the needles is much varying, the most common length of the longest (fully developed) ones is between 0·83—0·9^{mm}, but the length may increase to 1·05^{mm}. By even transitions the size goes down to 0·22^{mm}, which is the smallest measured size. The thickness of the large needles varies from 0·014—0·011^{mm}, while in the smallest ones it goes down to 0·005^{mm}. Thus the needles are a little finer than in the preceding species; they are almost not fusiform at all, as they do not at all taper, or only taper to a slight degree, towards the head. b. *Microsclera:* 1. Toxa: these are very fine, trichoform, and have a flat curve in the middle, and a similar one a little from each end; all three curves are very flat, and Schmidt therefore mentions these bows as feine unspitzige Nadeln and Vosmaer as ac. Otherwise the curve is sometimes a little irregular. The length is between 0·085—0·114^{mm}, and the thickness in the middle is ca. 0·001^{mm}. These bows are exceedingly abundant everywhere in the sponge, and are also found in the dermal membrane. 2. Sigmata; these occur in two different sizes; the ends of the largest are most frequently curved with a more or less sharp bend, they are plane, or more or less contort up to a quarter of a turn; their length is rather constant 0·025—0·028^{mm}, and the thickness is ca. 0·002^{mm}. The small sigmata are always somewhat contort, their length is 0·014^{mm}, and the thickness ca. 0·001^{mm}. As the toxa, both kinds of sigmata are found throughout the sponge, but not in so large numbers.

The measures given here for the spicules of this species, agree with those given by Topsent (l. c. 1896) for specimens taken by Caudan, but, as more particularly mentioned by Topsent in the place cited, the spicules of the species appear to be subject to some variation: thus he mentions specimens in which the tylostyli only reach a length of 0·5mm; also the small sigmata seem sometimes to be quite wanting, or, on the other hand, sometimes to be found in somewhat larger numbers than the large ones; the size of toxa, on the contrary, is constant.

Biemma annexa was first mentioned by Schmidt l. c. as a variety of his *Desmacella vagabunda;* Vosmaer, in 1880 l. c., supposes it to be a separate species, but it was first established as a separate species by Ridley and Dendy in 1887. Topsent who in 1890 l. c. reestablishes Gray's old genus *Biemma* for the forms belonging here, which forms are distinguished from *Desmacella* by the halichondroid structure of the skeleton, first refers the present species (under the name of *Biemma Chevreuxi,* as he took it to be a new species) to the genus *Biemma,* but in 1892 l. c. he says that on account of the presence of toxa it belongs to the genus *Desmacella.* In the occurrence of toxa I cannot, however, see any reason for referring it to *Desmacella;* on account of its skeletal structure, which by the only little marked fibres and by the want of spongin quite agrees with that of the other *Biemma*-species, it has just to be referred to the genus *Biemma.*

Locality: Station 97, 65° 28' Lat. N., 27° 39' Long. W., depth 450 fathoms, one specimen and two fragments.

Geogr. distr. This species has a wide range north of the equator having been found from about ca. 18° Lat. N. up to 65° 28' Lat. N. As to bathymetrical range it has been found on depths from 500 fathoms to ca. 21 fathoms. The Antilles, depth 390 fathoms (Challenger); Florida, depth 105 fathoms (Schmidt); in the Mediterranean in the Gulf of the Lion on depths of ca. 60—ca. 21 fathoms, at the coast of Asturias, depth ca. 66 fathoms; in the Gascony Bay, depths ca. 345 fathoms and 500 fathoms, and southwest of Belle-Isle, depth ca. 60 fathoms (Caudan); in the western entrance of the English Channel, depth 500 fathoms (Carter); at the western coast of Norway southwest of Bukenfjord, depth 106 fathoms; and finally in the Denmark Strait 65° 28' Lat. N., 27° 39' Long. W., 450 fathoms (Ingolf).

Note. Topsent, in 1892 enumerates the until then described *Biemma*-species, and mentions four: *B. inornata* Bow., *corrugata* Bow., *Grimaldii* Topsent, and *Dautzenbergi* Topsent. As before said, *Dautzenbergi* is synonymous with *rosea* Frstdt. In the present work I further refer *annexa* Schmidt to this genus. Finally the *Gellius infundibuliformis,* established by Vosmaer (Sponges of Willem Barents, Bijdr. tot de Dierk. 12te Afl., 3die Gedeelte, 26. Pl. I, fig. 13, Pl. IV, figs. 34—37) the spiculation of which is tylostyli and sigmata, will probably have to be referred to this genus. Thus at present the genus *Biemma* appears to comprise the following species:

Biemma inornata Bow.
— *corrugata* Bow.
— *annexa* O. Schmidt.
— *rosea* Frstdt.
— *Grimaldii* Topsent.
— *infundibuliformis* Vosm.

Desmacella O. Schmidt.

The form varying, massive and irregular, or erect and of a more definite form, leaf-shaped or more or less calicular. The skeleton consists of long, well developed branched fibres, the spicules of which are united by a most frequently slight mass of spongin. Spicula: Megasclera monactinal, styli (sometimes tylostyli); microsclera may be combined in various ways, sigmata alone, or sigmata of two to three sizes, and rhaphides of one to three sizes, and most frequently small comma-shaped styli (commata) (perhaps always found at this combination of spicules) or finally rhaphides alone.

Of this genus we have several species, all, however, nearly related to each other; these species are grouped round *Desmacella Peachii* Bow., and agree in the fact that with regard to microsclera they have sigmata at least of two sizes, rhaphides of one or more sizes, and all, I suppose, small comma-shaped styli. The question whether we have here one varying species or several species, may be rather difficult to decide; the spicules, however, seem here, as in other places, to give rather sure and constant species-characters, even if the differences are small. It may also give rise to some difficulty to decide whether any of the species in hand — and if this is the case, then which of these species — are identical with earlier described species, as the difference of the spiculation and the forms of the spicules are not given with sufficient distinctness in the earlier descriptions. When in the following I have determined one of the species before me as Bowerbank's *D. Peachii*, I have therefore made this determination with some reservation.

1. **D. capillifera** Levinsen.

Pl. XVI, Fig. 1 a—g.

1886. *Gellius capilliferus* Levinsen, Dijmphna Togtets zool.-bot. Udbyttet, 357, Tab. XXX, figs. 7—10.

1896. *Desmacella Peachii* var. *groenlandica* Lambe, Sponges from the Atlant. Coast of Canada, Transact. of the Roy. Soc. of Canada, Ser. 2, II, Sect. IV, 186, Pl. I, figs. 5, 5 a—e.

Form? The dermal membrane thin, only provided with microsclera. The skeleton consists of powerful fibres with little spongin. Spicula: Megasclera styli 0·3—1·8^{mm}; microsclera sigmata of two sizes, the larger 0·04—0·1^{mm}, most frequently in bundles, the smaller 0·010—0·031^{mm}; rhaphides 0·175—0·19^{mm}, most frequently in bundles; commata 0·02^{mm}.

Of this species we have only a little piece attached to a Bryozoa, and presumably this piece is only the nethermost part of a sponge that has been broken off. Thus with regard to outer characteristics I cannot add much to the description given by Levinsen l. c., which is also based on fragments. The *dermal membrane* is thin, and of spicules it has only sigmata and rhaphides; sigmata are very abundant, especially the smaller form, and the rhaphides occur partly scattered, but most frequently in bundles. These bundles seem to form a kind of reticulation. The colour (in spirit) is yellowish gray. Lambe l. c. describes the dermal membrane in the same way, but has also found circular openings in it of an average size of 0·75^{mm}, which he regards as oscula. The *skeleton* has the structure characteristic of the genus consisting of fibres the spicules of which are united by spongin.

Spicula: a. *Megasclera* are long, rather slender styli; more or less curved, almost always nearest to the head end; the other end is evenly and long tapering, the outermost point itself may be shorter or longer. In some of the shorter styli the curve is found quite close to the headend. The length is somewhat varying, and is between 1·8—0·3mm; the shorter ones have all a curve close to the head-end, but are otherwise straight. The most frequent length seems to be 1·7—1·5mm; the thickness at the upper end is 0·03—0·023mm. Finer styli occur, but only in very small numbers. Irregular forms with the thin end rounded may also be found singly. The styli, as shown above, divide into two groups, which are, however, not quite sharply separated: the typical long, more evenly curved styli, and the shorter ones with a somewhat sharper curve close to the upper end. The length of the former may be given to be between 1·7—0·8mm, of the latter between 0·7—0·3mm.

Besides the mentioned styli that form the fibres of the skeleton, some other styli occur, which are short, of an average length of 0·26mm, and irregularly curved or sinuous to a higher or lower degree. These styli, however, occur in a particular way, being only found in the part of the sponge that is attached to the substratum, where they form a thin layer.

b. *Microsclera:* 1. Sigmata of two sizes; the larger ones have a regularly curved shaft, and the recurved ends form a hook that is almost rectangular; generally they are not contort, or only contort to a small degree. They are somewhat varying in size, the length being 0·1mm down to 0·04mm, and the thickness proportionately 0·0047—0·002mm; they are found both singly and in bundles of different sizes. The small sigmata have a form resembling that of the large ones; their length varies from 0·031—0·016mm, the thickness is ca. 0·001mm. Neither are these sigmata contort. They are more numerous than the large, but do not appear to occur in bundles. 2. Rhaphides, these have a length of 0·176—0·19mm, and an average thickness of 0·001mm; they are very long and finely tapering to both ends. Single rhaphides are found scattered, but by far the greatest part occur in loose bundles. 3. Commata; small, comma-shaped, very fine styli of a length of ca. 0·02mm; at the upper end they have a thickness of ca. 0·0007mm, they are evenly curved, and taper to a long, exceedingly fine point. As seen from this description they are very small, and consequently they are easily overlooked. In this sponge they are only found in very small numbers, which is, perhaps, due to the fact that we have only the lower part of the sponge, and therefore I have not been able to observe, whether they occur in any particular way in the sponge. Levinsen l. c. does not mention these spicules, but by an examination of his original specimen I have found them, although also only in small numbers[1]. Besides in the dermal membrane sigmata and rhaphides are also found in the other tissue.

As I have had occasion to make a comparison with the original specimen of Levinsen, I have been able with certainty to identify the species. The spicules agree very well, only are the rhaphides in my specimen upon the whole somewhat shorter, which is, however, scarcely of any importance. With regard to the quoting of Lambe I cannot be so certain, as here some difference is

[1] These silicious bodies for which I propose the name of commata on account of their form, have only been mentioned once, viz. by Fristedt (Kgl. Sv. Vet. Akad. Handl. Bd. 21, No. 6, 20, Tab. II, Fig. 10—11 in a *D.* [illegible] species which he calls *D. Peachii* Bow. var. *stellifera*. As I have found them, however, in all four species before me, and as on account of their smallness and inconspicuous form, they are easily overlooked, I think myself justified in taking it for granted that they have been overlooked by the authors in the species belonging here. Therefore by the identification I have not taken the fact into consideration that they have not been mentioned in two of the following species.

found, especially consisting in the fact that the large sigmata seem to become somewhat larger, up to 0·16mm, and especially thicker, from 0·006—0·013mm, and that the rhaphides are stated to be of an average length of 0·275mm, but as otherwise the form of sigmata, as also the fact that they are plane, agree well with my species, I suppose the species to be identical with *capillifera*.

Bowerbank's *Desmacella variantia* so far has the same spiculation as *capillifera*, as the microsclera are sigmata of two sizes and only one kind of rhaphides, but the measures given by Bowerbank, make its being referred to this species impossible, the styli being given of a length of only 0·6mm and the rhaphides of 0·05mm.

Locality: Station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 204 fathoms, a fragment on a *Retepora Beaniana*.

Geogr. distr. The species seems to be widely spread in longitude: the Atlantic coast of Canada, ca. 50° Lat. N., depth 200 fathoms (Lambe); the Denmark Strait 64° 56′ Lat. N., depth 204 fathoms (Ingolf): the Kara Sea between 70 and 72° Lat. N., depth 78 fathoms (Levinsen). In each of the localities only one specimen has been taken.

2. **D. Peachii** Bow.

Pl. IV, Figs. 10—13, Pl. XVI, Fig. 2, a—l.

1866. *Desmacidon Peachii* Bowerbank, Mon. of Brit. Spong. II, 349, 3, III, Pl. LXIII, figs. 1—7.

1867. *Biemma Peachii* Gray, Proc. Zool. Soc. 1867, 538.

1870. *Desmacella Peachii* O. Schmidt, Spongien d. atlant. Gebiet, 77.

1880. *Desmacodes Peachi* Vosmaer, Notes from the Leyden Museum 104, 2.

1887. *Rhaphiodesma aculeatum* Topsent, Arch. de Zool. exp. et gén. Sér. 2, Tome V bis, supplémentaire, 152, 59, Tab. VII, fig. 14.

1890. *Desmacella Peachi* Topsent, Mem. Soc. Zool. de France, III, 200.

Leaf-shaped or calicular. The surface with small, conical processes formed by the projecting fibres. The dermal membrane thin, only provided with microsclera. Oscula few, scattered. The skeleton consists of powerful polyspicular fibres, branching from the base up through the sponge and anastomosing. The needles are cemented by a small amount of spongin. Spicula: Megasclera styli 0·87—1·5mm; microsclera sigmata of two sizes, large ones 0·092mm, most frequently in bundles, small ones 0.016—0·021mm; rhaphides of two sizes in bundles, long, hairlike ones 0·15—0·17mm, short ones 0·042—0·057mm; commata 0·011—0·014mm.

To this species I refer one of the four species before me that seems to me to agree rather well with Bowerbank's description and figures (fig. 2, where the skeletal spicule is figured as a tylostylus, is evidently erroneous, or a spicule not normal to the species has been figured; in the text tylostyli are not mentioned, and in the systematic synopsis given before the genus, it is just by the "Skeleton spicula acuate" that *D. Peachii* is distinguished from *D. ægagropila* with the "Skeleton spicula spinulate"), and no doubt it is also this species that has first been described by Topsent l. c. as *Rhaphiodesma aculeatum*, but later by him has been referred to *Desmacella Peachii*. The following species is chiefly distinguished from the present one by the form of the large sigma, and here we have by the determination only the figure of Bowerbank to go by, but this figure seems to agree best with the sigma in the present species.

As to the exterior, my specimens of the species agree very well with the figure of Bowerbank. The species may have a very various form which seems, however, to be connected with the age of the individual. It begins as a little cushion which may be higher or lower, and which may, on account of the ends of the fibres that project through the conical processes of the skin, to some degree resemble *Halicnemia verticillata* Bow. We have two specimens of this form, one of which has a breadth of 8^{mm}, and a height of 5^{mm}, the other has a similar breadth, but a height of 12^{mm}. Both these specimens are attached to a *Sipho*. In growing it rises more from the substratum, and assumes a leaf-shaped or calicular form. It is possible that in the grown state it is normally of a calicular form, as the leaf-shaped pieces in hand are fragments; the largest specimen in my possession, which is, however, highly damaged, has an open calicular form; it has a height of 57^{mm}, and the wall has a thickness of about $10-15^{mm}$. It has been attached by a rather small base. Bowerbank's specimen is somewhat larger having a height of about 100^{mm}. The *surface* of the sponge which is only undamaged in the smaller specimens, is characteristic by the fact that it rises into rather close-set, conical processes pierced by the ends of the fibres. On account of the solid skeleton the consistency is rather firm and somewhat elastic. The colour (in spirit) is brown or grayish brown. The *dermal membrane* is very thin, and is supported by the ends of the fibres; it is only provided with microsclera; first rhaphides are found of two different sizes in bundles, they are scattered without any order, and in some places only the long ones are found, in other places only the short ones. Next two kinds of sigmata are found in the skin, of which especially the small ones are found abundantly; finally commata are found in no small number, but on account of their smallness they are only little conspicuous and difficult to observe. *Oscula* and *pores:* I have only with certainty observed pores in the smallest of my specimens where they were found in large numbers in the fields between the projecting ends of the fibres, so that here the skin in several places was reduced to a sieve. Their form varied from round to oval, and the size was measured to $0·05-0·15^{mm}$. As the skin was wanting in most specimens I have only been able to examine it in a deficient way; I am, however, inclined to think that it will show features similar to those mentioned under the following species. In the specimens in which the skin was tolerably undamaged, a few scattered circular holes were seen of a size of $1·5-2·5^{mm}$ (they were only seen in the small specimens); these openings I take to be oscula.

The *skeleton* consists of rather powerful polyspicular fibres branching upward from the base of the sponge and anastomosing, so that they form a rather dense reticulation. They are thickest below, and may here reach a thickness of up to $0·5^{mm}$, otherwise the average thickness is about $0·2^{mm}$. Branches from the fibres bend everywhere outward, and support and pierce the dermal membrane, as before mentioned. The spaces between the fibres are filled by an irregular network of the finer branches and anastomosings. The spicules of the fibres are cemented by spongin which is not, however, seen to coat the whole fibre. The spongin is seen especially distinctly where branches go off from the fibres.

Spicula: a. *Megasclera* are styli, more or less, oftenest slightly curved, and almost always with the curve nearest to the upper end; the other end runs into a long, evenly tapering point, the outermost end of which may be more or less shortly pointed; especially in the shorter and thicker spicules the point is often short. The length is somewhat varying, from about $1·5-0·87^{mm}$; in this respect some difference may be found between different individuals. The thickness at the upper end is between 0·020—0·030^{mm}, the longest generally not being the thickest. Considerably finer needles of about the same length, and connected with the others by transitions, may be found, but only in small numbers. Besides normally formed styli forms may rather frequently be found, in which the pointed end is rounded, and then it may be thinner or thicker, so that we get strongyla.

As in the preceding species I have also in the present one down at the place of attachment found irregularly formed, more or less sinuous and curved needles, upon the whole smaller than the normal needles of the species.

b. *Microsclera.* 1. Sigmata of two sizes: the larger ones have a regularly bent shaft, and the ends are recurved with a round bend, and form a rather large hook. These sigmata are always contort, generally about a quarter of a turn. The length is rather constant, and is between 0·09—0·10^{mm}; the thickness is 0·0035—0·004^{mm}. Also finer sigmata, down to quite fine ones, are found, which no doubt are developmental forms; they are of the same length as the fully developed ones. Besides being found single, these sigmata very frequently occur in bundles, sigmadragmata, and presumably they are all developed in this way. As far as I have been able to decide, each bundle contains always eight sigmata; frequently bundles are seen made up of fine sigmata, but generally they have the full thickness, and consequently the bundles are not disunited, until the sigmata are fully developed. The small sigmata have a regular sigma-form; their length varies from 0·016—0·021^{mm}, the thickness is ca. 0·001^{mm}. They are never seen in bundles. 2. Rhaphides of two sizes: longer and shorter; the longer rhaphides are hairlike and finely pointed, of a length of 0·15—0·17^{mm} and a thickness at most of 0·001^{mm}. These rhaphides may be seen singly, but they occur chiefly in bundles, trichodragmata, which seem to be of a very varying thickness. The smaller rhaphides are somewhat thicker than the longer ones, and they are fusiform; sometimes the greatest thickness is nearest to one end. The length varies from 0·042—0·057^{mm}, but most frequently it is 0·05^{mm}, the thickness is 0·0015—0·002^{mm}. These rhaphides also occur in bundles, trichodragmata; the bundles are often seen to contain eight rhaphides, but there seem also to be bundles with more needles. 3. Commata, small, comma-shaped styli of a similar form as in the preceding species; the head end is slightly swollen; the length is 0·011—0·014^{mm}, and the thickness at the upper end ca. 0·001^{mm}. All the microsclera occur as well in the dermal membrane as in the other tissue; of the two forms of sigmata the smaller are everywhere most abundant.

Gemmulæ? Besides the silicious bodies mentioned before we find in this sponge a particular form, viz. small silicious globules. There is, however, the peculiarity of the occurrence of the globules, that they are not found in all individuals, and in the sponges where they are found, they occur only in certain places, so that in many cuttings of the sponge they are not seen at all, while in others they are found in great abundance. There can be no doubt that these globules belong to the same kind of bodies as will be mentioned below under *D. groenlandica* Frstdt., and which I take to be gemmulæ; thus the fact that they are not found constantly, may also be understood, as an individual need not at all times have these bodies. In the present species I have not found them to form distinct round capsulæ, but have only found them scattered singly in the tissue, or in irregular loose heaps. These globules vary in diameter from 0·004—0·008^{mm}.

Locality: Station 53, 63° 15′ Lat. N., 15° 07′ Long. W., depth 795 fathoms, a couple of small specimens; station 92, 64° 44' Lat. N., 32° 52' Long. W., depth 976 fathoms, fragments of a larger specimen; station 95, 65° 14' Lat. N., 30° 39' Long. W., depth 752 fathoms, two quite small specimens and a few fragments; station 96, 65° 24' Lat. N., 29° 00' Long. W., depth 735 fathoms, two smaller specimens; it has further been taken on the East-Greenland expedition 1891—92 on 65° 39' Lat. N., 28° 25' Long. W., depth 553 fathoms, one specimen. These stations are all situated in the Denmark Strait, excepting station 53 that is off the south coast of Iceland.

Geogr. distr. Of this sponge hitherto only two specimens have been known, one taken at Scotland (the original specimen of Bowerbank) the other in the English Channel at Luc (Topsent). Unfortunately no depth has been given for either of these localities.

3. D. hamifera n. sp.

Pl. VII, Figs. 4—6, Pl. XVII, Fig. 1 a—l.

Leaf- or funnel-shaped. The surface with small conical processes formed by the projecting fibres. The dermal membrane thin, only provided with microsclera. Oscula scattered. The skeleton consists of powerful polyspicular fibres branching from the base up through the sponge, and connected by transverse anastomoses. Spongin is found cementing the spicules, but only to a rather small degree. Spicula: Megasclera styli 0·75—1·50 mm; microsclera sigmata of two sizes, large ones of a peculiar form, most frequently as dragmata 0·08—0·107 mm, small ones 0·014—0·021 mm; rhaphides as trichodragmata of two sizes, long, hair-like ones 0·15—0·10 mm, short ones 0·043—0·06 mm; commata 0·011—0·014 mm.

This species is of a quite similar form and structure as the preceding one. The specimens in hand have an erect, leaf-shaped form; a single one shows a short, thick stalk which has been attached, and which has at the top the remains of an open funnel (Pl. VII, fig. 5). None of the specimens, however, are quite undamaged, so that there may be some doubt whether the species is always funnel-shaped, or perhaps also may be leaf-shaped. The largest specimen, a somewhat concave-convex leaf, has a height of 12 cm, and a similar breath; the thickness in the middle of the leaf is about 20 mm. The thickness is greatest below where the sponge has been attached, and decreases towards the upper edge. The other specimens are all somewhat smaller, also leaf-shaped, but most of them are a little arcuate, so that the probability is that the sponge is funnel-shaped. A single fragment is attached to a stone. The consistency is rather firm, hard down towards the place of attachment. The colour (in spirit) varies between light yellow and light gray. The *dermal membrane* is also in this species supported by the ends of the fibres, and so the *surface* shows the same kind of small processes as in the preceding species. The dermal membrane is otherwise only kept here and there in a few of the specimens. It shows, at all events in some places, a quite peculiar structure. When viewed under a lens, it shows a network resembling a network of spiculo-fibres, as for instance in *H. panicea*; but under higher magnifying powers it is seen that the network is made by the formation of thicker strings in the skin inwardly; the network incloses roundish or oval thin-skinned fields, and in these fields the pores are lying in different numbers. In the strings of the network some roundish or fusiform cells are seen filled with refringent granules (cellules sphéruleuses Tops.). This structure of the skin, however, is not found everywhere, the skin in other places appearing as a simple thin membrane without any difference may be found between different individuals. The thickness at the upper end is between 0·029—0·039mm, the longest generally not being the thickest. Considerably finer needles of about the same length, and connected with the others by transitions, may be found, but only in small numbers. Besides normally formed styli forms may rather frequently be found, in which the pointed end is rounded, and then it may be thinner or thicker, so that we get strongyla.

As in the preceding species I have also in the present one down at the place of attachment found irregularly formed, more or less sinuous and curved needles, upon the whole smaller than the normal needles of the species.

b. *Microsclera.* 1. Sigmata of two sizes: the larger ones have a regularly bent shaft, and the ends are recurved with a round bend, and form a rather large hook. These sigmata are always contort, generally about a quarter of a turn. The length is rather constant, and is between 0·09—0·10mm; the thickness is 0·0035—0·004mm. Also finer sigmata, down to quite fine ones, are found, which no doubt are developmental forms; they are of the same length as the fully developed ones. Besides being found single, these sigmata very frequently occur in bundles, sigmadragmata, and presumably they are all developed in this way. As far as I have been able to decide, each bundle contains always eight sigmata; frequently bundles are seen made up of fine sigmata, but generally they have the full thickness, and consequently the bundles are not disunited, until the sigmata are fully developed. The small sigmata have a regular sigma-form; their length varies from 0·016—0·021mm, the thickness is ca. 0·001mm. They are never seen in bundles. 2. Rhaphides of two sizes: longer and shorter; the longer rhaphides are hairlike and finely pointed, of a length of 0·15—0·17mm and a thickness at most of 0·001mm. These rhaphides may be seen singly, but they occur chiefly in bundles, trichodragmata, which seem to be of a very varying thickness. The smaller rhaphides are somewhat thicker than the longer ones, and they are fusiform; sometimes the greatest thickness is nearest to one end. The length varies from 0·042—0·057mm, but most frequently it is 0·05mm, the thickness is 0·0015—0·002mm. These rhaphides also occur in bundles, trichodragmata; the bundles are often seen to contain eight rhaphides, but there seem also to be bundles with more needles. 3. Commata, small, comma-shaped styli of a similar form as in the preceding species; the head end is slightly swollen; the length is 0·011—0·014mm, and the thickness at the upper end ca. 0·001mm. All the microsclera occur as well in the dermal membrane as in the other tissue; of the two forms of sigmata the smaller are everywhere most abundant.

Gemmulæ? Besides the silicious bodies mentioned before we find in this sponge a particular form, viz. small silicious globules. There is, however, the peculiarity of the occurrence of the globules, that they are not found in all individuals, and in the sponges where they are found, they occur only in certain places, so that in many cuttings of the sponge they are not seen at all, while in others they are found in great abundance. There can be no doubt that these globules belong to the same kind of bodies as will be mentioned below under *D. groenlandica* Frstdt., and which I take to be gemmulæ; thus the fact that they are not found constantly, may also be understood, as an individual need not at all times have these bodies. In the present species I have not found them to form distinct round capsulæ, but have only found them scattered singly in the tissue, or in irregular loose heaps. These globules vary in diameter from 0·004—0·008mm.

Locality: Station 53, 63° 15′ Lat. N., 15° 07′ Long. W., depth 795 fathoms, a couple of small specimens; station 92, 64° 44' Lat. N., 32° 52' Long. W., depth 976 fathoms, fragments of a larger specimen; station 95, 65° 14' Lat. N., 30° 39' Long. W., depth 752 fathoms, two quite small specimens and a few fragments; station 96, 65° 24' Lat. N., 29° 00' Long. W., depth 735 fathoms, two smaller specimens; it has further been taken on the East-Greenland expedition 1891–92 on 65° 39' Lat. N., 28° 25' Long. W., depth 553 fathoms, one specimen. These stations are all situated in the Denmark Strait, excepting station 53 that is off the south coast of Iceland.

Geogr. distr. Of this sponge hitherto only two specimens have been known, one taken at Scotland (the original specimen of Bowerbank) the other in the English Channel at Luc (Topsent). Unfortunately no depth has been given for either of these localities.

3. **D. hamifera** n. sp.

Pl. VII, Figs. 4–6, Pl. XVII, Fig. 1 a–l.

Leaf?- or funnel-shaped. The surface with small conical processes formed by the projecting cores. The dermal membrane thin, only provided with microsclera. Oscula scattered. The skeleton consists of powerful polyspicular fibres branching from the base up through the sponge, and connected by transverse anastomoses. Spongin is found cementing the spicules, but only to a rather small degree. Spicula: Megasclera styli 0·75—1·50mm; microsclera sigmata of two sizes, large ones of a peculiar form, most frequently as dragmata 0·08—0·107mm, small ones 0·014—0·021mm; rhaphides as trichodragmata of two sizes, long, hair-like ones 0·15—0·16mm, short ones 0·043–0·06mm; commata 0·011—0·014mm.

This species is of a quite similar form and structure as the preceding one. The specimens in hand have an erect, leaf-shaped form; a single one shows a short, thick stalk which has been attached, and which has at the top the remains of an open funnel (Pl. VII, fig. 5). None of the specimens, however, are quite undamaged, so that there may be some doubt whether the species is always funnel-shaped, or perhaps also may be leaf-shaped. The largest specimen, a somewhat concave-convex leaf, has a height of 12cm, and a similar breath; the thickness in the middle of the leaf is about 20mm. The thickness is greatest below where the sponge has been attached, and decreases towards the upper edge. The other specimens are all somewhat smaller, also leaf-shaped, but most of them are a little arcuate, so that the probability is that the sponge is funnel-shaped. A single fragment is attached to a stone. The consistency is rather firm, hard down towards the place of attachment. The colour (in spirit) varies between light yellow and light gray. The *dermal membrane* is also in this species supported by the ends of the fibres, and so the *surface* shows the same kind of small processes as in the preceding species. The dermal membrane is otherwise only kept here and there in a few of the specimens. It shows, at all events in some places, a quite peculiar structure. When viewed under a lens, it shows a network resembling a network of spiculo-fibres, as for instance in *H. panicea*; but under higher magnifying powers it is seen that the network is made by the formation of thicker strings in the skin inwardly; the network incloses roundish or oval thin-skinned fields, and in these fields the pores are lying in different numbers. In the strings of the network some roundish or fusiform cells are seen filled with refringent granules (cellules sphéruleuses Tops.). This structure of the skin, however, is not found everywhere, the skin in other places appearing as a simple thin membrane without any network[1]). Of spicules the skin has only microsclera, viz. rhaphides of two sizes, especially occurring in bundles, but without any order; in some places especially the long ones are seen, in others the short ones; where pores are seen, the bundles of rhaphides, especially the short ones, seem to be restricted to the strings between the thin-skinned pore fields, while long rhaphides are seen scattered singly also over the pore fields. Further sigmata of two sizes are found in the skin, of which the larger ones are found rather sparingly in most places, while the smaller are everywhere abundant; finally commata are also found abundantly. *Oscula* and *pores:* As before said, the pores are found in the thin-skinned pore fields to a number of about ten in each field; they were measured of a size of 0·029—ca. 0·12^{mm}. Where the skin was kept, here and there some circular openings were found of a diameter of 1·5—2^{mm}, which openings I take to be oscula.

The *skeleton* is constructed in a quite similar way as in the preceding species. It consists of polyspicular fibres issuing at the base, and running up through the sponge. The fibres are thickest at the base, and reach here a thickness of 1—1·5^{mm}; in their branching upward they become somewhat thinner, and at the same time they become more richly branched. In a radial longitudinal section the more or less parallel or somewhat diverging longitudinal fibres are distinctly seen, thus being the principal fibres; they are connected by numerous transverse anastomoses. Outward towards each side the fibres send off branches supporting and piercing the dermal membrane (Pl. VII, fig. 6). In the tangential direction the fibres diverge and branch somewhat more, on account of the fan-shaped or calicular form of the sponge. The spicules of the fibres are cemented by a distinct, but clear mass of spongin, which is most copious towards the base of the sponge, and which seems to coat the fibres entirely, although only with an exceedingly thin layer.

Spicula: a. *Megasclera* are styli, more or less, sometimes somewhat irregularly, curved; they have a long tapering point, of which, however, the outermost end is shortly pointed. The length varies from 0·75—1·56^{mm}; most frequently it is between 1—1·25^{mm}. The thickness is between about 0·024—0·036^{mm}; generally the length and thickness are in proportion to each other, although it is not always the case. Styli with a more or less broadly rounded point are rather frequently seen. Considerably finer needles which may be regarded as developmental forms, occur in small numbers.

Also in this species we find in the layer touching the place of attachment irregularly formed spicules of other dimensions than the other ones.

b. *Microsclera:* 1. Sigmata of two sizes; the large sigmata have a peculiar form, being highly curved, and the curve is most frequently sharpest in the middle of the shaft, while the piece between the curve and the hook-shaped end may be more or less straight; the ends are finely pointed and recurved in a sharply hook-shaped way. These sigmata are almost always contort, most frequently about a quarter of a turn, but as well with regard to this feature, as upon the whole with regard to form, they may be somewhat varying. Their length, which is, of course, somewhat dependent on the degree of curving, is 0·08—0·107^{mm}, the thickness varies from 0·002—0·003^{mm}. Quite fine forms, developmental phases, of the same length as the others, are also found. These sigmata are seen both

[1]) In these latter places no pores have been observed; it is possible that the mentioned structure of the skin is only found in the places provided with pores, and it is also possible that pores are only found in certain places and oscula in others. But the material in hand has not been sufficient to enable me more particularly to elucidate this question.

singly and as sigmadragmata, which latter also in the present species seem always to be composed of eight sigmata. The small sigmata have a regular form, their length varies from 0·014—0·021mm, the thickness is ca. 0·001mm, or still finer. These sigmata are not contort, and they are never seen in bundles. They are present in much larger numbers than the large ones. 2. Rhaphides of two sizes: the long rhaphides are hair-like and finely pointed; they have a length of 0·15—0·16mm, and their thickness is at most 0·001mm. These spicules may be found singly, but they occur chiefly in trichodragmata of varying thickness. The small rhaphides are thicker, fusiform, and of a length of 0·043—0·06mm. The thickness is 0·0014—0·0017mm. These rhaphides are found in bundles, which often seem to contain eight rhaphides, but may also be composed of a greater number. 3. Commata: small, comma-shaped styli with a somewhat swollen head end; sometimes they are a little irregularly curved; their length is 0·011—0·014mm, and the thickness at the head end is 0·0012mm. All the forms of the microsclera are found, besides in the dermal membrane, also in the other tissue of the sponge in great abundance.

Gemmulæ? I have also in individuals of this species found gemmula-like bodies. Most frequently they were here found as roundish loose heaps of silicious globules, but also as distinctly limited, more or less globular or roundish bodies, in which the silicious globules, it would seem, were lying in a membrane or inside of it (Pl. XVII, fig. 1, l). Generally these bodies had a diameter of 0·05—0·07mm. The silicious globules vary from 0·0015—0·0057mm. All the globules in one heap are of about the same size. In a few specimens these bodies were found especially abundantly.

Locality: By the Ingolf expedition this species has been taken on station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 2, 63° 04′ Lat. N., 9° 22′ Long. W., depth 262 fathoms; station 3, 63° 35′ Lat. N., 10° 24′ Long. W., depth 272 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 97, 65° 28′ Lat. N., 27° 36′ Long. W., depth 450 fathoms. It has further been taken on 66° 20′ Lat. N., 25° 12′ Long. W., depth 96 fathoms; 63° 15′ Lat. N., 9° 35′ Long. W., depth 270 fathoms; 61° 23′ Lat. N., 5° 04′ Long. W., depth 255 fathoms (Wandel); and at the Faröe Islands, a little to the east of Suderö, depth ca. 150 fathoms (Th. Mortensen). In all about ten more or less damaged specimens or fragments have been taken. All the localities are situated at the Faröe Islands, between the Faröe Islands and Iceland, and in the Denmark Strait; and its bathymetrical range is between 96 and 450 fathoms.

4. D. groenlandica Frstdt.

Pl. VI, Fig. 14, Pl. VII, Fig. 7, Pl. XVII, Fig. 2 a—h.

1887. *Desmacella Pecchii* var. *groenlandica* Fristedt, Vega Exp. vetensk. Iakttagelser IV, 441, Pl. 24, figs. 38—45, Pl. 28, fig. 14.

The form calicular. The surface with small conical processes [illegible] *the dermal membrane thin, only provided with microsclera. Oscula* [illegible] *with papilla-like projections. The skeleton consists of fibres, going from* [illegible] *richly branching and anastomosing. Spongin is found cementing the needles* [illegible] *Spicula: Megasclera styli 0·04—0·37mm; microsclera sigmata of two sizes,* [illegible] *small ones 0·008—0·01^{mm}; rhaphides of two sizes, most frequently in dragmata, the long ones 0·25—0·268^{mm}, the short ones 0·08—0·1^{mm}; commata 0·008^{mm}.*

The only specimen in hand of this species has an open, somewhat irregular calicular form, and has been attached without any stalk. Its height is ca. 6^{cm}, and its greatest breadth in the circumference ca. 8·5^{cm}, while the thickness of the wall is scarcely 2^{cm}. The surface is set with small processes due to the ends of the fibres. The colour (in spirit) is pale yellow. The consistency is less firm than in the preceding species. The *dermal membrane* is thin, and is supported by the ends of the fibres; of spicules it has only microsclera, viz. rhaphides of two sizes, partly scattered in the skin, partly occurring in bundles, and small sigmata, present in very large numbers. In some places of the skin was seen a similar structure with thinner fields as in the preceding species. In the present species *oscula* have a quite peculiar structure their edge being provided with papillæ. When the osculum is open, it is a more or less round hole of a diameter of ca. 0·5^{mm}. When this is the case some slightly projecting lobes are seen in the edge, and the ends of rhaphides project into the opening. When the osculum is being shut these lobes grow to longer and longer papillæ, and the projecting rhaphides cross each other; at last the papillæ come together, and the closed osculum forms a little conical process (Pl. VI, fig. 14). Whether the papillæ are free or only papilla-like folds of the skin, I have not been able to see. This way of closing the osculum is quite peculiar, and it is to be supposed that the function of the projecting rhaphides is to bar the entrance when the osculum is not closed. In the present specimen oscula are found abundantly on the inside; but as the skin of the outside is torn off it cannot be decided, whether they have been restricted to the inside, or have been found all over the sponge. *Pores* I have not seen; they must be supposed to be lying in the before mentioned thin-skinned fields.

The *skeleton* is of a quite similar structure as in the two preceding species, and consists of fibres running from the base up through the sponge branching and anastomosing, and giving off branches towards the surface supporting the dermal membrane. The fibres are a little thinner, and seem to be somewhat more richly branched than in the preceding species. A distinct, clear mass of spongin unites the spicules of the fibres, and coats the fibres entirely, though only with a thin, scarcely observable layer.

Spicula: a. *Megasclera:* these are slightly, or at the head end, a little more strongly curved styli with an evenly tapering point the outermost part of which may be a little more or less shortly pointed. The length varies from ca. 0·94—1·37^{mm}, and the thickness at the upper end is 0·025—0·035^{mm}. Styli with more or less broadly rounded points are not scarce.

Also in this species styli are found in the basal layer, smaller than the normal ones, and irregularly bent in different ways.

b. *Microsclera:* 1. Sigmata of two sizes; the larger are of a quite similar form as in the preceding species with a strong curve in the middle of the shaft and a little hook-shaped recurving of the ends; they are also contort. The length from one hook to the other is ca. 0·09—0·10^{mm}, and the thickness is 0·0028^{mm}. These sigmata occur in very small number, and only quite singly, so that there might be some doubt, whether they really belong to the sponge or are extraneous; as, however, they are found in almost every cutting of the sponge, the probability is that they belong to it. This belief is also favoured by the fact that they are mentioned by Fristedt as found in his specimen, which is, in spite of the scarcely quite correct figure of the large sigma, surely identical with the the species before me[1]). The small sigmata are much smaller than in the preceding species; they are of the common form, and are plane; their length is between 0·008—0·01mm, and the thickness may be given as 0·0007mm or still finer; these sigmata are exceedingly numerous, as well in the dermal membrane as throughout the sponge. 2. Rhaphides of two sizes, both considerably larger than the corresponding rhaphides in the two preceding species. The long rhaphides have a length of 0·25—0·268mm, and a thickness in the middle of ca. 0·002mm. Their ends are produced into long tapering, fine points. They are always straight, and if some are seen to be curved, when a piece of the sponge is examined under the microscope, the cause of this fact cannot be that they have such a form, but it must be due to a force acting on them. These rhaphides occur both scattered and in bundles containing a rather large number of rhaphides. The short rhaphides are fusiform, their length varies from 0·08—0·1mm, and the thickness is about 0·0028mm. These rhaphides are chiefly found in bundles that seem most frequently to contain a rather large number of rhaphides. Both kinds of rhaphides are found abundantly as well in the dermal membrane as through the whole sponge. 3. Commata; these are only found in very small numbers, but like the large sigmata they are found in every cutting; they are small, their length being ca. 0·008mm, and the thickness at the head end about 0·001mm.

Gemmulæ? In this species Fristedt mentions the same bodies as have been mentioned in the two preceding species, and which he takes to be gemmulæ. He figures these bodies Pl. 24, figs. 44—45. In the specimen before me I have only seen the small silicious globules that are found in the wall of the mentioned bodies, singly or in small groups, while the piece of Fristedt's original specimen I have had for examination, shows the gemmulæ-like bodies abundantly; they are most frequently quite globular, of a diameter of about 0·08mm; they are formed of silicious globules imbedded in, or situated inside of, a membrane which is, perhaps, made of spongin; on the other hand I have not been able to find the depression in the wall mentioned by Fristedt („a small depression like that in the globular spicules of Geodia"), and I suppose that it is not really found, but is only due to the refraction (Pl. XVII, fig. 2 f). In the bodies that seem to be quite finished, the globules have a diameter of ca. 0·007mm, while in others, mostly seen as loose groups of globules, it is considerably smaller, down to 0·002mm, or still smaller. The globules of the same group are always of about the same size, so that all the globules belonging to one of the gemmula-like bodies, appear to be begun and developed contemporaneously.

The reason why these bodies have here been termed gemmulæ, is only that they recall to some degree the gemmulæ of the spongillæ, and presumably serve the propagation of the sponge; it is only little probable that their function should be the same as that of the gemmulæ of the spongillæ, as the question is here of species from rather considerable depths (78—676 fathoms).

Locality: The Denmark Strait 66° 20' Lat. N., 65° 12' Long. W., depth 66 fathoms (Wandel), one specimen.

[1]) Fristedt l. c. does not mention that these sigmata are so small in number, and yet they must surely have been so also in his specimen, as I have not even been able to find any large sigma in the little piece of his specimen I have had for examination, but then this piece also consisted almost only of naked fibres.

Geogr. distr. Fristedt has the species (a small fragment) from the east coast of Greenland, depth 130 fathoms.

Note. As before mentioned, the four *Desmacella*-species enumerated here, appear to be nearly related, showing great correspondence as well with regard to their skeletal structure and spiculation, as also their outer form and the structure of their skin seem to be corresponding. We might, perhaps, be justified in establishing a special genus for them, to which genus some more species would then have to be referred, as all species with rhaphides of one or more sizes seem to be nearly related, and must be grouped together. I shall here put together the hitherto described species that are possessed of rhaphides; with regard to the species not described here, I give the measures according to the authors in question:

	Megasclera	Microsclera			
	Styli	Sigmata	Rhaphides	Commata	Gemmulæ?
Desmacella varians Bow.	0·43—0·63mm	Two sizes: large: 0·064—0·085mm small: 0·012—0·025mm	One size: 0·06mm	not observed	not observed
capillifera Levins.	0·6—1·8mm	Two sizes: large: 0·04—0·1mm small: 0·019—0·031mm	One size: 0·176—0·19mm	0·02mm	not observed
fortis Tops. Amboyna, The Read Sea.	ca. 1mm	Two sizes: large: 0·09—0·105mm small: 0·02mm	One size: 0·14mm	not observed	not observed
Peachii Bow.	0·87—1·5mm	Two sizes: large: 0·09—0·10mm of common form, small: 0·016—0·021mm	Two sizes: long: 0·15—0·17mm short: 0·042—0·057mm	0·011—0·014mm	÷
Peachii var. *stellifera* Frstdt. West-coast of Sweden	1mm	Two sizes: large: ca. 0·12mm of common form, small: ca. 0·015mm	Two sizes: long: 0·15mm short: 0·048mm	0·009mm and asters with stubby points: 0·008mm	not observed
hamifera mihi	0·75—1·56mm	Two sizes: large: 0·08—0·107mm of peculiar form, small: 0·014—0·021mm	Two sizes: long: 0·15—0·16mm short: 0·043—0·06mm	0·011—0·014mm	—
groenlandica Frstdt.	0·94—1·37mm	Two sizes: large: 0·09—0·10mm of peculiar form, small: 0·008—0·01mm	Two sizes: long: 0·25—0·268mm short: 0·08—0·1mm	0·008mm	—
Peachi var. *trirhaphis* Tops. Amboyna	0·35mm	Three sizes: largest: 0·08mm middle: 0·045mm smallest: 0·018mm	Three sizes: longest: 0·17mm and 0·005mm middle: 0·15mm, fine short: 0·04mm and 0·003mm	not observed	not observed
Peachi var. *fistulosa* Tops. Amboyna	0·3—0·33mm	0·015—0·058mm	Three sizes: longest: 0·11mm, fine middle: 0·105mm and 0·003mm short: 0·033mm and 0·001mm	not observed	not observed
aberrans Tops.	0·6mm	÷	One size: 0·18mm	÷	÷

On account of the rather considerable differences with regard to the spiculation, I take the two varieties *trirhaphis* and *fistulosa* established by Topsent (Rev. Suisse de Zool. IV, 1897, 461, Pl. XVIII, Fig. 9, Pl. XXI, Fig. 35; 462, Pl. XVIII, Fig. 11), to be independent species, and this opinion may, I suppose, also hold good with regard to Fristedt's variety *stellifera*, the spiculation of which is quite peculiar.

Kieschnick (Semon: Zool. Forschungsreisen in Austr. Band V. Denkschrift. Med. Nat. Gesellsch. Jena, Band 8, 1900, 568, Tab. XLV, Fig. 53—56) establishes a *Desmacella fragilis* from Amboyna, whose spiculation of microsclera is given thus: „grosse Doppelhaken, Sigma, zarten Bogen, Trichodragmen", but neither from the very incomplete description nor from the figures (the „zarten Bogen" are not figured) can anything be seen but the fact that the species belongs to the present group.

I shall further call attention to the fact that the genus *Sigmaxinella* with the species *australiana* Dend., *flabellata* Cart., and *ciocalyptoides* Dend., established by Dendy (Proceed. of the Roy. Soc. of Vict. IX, 1897, 240) and referred to *Axinellidæ*, would, according to the descriptions in hand, scarcely seem to be different from *Desmacella*.

Topsent, in 1892, enumerates the *Desmacella*-species then known to him, and mentions six; of these *Peachii* and *aberrans* are mentioned above; of the other four *annexa* has here been referred to the genus *Biemma*. The other species are: *pumilio* Schm., *vagabunda* Schm., and *cavernula* Bow. With regard to *pumilio* and *vagabunda* it is, on account of the shortness of the description, impossible to form any nearer opinion; with regard to *vagabunda* there may, perhaps, be some probability that it may be a *Desmacella*. Later has, besides the species mentioned above, one more species supervened, viz. the *D. vulgaris*, established by Topsent 1892 (Arch. de zool. exp. et gén. X, 1892, XXI). Besides the ten *Desmacella*-species belonging to one group, which are enumerated above, the genus consequently still comprises the following:

Desmacella pumilio Schm.?
vagabunda Schm.?
cavernula Bow.
vulgaris Tops.

Hamacantha Gray.

The form varying, massive, roundish or quite irregular, sometimes more or less erect, or thinly crust-shaped; sometimes provided with papillæ. The skeleton is an irregular network of mostly polyspicular fibres and irregularly scattered spicules and bundles of spicules. Spongin is present to a small degree, or wanting. Spicula: Megasclera styli, sometimes oxea interspersed between the styli, or exclusively oxea. Microsclera: the microsclera characteristic of the genus, are diancistra of one to three different forms, together with which may be found toxa, trichodragmata, or sigmata.

1. H. Bowerbanki n. sp.

Pl. VII, Figs. 2—3, Pl. XVIII, Fig. 1 a—k, Figs. 2—3.

1874. ?*Halichondria falcula* Bowerbank, Mon. Brit. Spong. III, 208, Pl. LXXIV, figs. 1—3.
1882. *Hymedesmia Johnsoni* Carter, Ann. Mag. Nat. Hist. Ser. 5, IX, 207, Pl. XI, fig. 20 a—c.

found, which have already been figured by O. Schmidt (Spongien des Meerbus. von Mexico 1880, Taf. IX, Fig. 10). The earliest stage I have seen, is a quite thin needle, rather shortly recurved in both ends, and of about the same length as the fully developed diancistron. The development now consists in the needle growing in thickness, the ends increasing in length, and the sharp edges being formed. All phases of this development may be found, as shown in Pl. XVIII, fig. 1 d. It has been a matter of some speculation whether these diancistra were most justly to be termed sigmata or chelæ. O. Schmidt (Spong. d. atlant. Gebiet. 1870, 54, and Spong. d. Meerbus. von Mexico, 1880, 82), declares them to be a modification of sigmata, on account partly of their being developed from a phase that he thinks to be sigma-like, partly of their being contort as many sigmata. Carter (Ann. Mag. Nat. Hist. 5, IX, 298), on the other hand, finds by comparing them with the peculiar, contort chela in *Esperella (Desmacidon) titubans*, that they are chelæ (anchorates), while Vosmaer (The Spong. of Villem Barents , Bijdr. tot de Dierk., 12te Aflev., 3die Gedelt., 1885, 28) says: I call special attention to fig. 85, being a trenchant bihamate with two teeth. This may be a proof that they are modified anchors and not modified bihamates . Such abnormities may be found of the diancistra as well as of other silicious bodies, but they surely prove nothing, neither is anything proved by what has been said by Schmidt or Carter, and with regard to the relation between diancistra and the other meniscoid microscleres nothing can be said. The fact mentioned by Schmidt (l. c. 1870, 54, Taf. V., Fig. 17), that the diancistra and especially the sharp edges are not quite silicified, and are more or less destroyed by being boiled, must, as might be thought beforehand, be founded upon a mistake; the fact is that they will stand boiling in hydrochloric acid or aqua regia long enough. The form given in fig. 17 c, appears rather to be a quite abnormal form, such as may be found. The second kind of diancistra are considerably smaller, but of a similar form, the only differences being that the shaft almost always has a slight curve in the middle, and that the points of the recurved ends come somewhat nearer to each other than in the large ones. The edges are here very difficult to see, so that we may easily get the impression that they are wanting. The length is between 0·045—0·057^{mm}, sometimes they may be a little longer; the thickness in the middle is 0·004—0·007^{mm}. They are developed in the same way as the preceding ones, bus as the edges are only to be seen with difficulty, the developmental phases are far from being conspicuous. Besides the mentioned forms a third form of diancistra is found, which is the smallest of the three; they are highly bent in the middle, and the plane of this curve may be situated differently with regard to the planes through the shaft and the recurved ends. Otherwise the principle of their form is the same as in the two preceding kinds: the edges issuing from the shaft are rather broad, and therefore the notch in the middle of the shaft between the two edges is most frequently distinctly seen; the edges are also in this form only seen with difficulty. The length of these diancistra are between 0·021 and 0·028^{mm}, most frequently nearest to the former figure; the thickness in the middle is ca. 0·0010^{mm}. Of these three different forms of diancistra the largest ones occur in a peculiar way, being attached to the fibres of the skeleton with one end, while the other end projects, and they are collected in bundles situated along the fibres with certain intermediate spaces, in the same way, as Topsent (Résultats des Camp. scient. du Prince de Monaco, Fasc. II, 1892, 87, Pl. VII, Fig. 4) mentions and figures for the species determined by him as *H. Johnsoni*; on the other hand they are not found in the dermal membrane or in the membrane lining the canals. The two other forms, on the contrary, are found scattered in the tissue of the sponge, in the dermal membrane, and in the membranes lining the canals.

As will be seen, the three mentioned forms of diancistra are well characterized and distinctly separated; this fact, however, has not hitherto been acknowledged, the smaller forms having been regarded as developmental phases of the largest one. Thus Ridley and Dendy (Challeng. Report, XX, Monaxonida 61) say of the small diancistra of the *H. esperioides* established by them that they seem to be young forms of the large diancistra. I have had occasion to examine *H. esperioides*, and it was seen that the small diancistra of this species are forms having great resemblance to the small diancistra of the present species; accordingly they are an independent form without any connection with the large diancistra, neither could they, by a growth by mere apposition, get a form like that of the large ones[1]. Topsent, in the work quoted above p. 87, says of the small diancistra in the species determined by him as *H. Johnsoni* Bow. ... petits diancistres grêles que l'on peut prendre pour des spicules jeunes ou frappés d'un arrêt de développement. Both these interpretations are untenable, as the small diancistra, as is shown in the preceding description, are independent forms without any connection with the development of the large diancistron; as was to be expected, this development takes place in a quite different way, and they grow only by apposition. 2. Toxa; these are comparatively fine; they have a strong curve in the middle, while the ends are long and evenly recurved, and most frequently the outermost piece of the ends forms a point which is slightly recurved with a rather sharp bend. Within the bounds of this description they may be somewhat varying, being higher or flatter, or somewhat irregular, and they are also often somewhat contort. The length, which is, to a certain degree, dependent on the degree of curving, may vary between 0·08 and 0·157^{mm}, and sometimes, in more flat bows, it may be a little greater; the thickness in the middle is 0·0017–0·002^{mm}. The bows are found scattered in the tissue, but are not numerous; they are not found in the dermal membrane.

If I have not thought to be justified in determining the present species as *H. Johnsoni* Bow., the reason is partly that we have no detailed description of this species. Bowerbank, as is well known, in 1864 in the first volume of Mon. of Brit. Sponges, only describes the large diancistron of a species from Madeira without giving this species a name in the text, only mentioning that it is related to the genus *Hymedesmia*; in the explanation of the figures he calls it *Hymedesmia Johnsoni* M. S. He gives two figures of it, from which is seen that it has large diancistra and styli. In 1870 O. Schmidt, in Spong. d. atlant. Gebiet, enumerates a species, which he identifies with that of Bowerbank, and calls *Desmacella Johnsoni*, but he gives no distinct description. Topsent, in the work quoted before, enumerates a species which he determines as *Hamacantha Johnsoni* Bow.; of the microsclera in this species he says that large diancistra are always found, small fine diancistra almost always, sometimes sigmata, sometimes bows, and rarely (in one case) rhaphides. Topsent, however, gives no measurings of the different forms. Now it is rather certain that Topsent has had before

1) Ridley and Dendy, Pl. XVII, fig. 2 d, figure one of these small diancistra, and say in the explanation of the plate: young diancistron, showing the hooks still united to the shaft by a thin web, which fact is also shown in the figure; the interpretation, however, is wrong, the structure being the same as in the small diancistra of the present species, the fact is that the edge issuing from the shaft is very broad, and comes close to the recurved end, but it is always distinctly separated from this end. In *H. esperioides* only two forms of diancistra are found, corresponding to the smallest and the largest of the present species.

him more than one species; at least the fact is that the two *Hamacantha*-species I have before me, the present species and the following one, are entirely constant with regard to their spiculation; one has always three forms of diancistra and toxa, the other always only one form of diancistra, and rhaphides, but no toxa. To this constant difference in the spiculation is further, as appears from the descriptions, added other constant characters. To judge by the forms of microsclera mentioned by Topsent, it would appear that he has had three species, viz. the present one (all the specimens with toxa), the following one (the specimen with rhaphides), and a species with sigmata. As has been shown, we do not at present know with certainty, what *H. Johnsoni* is, and therefore I presume it will be best by the determination to leave this species out of consideration.

On the other hand there might be some possibility that *Halichondria falcula* Bow. is identical with the present species, but this fact cannot be decided by Bowerbank's description. Thus he mentions and figures only one form of diancistra; as skeleton-spicule he figures a stylus of common form, but in the description he uses the term "fusiformi-acuate". The description of the external form and the surface agrees well with the present species. Finally the species is obtained at the Shetland Islands, which locality is not very far from several of the stations, on which *H. Bowerbanki* is obtained. The *Hymedesmia Johnsoni* mentioned by Carter l. c., seems, by being possessed of toxa, and also by the description upon the whole, rather certainly to be identical with the present species.

Locality: Station 1, 62° 30' Lat. N., 8° 21' Long. W., depth 132 fathoms; station 9, 64° 18' Lat. N., 27° 00' Long. W., depth 295 fathoms; station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms; station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms; station 81, 61° 44' Lat. N., 27° 00' Long. W., depth 485 fathoms; station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; station 90, 64° 45' Lat. N., 29° 06' Long. W., depth 568 fathoms; station 94, 64° 56' Lat. N., 36° 19' Long. W., depth 204 fathoms; station 97, 65° 28' Lat. N., 27° 39' Long. W., depth 450 fathoms; station 98, 65° 38' Lat. N., 26° 27' Long. W., depth 138 fathoms; station 112, 67° 57' Lat. N., 6° 44' Long. W., depth 1267 fathoms (temperature ÷ 1.1 C.). Finally it has been taken on 64° 42' Lat. N., 27° 43' Long. W., depth 426 fathoms (Wandel). All these stations are between ca. 62° and 68° Lat. N., and are dispersed in the sea between the Faröe Islands and Iceland, to the south of Iceland, the Denmark Strait, and the Davis Strait. The depth ranges between 132 and 1267 fathoms. On some of the stations, especially station 89, the species has been taken in very large numbers. On station 112 with the great depth of 1267 fathoms and the negative bottom temperature only a single quite small specimen was taken. On the other hand the largest specimens are from the stations 1 and 98 with depths of respectively 132 and 138 fathoms.

Geogr. distr. Carter l. c. mentions his *Hymedesmia Johnsoni* from between Scotland and the Faröe Islands and from Madeira. According to what is stated above, the species must also be supposed to have been taken on the expedition of the Prince of Monaco 1886—88.

2. **H. implicans** n. sp.

Pl. V, Figs. 6—9, Pl. XIX, Fig. 1 a—e, Figs. 2—6.

1885. ? *Hamacantha papillata* Vosmaer, Sponges of the "Willem Barents", Bijdrag. tot de Dierk., 12te Afl. 3de Gedeelt. 28, Pl. I, fig. 15 a—b, Pl. V, figs. 82—86.

1892. *Hamacantha Johnsoni* var. *complanata, partim, specimen rhaphidibus instructum*, Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 87, Pl. VII, fig. 5 b, h.

Formed like a flat cushion, or more or less crust-shaped, provided with more or fewer, round or flattened, conical papillæ. Embodies extraneous bodies copiously, especially in the part turned towards the substratum. Outermost the sponge has a rather firm dermal layer provided with close-lying spicules in several layers parallel to the surface, but otherwise lying in every direction; from these layers close-standing spicules project, and therefore the surface is shaggy. Oscula are found at the summits of the papillæ. The skeleton consists of irregularly running, polyspicular fibres and scattered spicules. Spongin wanting. Spicula: Megasclera styli $0{\cdot}27$—$0{\cdot}68^{mm}$; *microsclera diancistra of one form* $0{\cdot}19$—$0{\cdot}22^{mm}$; *rhaphides in trichodragmata* $0{\cdot}11^{mm}$.

This species has a quite peculiar way of growing; it grows as thinner or thicker incrustations on shells of Mollusks, Bryozoa, worm-tubes, stones etc.; but generally it spreads over the body on which it is growing, grows round it, and embodies it completely; sometimes the substratum has only been small stones and particles of gravel, and even if it grows on a more extended substratum, it always includes extraneous bodies copiously, so that, when a specimen is cut through, the lower half is always found abundantly filled with foreign bodies, especially pebbles and gravel (Pl. V, fig. 9). These particles are kept together and surrounded by sponge-tissue. Besides thus having incrusted foreign bodies, the sponge moreover is most frequently somewhat incrusted on the outside, and on account of its form folds and hollows may be formed, which, as it seems, may be quite closed by coalescings, and be filled with gravel and the like. Thus these cavities belong originally to the surface of the sponge, and by the cutting through of a sponge, in which they are found, cavities will accordingly be found filled with foreign particles, of which cavities some belong to the interior of the sponge, while others belong to the surface; they may, however, be distinguished from each other by the fact that the surface of the sponge is finely shaggy, and therefore the walls of the cavities, which do not belong to the interior of the sponge, but have their origin from coalescings, are shaggy from projecting spicules. The form of the sponge may otherwise be somewhat varying according to the substratum, on which it is growing; when growing on large, flat shells, it forms a regular crust or cushion, while it is oftenest more or less irregular, when growing on smaller bodies. The largest specimen in hand, growing on a *Pecten*-shell, has a greatest extent of ca. 47^{mm} and a thickness of 6—7^{mm}. The other specimens grow especially on bivalves and Brachiopods, and are most frequently growing on, or have incrusted, several shells. The surface is set with a larger or smaller number of conical papillæ, formed by the skin; the papillæ have an average length of 5—7^{mm}; they are either round or flattened. Otherwise the *surface* is shaggy from projecting spicules. The sponge is very cavernous, and especially in the upper part, where no extraneous bodies are embodied, large cavities are found immediately under the skin; therefore it is of a somewhat vesicular consistency. The colour (in spirit) is grayish white, somewhat transparent, but often it appears to be brownish on account of sand and mud covering it. Externally the sponge is provided with a rather firm *dermal layer* furnished with rather close-lying spicules intercrossing in all directions, but parallel to the surface; they are lying in several layers, and the part marked off as skin, has a thickness of ca. $0{\cdot}10^{mm}$. Through the spicules of the skin other spicules project rather close to each other; they are stuck with one end between the parallel spicules of the skin, while all the other part projects, so that the skin is very distinctly shaggy (Pl. XIX, fig 3).

Oscula and *pores:* In the examined specimens the pores were only found in small numbers; they are small and difficult to observe, not going vertically through the dermal layer, and so their outer opening is only little conspicuous when a piece of stained skin is viewed from above. The size is measured from 0·011—0·028^{mm}. Oscula: as before said the surface has a larger or smaller number of papillæ, up to a score in the largest specimens. These papillæ are formed by the dermal layer; the spicules of the skin are here arranged parallelly to the longitudinal axis of the papilla. On the summit of the papilla the oscular opening is found; these openings, however, are not round, but are made by the skin of the papilla being split into a number of narrow lobes, and according to this arrangement the spicules in the outermost part of the papilla are gathered in a like number of bands (Pl. XIX, fig. 5). The papillæ may have a somewhat different appearance, which would seem to be due to a different degree of contraction. In their most extended form they are thin-skinned and translucent, of a length of 6—7^{mm}, are tapering and often compressed (Pl. V, figs. 7—8). Then they may be shorter and shorter, and at the same time they become round and more compact, and the end becomes stubby, and assumes also a darker colour (Pl. V, fig. 6). They may be so short as only to form a quite flat prominence; at the same time a kind of folding must take place, for when such a papilla is viewed from above under the microscope it is seen that the very close-packed spicules form, as it were, bands or partition walls going from the middle towards the periphery (Pl. XIX, fig. 6).

The *skeleton:* As has been said above, the sponge is very cavernous, and therefore its body consists mostly of more or less membrane-like parts which in the lower part of the sponge surround and keep together an abundant mass of extraneous bodies, while in the upper part of the sponge they surround and bound a number of cavities, into which the pores lead, and from some of which oscula lead out. The skeleton therefore, besides of the mentioned dermal skeleton, consists of some irregular fibres, partly found in the membrane-like parts separating the cavities, partly running freely here and there, especially from the lower part to the dermal layer. The fibres found in the membranes are polyspicular, sometimes distinct and well defined, sometimes more dissolved in the membrane. Besides with these fibres the membrane is also provided with diancistra lying in beautiful rosettes rather close to each other (Pl. XIX, fig. 4). Also the freely running fibres are polyspicular, and have rather many spicula alongside. The thickness of the fibres is generally 0·10—0·17^{mm}. As in the preceding species diancistra are found in rosettes on the fibres. In the lower part of the sponge fibres may be found where there is some interval between the incrusted extraneous bodies; where such is not the case the parts of the tissue between the foreign particles are provided with diancistra placed in rosettes in large numbers, and only a few needles. Spongin is not seen in the skeleton.

Spicula: a. *Megasclera* are styli; they are straight or slightly curved, sometimes a somewhat sharper bend is found at the head end; they are thickest in the middle tapering somewhat to the rounded end, though not so much as in the styli of the preceding species; the smaller needles are least tapering, often quite imperceptibly, and sometimes not at all. The opposite end may be somewhat different; most frequently it has a very stubby point that may end in a quite small, pointed process; in other cases the point is more long and evenly tapering. The length varies very considerably, from 0·27—0·68^{mm}, the thickness is in proportion 0·005—0·0178^{mm}; a few, quite fine needles, developmental forms, are seen; but besides these, part of the needles lying between the said limits, especially the comparatively long and fine ones, are presumably also developmental forms; it is, however, difficult in all instances to decide with certainty which needles are developmental forms, as the fully developed needles surely vary much in size; thus needles are found of a length of 0·298^{mm} and a thickness of 0·011^{mm}; on account of the proportion between length and thickness these needles convey the impression of being fully developed, and when the question is of spicules of this length presumably only the finer ones are developmental forms. b. *Microsclera:* 1. Dianeistra; in the present species dianeistra are only found of one kind; they are chiefly of the same structure as the large dianeistron of the preceding species, but are distinguished from it by being longer and more slender, and generally the shaft is a little bent; the recurved ends generally form a smaller angle with the shaft than in *Bowerbanki*; the edge issuing from the shaft, decreases evenly towards the middle, so that the notch between the two edges is longer and not so highly conspicuous as in the preceding species. Further these dianeistra are far less contort, not rarely quite plane. The length is between 0·19 and 0·22^{mm}, most frequently it is 0·208^{mm}. The thickness in the middle is 0·008—0·010^{mm}. The development of the dianeistra takes place in the same way as in the preceding species, as shown on Pl. XIX, fig. 1 c—d. The dianeistra are found in rosettes on the fibres, but this feature is not so distinctly marked as in the preceding species; further they are, as already mentioned, found in rosettes on the membranes separating the cavities, and they are also seen in the innermost layer of the dermal layer, which is presumably lined by the same membrane, and also here in beautiful rosettes; finally the dianeistra are also found abundantly in rosettes in the lower part of the sponge among the extraneous bodies. 2. Rhaphides: these are especially fine, the thickness is about 0·0007^{mm}, and they have an average length of 0·11^{mm}; they occur in bundles, trichodragmata, containing a large number of rhaphides; they are found throughout the sponge, but especially on the membranes and in the innermost part of the dermal layer.

Remarks: In this species "cellules sphéruleuses" were found in large numbers in the dermal layer and the membranes; they are quite globular or fusiform, densely filled with somewhat refringent granules, and are in spirit of a light yellow colour; the size of the round ones is ca. 0·005—0·008^{mm}, the fusiform ones are somewhat longer.

As has been mentioned under the preceding species I think that Topsent l. c. under his *H. Johnsoni* has comprised more than one species; the specimen of var. *aspinata* with rhaphides, mentioned at p. 87, seems undoubtedly to belong to the present species. The *H. papillata* established by Vosmaer l. c., seems by the occurrence of papillæ and upon the whole by its outer characters to agree with the present species, but the exceedingly incomplete and short description (2 lines) gives no sufficient hold for a determination, and as the mentioned and figured spicules do not agree with the present species, and rhaphides are not mentioned, the referring is doubtful.

Locality: The present species has upon the whole been taken on the same stations as the preceding one, but in smaller numbers. Station 6, 64° 18' Lat. N., 27° 00' Long. W., depth 295 fathoms; station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms; station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms; station 35, 65° 16' Lat. N., 55° 05' Long. W., depth 362 fathoms; station 81, 61° 44'

Lat. N., 27° 00′ Long. W., depth 485 fathoms; station 85, 63° 21′ Lat. N, 25° 21′ Long. W., depth 170 fathoms; station 80, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 201 fathoms. Thirty and odd specimens have been taken in all. According to the localities the species is spread in the Davis Strait and the Denmark Strait between ca. 62° and 65° Lat. N., on depths from 170–788 fathoms.

Geogr. distr. Where the specimen mentioned by Topsent, l. c., which I refer to this species, has been taken cannot be stated, but the collections, as well known, were made from the Bay of Gascony over the Azores to New Foundland, and accordingly the species reaches down to ca. 38° Lat. N. The *H. papillata* of Vosmaer is taken south of Spitzbergen on depths of 145 and 180 fathoms.

As correctly stated by Topsent l. c., the genus *Vomerula* established by O. Schmidt in 1880, and kept in 1887 by Ridley and Dendy in Challeng. Monaxonida together with Gray's genus *Hamacantha* established in 1867, will have to be comprised under this genus as a synonym, and thus *Hamacantha* will be the only genus in the subfamily *Hamacanthinæ*. As certainly characterized as is the genus *Hamacantha*, as much incertainty is found with regard to some of its species. Ridley and Dendy are surely right, when they (Challeng. Report, Monaxonida, LXVI) express the opinion that the *H. tibicen* established by O. Schmidt 1880 (Spong. der Meerbus. von Mexiko, II, 83), which is said to have as well diancistra as chelæ (Doppelankern Schmidt), is either a Desmacidonid with sigmata of such a form, that they might be misinterpreted as diancistra, or, what is perhaps more possible, with diancistra as foreign bodies.

At present the list of the species belonging to *Hamacantha*, looks as follows:

1864. *Hamacantha (Hymedesmia) Johnsoni* Bow. — Doubtful; the original never described; see before under *H. Bowerbanki*.

1874. *(Halichondria) falcula* Bow. — Perhaps = *H. Bowerbanki* mihi; see this species.

1880. *(Vomerula) tenda* Schmidt. — Stated to have fine oxea (feine Umspitzen Schm.) and bows, with transitional links between them.

1880. *(Vomerula) tibicen* Schmidt. — As stated above scarcely a *Hamacantha*.

1882. *(Hymedesmia) Schmidtii* Cart. — Stated by Carter to have oxea, diancistra and genuine sigmata[1]).

1885. *papillata* Vosm. — Perhaps = *H. implicans* mihi; see this species.

1887. *(Vomerula) esperioides* R. and D. — Well characterized species, has of microsclera sigmata and diancistra of two forms.

Bowerbanki mihi.

implicans mihi.

[1]) This species (Ann. Mag. Nat. Hist. Ser. 5. IX, 297, Pl. 11, fig. 21 a—e) might perhaps be identical with *H. esperioides* R. and D., as it appears to have diancistra of two forms and sigmata; Carter, to be sure, states it to be possessed of oxea, but his figure would imply that the question is of styli with highly tapering head ends. When Carter refers Schmidt's *H. Johnsoni* from Florida (Spong. Atl. Gebiet.) to his species, this is surely not correct, as it does not appear from the description of Schmidt that his species has real sigmata.

Plate I.


1
3
4
2
5
6

Plate II.

Plate III.

Page

Fig. 1. *Halichondria colossea* n. sp., seen from above. $^1/_3$ 27

— 2. *Halichondria colossea* n. sp., side view. $^1/_3$ .... —

— 3, 4, 5, 6, 7. *Halichondria osculum* n. sp., individuals of different forms. *o* osculum, *a* groove with osculum. $^1/_1$ 23

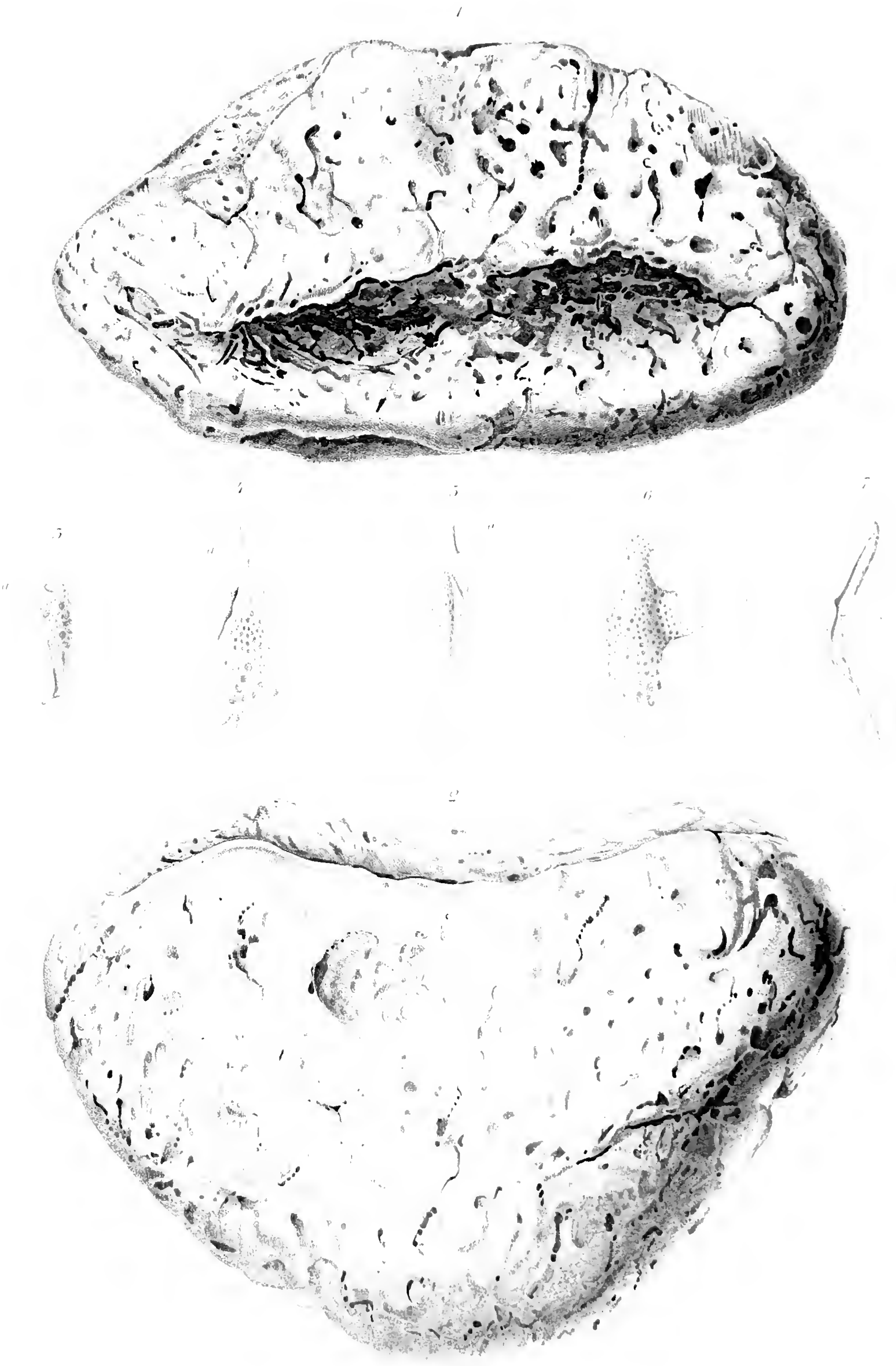


Plate IV.

Page

Fig. 1. *Eumastia sitiens* O. S. A pore papilla. A little more than $^{2}/_{1}$ 31

— 2. *Eumastia sitiens* O. S. An oscular papilla. A little more than $^{2}/_{1}$ . . . . —

— 3. *Eumastia sitiens* O. S. A pore- and oscular papilla. A little more than $^{2}/_{1}$ . . . . —

— 4. *Eumastia sitiens* O. S. A pore papilla cut through, showing the skeleton. A little more than $^{2}/_{1}$ . . . . —

— 5. *Eumastia sitiens* O. S. The end of an oscular papilla. ca. $^{10}/_{1}$ . . . . —

— 6. *Eumastia sitiens* O. S., attached to a *Pecten islandicus*; in a couple of the papillæ is seen *Aristias tumidus* Kr. $^{1}/_{1}$ . . . . —

— 7. *Petrosia crassa* Cart., attached to a little stone together with an Octactinia. At the lowermost part of the sponge the skin is partly wanting. $^{1}/_{1}$ 54

— 8. *Petrosia crassa* Cart. One of the most differentiated oscula. $^{2}/_{1}$ . . . . —

— 9. *Petrosia crassa* Cart. Section of the sponge through an osculum, showing especially the radiating canals, and partly those parallel to the surface. $^{1}/_{1}$ . . . . . —

— 10. *Desmacella Peachii* Bow. A quite young individual on a fragment of a *Sipho*. $^{3}/_{2}$ 90

— 11. *Desmacella Peachii* Bow. A somewhat older individual on a fragment of a *Sipho*. $^{3}/_{2}$ . . . . —

— 12. *Desmacella Peachii* Bow. $^{1}/_{1}$ . . . . —

— 13. *Desmacella Peachii* Bow. A calicular specimen, the skin is wanting, and the edge is damaged. $^{1}/_{1}$ . . . . —

— 14. *Biemma annexa* O. S. *a* the place of attachment. $^{1}/_{1}$ 85

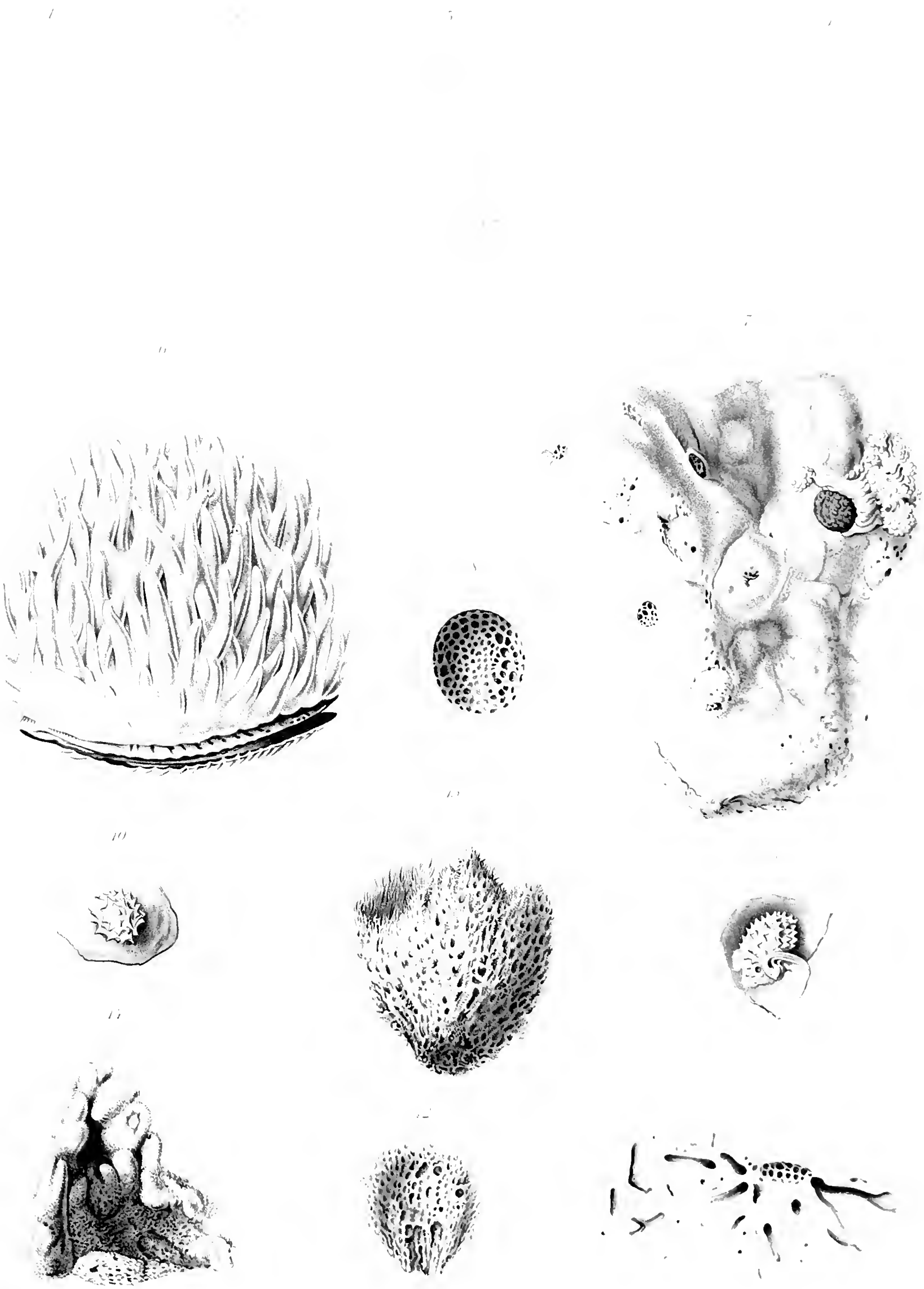


Plate V.

		Page
Fig. 1.	*Reniera calamus* n. sp. Fragment. 1/1	48
— 2.	*Reniera calamus* n. sp. Cut through. 1/1	—
— 3.	*Gelliodes plexa* n. sp. A leaf-shaped piece viewed from the inside, the skin is only kept in the middle. 1/1	75
— 4.	*Gelliodes plexa* n. sp. A funnel-shaped specimen, the greater part of the upper edge broken off; the skin wanting on the outside. 1/1	—
— 5.	*Reniera folium* n. sp. 1/1	39
— 6.	*Hamacantha implicans* n. sp. Most of the papillæ highly contracted. 1/1	104
— 7.	*Hamacantha implicans* n. sp. The papillæ stretched out. 1/1	—
— 8.	*Hamacantha implicans* n. sp. The papillæ stretched out. 1/1	—
— 9.	*Hamacantha implicans* n. sp. Cut through to show the extraneous bodies embodied in the lower part, and the cavities of the upper part. 2/1	—

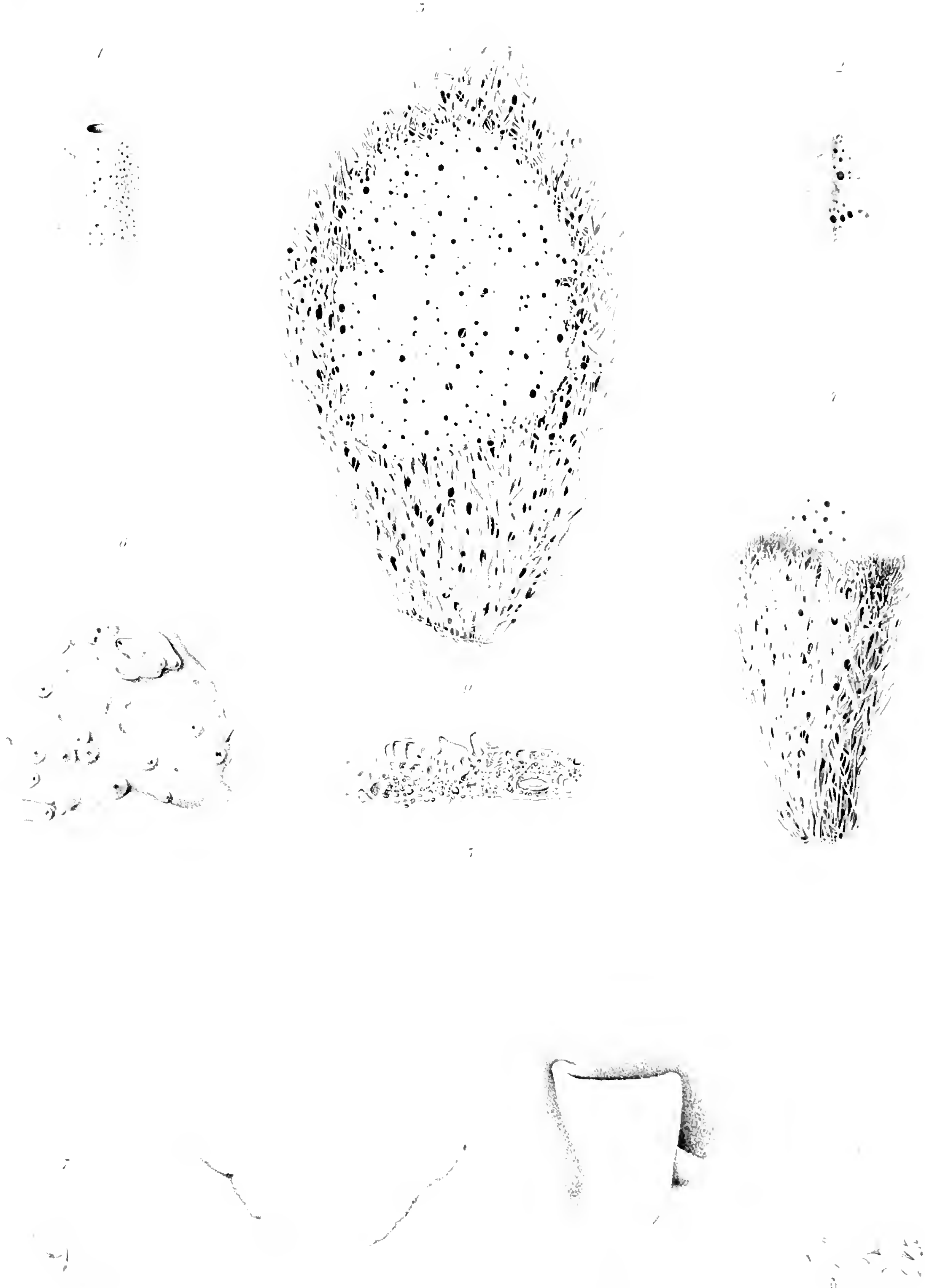


Plate VI.

		Page
Fig. 1.	*Biemma rosea* Frstdt. The largest piece seen from the pore side; the skin wanting in a few places. $^1/_1$	82
— 2.	*Biemma rosea* Frstdt. A piece probably from the middle of the sponge, seen from the oscular side. $^1/_1$	—
— 3.	*Phlœodictyon elongatum* Tops. $^1/_1$	59
— 4.	*Phlœodictyon elongatum* Tops., highly incrusted with sand. $^1/_1$	—
— 5.	*Gellius luridus* n. sp. Somewhat damaged above, but less than the two following ones. $^1/_1$	64
— 6.	*Gellius luridus* n. sp. Broken off above. $^1/_1$	—
— 7.	*Gellius luridus* n. sp. Broken off above. $^1/_1$	—
— 8.	*Gellius luridus* n. sp. The preceding specimen (fig. 7) cut through longitudinally. $^1/_1$	—
— 9.	*Phlœodictyon irregulare* n. sp. $^1/_1$	61
— 10.	*Phlœodictyon irregulare* n. sp. $^1/_1$	—
— 11.	*Phlœodictyon tuber* n. sp. $^1/_1$	57
— 12.	*Phlœodictyon tuber* n. sp., incrusted with sand. $^1/_1$	—
— 13.	*Phlœodictyon tuber* n. sp., showing a broken off fistula. $^1/_1$	—
— 14.	*Desmacella grœnlandica* Frstdt. Skin with oscula closed in different degrees. Ends of fibres are seen. ca. $^2/_1$	95

Plate VII.

Page

Fig. 1. *Reniera parenchyma* n. sp. $^1/_1$ 37

— 2. *Hamacantha Bowerbanki* n. sp., showing one osculum; the surface damaged in places. $^1/_1$ 99

— 3. *Hamacantha Bowerbanki* n. sp., showing several oscula. $^1/_1$ . . . . . —

— 4. *Desmacella hamifera* n. sp. A leaf-shaped fragment, the skin almost quite wanting. $^1/_1$ 93

— 5. *Desmacella hamifera* n. sp. The middle part of a short-stalked, calicular specimen. $^1/_1$ . . . . . —

— 6. *Desmacella hamifera* n. sp. Radial longitudinal section through the wall, showing the skeleton. $^3/_2$ . . . . . —

— 7. *Desmacella groenlandica* Frstdt. The skin wanting on the outside. $^1/_1$ 95


2
1
4
5
7

Plate VIII.

Plate IX.

			Page
Fig.	1.	*Halichondria panicea* Pall. Oxea, × 165	17
—	2.	*Halichondria genitrix* O. S. Oxea, *a* of the larger ones, *b* of the smaller ones, *c* monstrous forms, × 165	18
—	3.	*Halichondria fibrosa* Frstdt. Oxea, *a* of the larger ones, *b* of the smaller ones, *c* oxeum with a swelling in the middle, × 165	20
—	4.	*Halichondria velamentosa* Arm. Hans. Oxea, × 165	22
—	5.	*Halichondria velamentosa* Arm. Hans. Dermal membrane from the oscular side, with a few pores, × 54	—
—	6.	*Halichondria velamentosa* Arm. Hans. Dermal membrane from the pore side, × 54	—
—	7.	*Halichondria osculum* n. sp. Oxea, × 165	23
—	8.	*Halichondria osculum* n. sp. Dermal membrane, × 38	—
—	9.	*Halichondria osculum* n. sp. Membrane from the oscular cavity, × 33	—
—	10.	*Halichondria oblonga* Arm. Hans. Oxea, × 165	24

Plate X.

Plate XI.

1 3 2 7

7 6 5

12

13

10

11

15a 15b

16

Plate XII.

Plate XIII.

		Page
Fig. 1.	*Gellius luridus* n. sp. *a* oxea, × 165, *b* toxa of different sizes, × 585, *c* sigmata of different sizes, × 585	64
— 2.	*Gellius luridus* n. sp. Longitudinal section, showing the dermal layer, lamellæ and canals, × ca. 2. (After a dried preparation, which makes the skeleton appear distinctly)	—
— 3.	*Gellius luridus* n. sp. Longitudinal section through the dermal layer in a place where this layer is thick, × ca. 33. *a* the part marked off as special dermal layer	—
— 4.	*Gellius luridus* n. sp. Dermal membrane with spicules and pores, × 65	—
— 5.	*Gellius luridus* n. sp. Piece of skeleton lamella with the holes formed by the passage of the canals, × 2	—
— 6.	*Gellius luridus* n. sp. The upper part of fig. 5, × 18	—
— 7.	*Gellius luridus* n. sp. Spicules from the dermal membrane, showing the cementing by spongin, × 110	—
— 8.	*Gellius luridus* n. sp. Two single spicules with spongin coats, × 110	—
— 9.	*Gellius microtoxa* n. sp. *a* oxea, *b* developmental forms, × 165, *c* toxa of different sizes, × 585, *d* sigmata of different sizes, *e* developmental forms, × 585	67
— 10.	*Gellius microtoxa* n. sp. Dermal membrane with spicules and (cellules sphérulenses), partly scattered, partly forming a band, × ca. 65	—
— 11.	*Gellius primitivus* n. sp. *a* oxea of different sizes, × 255, *b* toxa of different sizes, × 485	69
— 12.	*Gellius proximus* n. sp. *a* oxea of different sizes, × 255, *b* toxa of different sizes, × 485	70

Plate XIV.

Plate XV.

Plate XVI.

Page

Fig. 1. *Desmacella capillifera* Levins. *a* styli of common form, *b* styli of the smaller form, straight with a more sharp curve at the head end, *c* irregular styli from the basal layer, × 77, *d* sigmata of the large form, *e* sigmata of the small form, × 485, *f* rhaphides, single and as trichodragmata, × 255, *g* commata, × 700 88

— 2. *Desmacella Peachii* Bow. *a* styli, *b* developmental forms, *c* irregular styli from the basal layer, × 77, *d* sigmata of the large form, *e* sigmadragma, *f* developmental form of the large sigma, *g* sigmata of the small form, × 485, *h* rhaphides of the long form, single and as trichodragmata, *i* rhaphides of the short form, single and as trichodragmata, × 380, *k* commata, × 700, *l* silicious globules, × 485 90

Plate XVII.

Page

Fig. 1. *Desmacella hamifera* n. sp. *a* styli, *b* developmental forms, *c* irregular styli from the basal layer, × 77, *d* sigmata of the large form, *e* sigmadrama, *f* developmental form of the large sigma, *g* sigmata of the small form, × 485, *h* rhaphides of the long form, single and as trichodragma, *i* rhaphides of the short form, single and as trichodragmata, × 380, *k* commata, × 700, *l* gemmula?, × 255, silicious globules, × 485 93

2. *Desmacella groenlandica* Fistdt. *a* styli, *b* irregular styli from the basal layer, × 77, *c* sigmata of the large form, × 485, *d* sigmata of the small form, × 700, *e* rhaphides of the long form, single and as trichodragma, *f* rhaphides of the short form, single and as trichodragma, × 255, *g* commata, × 700, *h* gemmula?, × 255, silicious globules, × 485 (gemmula is drawn from the original specimen of Fristedt) 95

3. *Biemma annexa* O. S. *a* tylostyli and subtylostyli, *b* a developmental form, × 120, *c* head ends of different needles, × 380, *d* toxa, × 485, *e* sigmata of the larger form, *f* sigmata of the smaller form, × 485 85

Plate XVIII.

Plate XIX.

		Page
Fig. 1.	*Hamacantha implicans* n. sp. *a* styli of different sizes, *b* developmental forms, × 165, *c* diancistra, *d* two developmental forms, × 380, *e* rhaphides, single and as trichodragma, × 380	104
— 2.	*Hamacantha implicans* n. sp. Dermal membrane with skeleton, × 58	—
— 3.	*Hamacantha implicans* n. sp. Transverse section of skin with projecting spicules, × ca. 54	—
— 4.	*Hamacantha implicans* n. sp. Piece of a membrane with fibres and diancistra in rosettes, × 32	—
— 5.	*Hamacantha implicans* n. sp. An oscular cone stretched out, × ca. 20	—
— 6.	*Hamacantha implicans* n. sp. An oscular cone contracted, seen from above, showing the vertical spicules arranged in a bandlike manner, × ca. 20	—

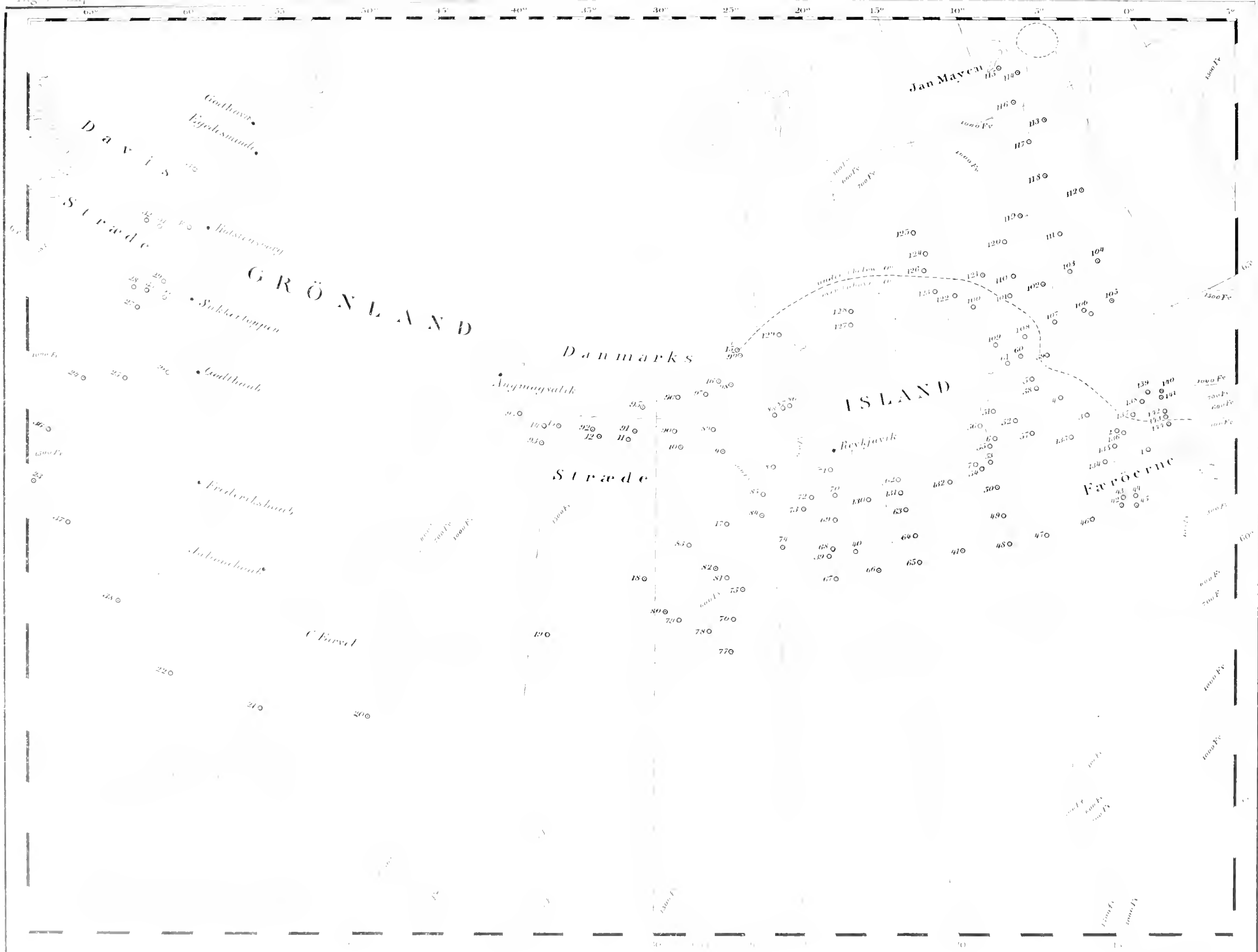
THE INGOLF-EXPEDITION

1895—1896.

THE LOCALITIES, DEPTHS, AND BOTTOMTEMPERATURES OF THE STATIONS.

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.
1	62° 30′	8° 21′	132	7°2	24	63° 06′	56° 00′	1199	2°4	45	61° 32′	9° 43′	643	4°17
2	63° 04′	9° 22′	262	5°3	25	63° 30′	54° 25′	582	3°3	46	61° 32′	11° 36′	720	2°4
3	63° 35′	10° 24′	272	0°5		63° 51′	53° 03′	136		47	61° 32′	13° 40′	950	3°23
4	64° 07′	11° 12′	237	2°5	26	63° 57′	52° 41′	34	0°6	48	61° 32′	15° 11′	1150	3°17
5	64° 40′	12° 09′	155			64° 37′	54° 24′	109		49	62° 07′	15° 07′	1120	2°[illegible]
6	63° 43′	14° 34′	90	7°0	27	64° 54′	55° 10′	393	3°8	50	62° 43′	15° 07′	1020	3°13
7	63° 13′	15° 41′	600	4°5	28	65° 14′	55° 42′	420	3°5	51	64° 15′	14° 22′	68	7°32
8	63° 56′	24° 40′	136	6°0	29	65° 34′	54° 31′	68	0°2	52	63° 57′	13° 32′	420	7°57
9	64° 18′	27° 00′	295	5°8	30	66° 50′	54° 28′	22	1°05	53	63° 15′	15° 07′	795	[illegible]
10	64° 24′	28° 50′	788	3°5	31	66° 35′	55° 54′	88	1°6	54	63° 08′	15° 40′	691	[illegible]
11	64° 34′	31° 12′	1300	1°6	32	66° 35′	56° 38′	318	3°9	55	63° 33′	15° 02′	[illegible]	[illegible]
12	64° 38′	32° 37′	1040	0°3	33	67° 57′	55° 30′	35	0°8	56	64° 00′	15° 09′	68	[illegible]
13	64° 47′	34° 33′	622	3°0	34	65° 17′	54° 17′	55		57	63° 37′	13° 02′	35	
14	64° 45′	35° 05′	176	4°4	35	65° 16′	55° 05′	362	3°6	58	64° 25′	12° 09′	[illegible]	
15	66° 18′	25° 59′	330	0°75	36	61° 50′	56° 21′	1435	1°5	59	65° 00′	11° [illegible]	[illegible]	
16	65° 43′	26° 58′	250	6°1	37	60° 17′	54° 05′	1715	1°4	60	65° 09′	12° 27′	[illegible]	
17	62° 49′	26° 55′	745	3°4	38	59° 12′	51° 05′	1870	1°3	61	65° 03′	[illegible]	[illegible]	
18	61° 44′	30° 29′	1135	3°0	39	62° 00′	22° 38′	865	2°9	62	63° 18′	[illegible]	[illegible]	
19	60° 29′	34° 14′	1566	2°4	40	62° 00′	21° 36′	845	3°3	63	62° 40′	[illegible]		
20	58° 20′	40° 48′	1695	1°5	41	61° 30′	17° 10′	1245	3°0	64	62° 06′	[illegible]		
21	58° 01′	44° 45′	1330	2°4	42	61° 41′	10° 17′	625	0°4	65	61° 33′	[illegible]	[illegible]	
22	58° 10′	48° 25′	1845	1°4	43	61° 42′	10° 11′	645	0°05	66	61° 33′	[illegible]		
23	60° 43′	56° 00′	Only the Plankton Net used		44	61° 42′	9° 36′	545	4°8	67	61° 30′	[illegible]		

Station Nr.	Long. W.	Lat. N.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.
68	62° 06′	22° 30′	843	3°4	92	64° 44′	32° 52′	976	1°4	118	68° 27′	8° 20′	1060	−1°0
69	62° 40	22° 17	589	3°9	93	64° 24′	35° 14′	767	1°46	119	67° 53′	10° 19′	1010	−1°0
70	63° 09′	22° 05′	134	7°0	94	64° 56′	36° 19′	204	4°1	120	67° 29′	11° 32′	885	−1°0
71	63° 46′	22° 03′	46			65° 31′	30° 45′	213		121	66° 59′	13° 11′	529	−0°7
72	63° 12′	23° 04′	197	6°7	95	65° 14′	30° 39′	752	2°1	122	66° 42′	14° 44′	115	1°8
73	62° 58′	23° 28′	486	5°5	96	65° 24′	29° 00′	735	1°2	123	66° 52′	15° 40′	145	2°0
74	62° 17′	24° 36′	695	4°2	97	65° 28′	27° 39′	450	5°5	124	67° 40′	15° 40′	495	−0°6
	61° 57′	25° 35′	761		98	65° 38′	26° 27′	138	5°9	125	68° 08′	16° 02′	729	−0°8
	61° 28′	25° 06′	829		99	66° 13′	25° 53′	187	6°1	126	67° 19′	15° 52′	293	−0°5
75	61° 28′	26° 25′	780	4°3	100	66° 23′	14° 02′	59	0°4	127	66° 33′	20° 05′	44	5°6
76	60° 50′	26° 50′	806	4°1	101	66° 23′	12° 05′	537	−0°7	128	66° 50′	20° 02′	194	0°6
77	60° 10′	26° 59′	951	3°6	102	66° 23′	10° 26′	750	−0°9	129	66° 35′	23° 47′	117	6°5
78	60° 37′	27° 52′	799	4°5	103	66° 23′	8° 52′	579	−0°6	130	63° 00′	20° 40′	338	6°55
79	60° 52′	28° 58′	653	4°4	104	66° 23′	7° 25′	957	−1°1	131	63° 00′	19° 09′	698	4°7
80	61° 02′	29° 32′	935	4°0	105	65° 34′	7° 31′	762	−0°8	132	63° 00′	17° 04′	747	4°6
81	61° 44′	27° 00′	485	6°1	106	65° 34′	8° 54′	447	−0°6	133	63° 14′	11° 24′	230	2°2
82	61° 55′	27° 28′	824	4°1		65° 29′	8° 40′	466		134	62° 34′	10° 26′	299	4°1
83	62° 25′	28° 30′	912	3°5	107	65° 33′	10° 28′	492	−0°3	135	62° 48′	9° 48′	270	0°4
	62° 36′	26° 01′	472		108	65° 30′	12° 00′	97	1°1	136	63° 01′	9° 11′	256	4°8
	62° 36′	25° 30′	401		109	65° 29′	13° 25′	38	1°5	137	63° 14′	8° 31′	297	−0°6
84	62° 58′	25° 24′	633	4°8	110	66° 44′	11° 33′	781	−0°8	138	63° 26′	7° 56′	471	−0°6
85	63° 21′	25° 21′	170		111	67° 14′	8° 48′	860	−0°9	139	63° 36′	7° 30′	702	−0°6
86	65° 03′ 6	23° 47′ 6	76		112	67° 57′	6° 44′	1267	−1°1	140	63° 29′	6° 57′	780	−0°9
87	65° 02′ 3	23° 56′ 2	110		113	69° 31′	7° 06′	1309	−1°0	141	63° 22′	6° 58′	679	−0°6
88	64° 58′	24° 25′	76	6°9	114	70° 36′	7° 29′	773	−1°0	142	63° 07′	7° 05′	587	−0°6
89	64° 45′	27° 20′	310	8°4	115	70° 50′	8° 29′	86	0°1	143	62° 58′	7° 09′	388	−0°4
90	64° 45′	29° 06′	568	4°4	116	70° 05′	8° 26′	371	−0°4	144	62° 49′	7° 12′	276	1°6
91	64° 44′	31° 00′	1236	3°1	117	69° 13′	8° 23′	1003	−1°0					


Jan Mayen
Davis Stræde
GRÖNLAND
Godthaab
Sukkertoppen
Danmarks Stræde
Angmagsalik
ISLAND
Reykjavik
Färöerne
Frederikshaab
Julianehaab
C. Farvel

THE DANISH INGOLF-EXPEDITION.

VOLUME VI.

3.

PORIFERA.

(PART III.)

DESMACIDONIDÆ (PARS.).

BY

WILL. LUNDBECK.

WITH 11 PLATES.

COPENHAGEN.
PRINTED BY BIANCO LUNO
1910.

Ready from the Press Avril the 1st 1910.

CONTENTS.

Desmacidonidæ.

Porifera.

III.

By

William Lundbeck.

(Fam. III. Desmacidonidæ.)

(Subfam. 1. **Mycalinæ**.)

(Group 2. Myxilleæ.)

Tedania Gray.

Of various shape, incrusting, massive, erect and leaf- or cup-shaped, or cylindrical, or finally more or less digitate and branched. The skeleton a more or less diffuse reticulation, generally multispicular, more rarely partly or quite unispicular. Spongin generally (or always) present, as a rule to a slight degree, sometimes more richly. The dermal skeleton as a rule formed of erect bundles of dermal spicules, sometimes also spicules lying horizontally in the dermis; it is sometimes strongly developed, sometimes weaker, with relatively few spicules. Oscula scattered, sometimes on the apex of tubes or papillæ; pores scattered or on the apex of papillæ or otherwise definitely localized. Spicula: megasclera: the skeletal spicules are smooth styli, the dermal spicules diactinal, tylota, tornota or strongyla, sometimes with slightly spined ends; microsclera only one form, rhaphides with unequal ends, finely spinulous, in dragmata or scattered.

1. **T. suctoria** O. Schmidt.

Pl. I, Figs. 1—5, Pl. IV, Fig. 1.

1870. *Tedania suctoria* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet. 43. Tab. V, Fig. 11.
1875. *Tedania increscens* O. Schmidt, Jahresb. d. Comm. zur wiss. Unters. deutsch. Meere in Kiel für 1872—73, 115.
1882. *Tedania suctoria*, Vosmaer, Niederl. Arch. f. Zool. Suppl. Band I, 42, Pl. I, fig. 24, Pl. III, figs. 83—88.
1885. — — , Vosmaer, Bijdr. tot. de Dierk. 12[de] Afl. 3[de] Gedeelt. 22.
1892. *Tedania conuligera* Topsent, Résultats des camp. sc. du Prince de Monaco, Fasc. II, 70, Pl. I, fig. 10.
1903. *Tedania increscens*, Thiele, Arch. für Naturgesch. 1903, I, 380. Taf. XXI, Fig. 9.
1904. *Tedania suctoria*, Topsent, l. c. Fasc. XXV, 176.
1909. — — , Lundbeck, Meddel. om Grønland, XXIX, 443.

Incrusting, massive, or more erect and sometimes somewhat branched. Surface more or less richly beset with papillæ and diffusely hispid. The dermal membrane somewhat solid, its skeleton [illegible] developed, consisting of bundles of dermal spicules, partly erect, partly more horizontally [illegible] scattered *spicules. Oscula few, lying on special papillæ, pores on the summit of other papillæ. The skeleton a mainly polyspicular, diffuse and irregular reticulation. Spicula: megasclera: the skeletal spicules styli 0·30—0·68 mm, the dermal spicules tylota 0·25—0·47 mm; microsclera one form, finely spinulous rhaphides with unequal ends 0·053—0·50 mm.*

Of this species we have a very rich material from the whole Ingolf territory. The individuals may have a very different aspect, but as a rule they are characterized by having a greater or smaller number of wart-shaped papillæ. In the typical and fully developed shape the species is massive, more or less roundish, lumpy and in greater or smaller extent attached to a substratum. From this roundish shape the species may show many variations, it may be elongated and assume a somewhat erect shape, and it may be club-shaped, lobate, compressed or more or less branched. The latter shape is no doubt due however, at all events partly, to the fact, that it incrusts, or originally has incrusted, branched Hydroids or Algæ, but in this case it seems to be able to continue its growth out in free, branched forms. The smallest and youngest specimens are incrusting and from this crust-shaped origin it may then by and by grow up to the massive shape, but it may also persevere as a crust and as such reach a considerable extent. In our material it is found growing on stones, various Bryozoa, worm-tubes, Algæ e. g. *Ptilota plumosa*, the specimen on this is branched, and finally on a crab. The largest specimen, which is of an elongated shape, has a length of about 40 mm; a massive, tuberous specimen is 30 mm in diameter; the incrusting specimens are generally small, but may, as said, reach a greater extent, up to 25 mm with a thickness not much over 1 mm. Topsent mentions and figures (l. c.) larger specimens, up to an extent of 9 cm, of typical massive shape. The colour (in spirit) is yellow or whitish yellow. The consistency is of medium firmness and somewhat elastic. The *surface* is more or less densely beset with papillæ, otherwise it is, when examined with a lens, somewhat diffusely hispid. In the larger, massive specimens the papillæ are generally present in great numbers, and the same is the case with the larger crusts; in the small incrustations the papillæ may be few or indistinct. The *dermal membrane* is a very solid and easily separable membrane; outermost it shows a thin, film-like layer, which under the microscope is seen to be curled or folded. It would seem that this layer in the living sponge is adhesive, as it generally shows adherent foreign particles such as diatoms in great multitude. *Oscula* and *pores:* as mentioned the surface is more or less richly beset with papillæ which are specially well developed in the larger specimens, while they are less developed in the small specimens. The papillæ are conical in their lower part, the upper part being cylindrical. They are seen from quite small warts up to a length of 4 mm; they are compressed and have a breadth up to 1·5 mm. These papillæ must be supposed to be partly oscular- and partly pore-papillæ, the fact is, that they show some difference. Some few of them are simply hollow and show an opening in the summit, their wall is thin and supported by dermal spicules which are more or less distinctly arranged as longitudinal bands; these papillæ must accordingly be taken to be oscular-papillæ. By far the most of the papillæ have another structure; they are hollow like the oscular-papillæ, but from the wall spicula fibres stretch into the lumen; these fibres may be branched upwards and terminate in the upper surface of the papillæ, which is thus supported by a number of spicular pillars. All the spicules in these fibres are dermal spicules. The papillæ show no opening at the summit. These papillæ must be supposed to be pore-papillæ, and probably the pores are found at their ends. The pores I have not seen, but as the papillæ are nearly always somewhat contracted, it was also not to be expected, that the pores should be visible. The two kinds of papillæ are often recognisable already from their outer shape, the oscular papillæ being somewhat evenly conically pointed, while the pore-papillæ are more cylindrical in their outer part and have a stubby or cut end. Often, however, the papillæ are so strongly contracted, that it is not possible to distinguish them from each other so directly. In the dermal membrane outside the papillæ no pores were found. The structure mentioned of the papillæ has not been described hitherto, only Schmidt has some remarks about it, but he takes them all to be oscula. For the rest he speaks about the peculiarity of the dermal membrane, remarking that it consists of: "einer äusseren sarcodeartigen und einer inneren festen membranösen Schicht". From his description of the papillæ it is seen, that it is a pore-papilla he has examined, which are also by far the most numerous; the fact is that he says: "Das Ende der Wärzchen ist etwas verdickt, der Gipfel scheinbar geschlossen, allein eine mässige Vergrösserung zeigt, dass der Hauptcanal in einer Anzahl Haarcanälchen sich nach aussen öffnet". The "Haarcanälchen" Schmidt has seen are no doubt the inner cavity divided by the fibres, and his description is otherwise in the main correct, only he takes the papilla to be an oscular-papilla.

The *skeleton*. The *dermal skeleton:* the skeleton formed by the dermal spicules is not much developed, it consists of larger or smaller bundles of dermal spicules lying in the membrane, partly horizontally, partly more or less erect in the somewhat thick dermis; besides the bundles more scattered and single spicules may also occur, but they are on the whole scarce, and large parts of the membrane may be seen without dermal spicules. At the base of the papillæ they are present in greater numbers, and from here they stretch out in the wall of the papilla and form the skeleton of the papilla as mentioned above. The *main skeleton* is a rather diffuse and irregular, multispicular reticulation in which primary and secondary fibres cannot be discerned; also single spicules are in many places seen to contribute to the skeleton. In the points of union is seen a distinct and rather rich amount of spongin which may also sometimes be seen to continue along the fibres.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli, they have an even, generally slight curve, lying nearest to the rounded end. The apex may be somewhat different, partly in the same individual, but especially in different individuals; it is generally of moderate length, but it may be both shorter and longer, and it may be bounded by straight or curved lines; finally it may be marked off in different ways; in a single specimen the point is often rounded and thus stubby. The length of the styles may vary considerably, yet generally not much in the single individuals, but on the other hand in different individuals; in all it is in the species between 0·30 and 0·68^{mm}, but only when the sizes measured for all individuals are taken into consideration; as the common lengths may be given 0·42–0·53^{mm}. The diameter is on the whole 0·007^{mm}–0·014^{mm}, but here also some difference is present, in single specimens not reaching beyond 0·011–0·012^{mm}. 2. The dermal spicules are tylota, they are generally straight, sometimes slightly curved. They have a distinct, but often rather elongated swelling at each end as a rule passing evenly into the shaft; this latter is sometimes somewhat polytylote. Also with regard to this spicule the length varies somewhat from individual to individual and follows herein the variation of the styles; the length lies in all between 0·25 and 0·47^{mm}, generally it is 0·32–0·41^{mm}. The diameter is about 0·003–0·006^{mm}, but sometimes does not reach the latter size.

The fully developed tylotes have about equal ends, but single developmental stages were seen, distinctly showing, that the tylote originally is monactinal. b. *Microsclera:* there is only one form, rhaphides; they have the special shape which is probably common to all the rhaphides in the species of *Tedania.* One end is short and curiously, obliquely pointed, while the other end tapers into a long, very fine apex; otherwise they are spinulous which under a low magnification is only seen as an indistinct fine crenulation; under a greater magnifying power it is on the contrary seen, that they are distinctly spined, the spines being dentiform and strongly compressed in the longitudinal direction; the smaller rhaphides are the relatively most strongly spined (Pl. IV fig. 1 c.). The length varies to a very high degree in the single individual, and also somewhat from individual to individual; it is in all 0·053—0·50^{mm}, generally it is 0·060—0·32^{mm}. Whether these different sizes are developmental stages it is difficult to decide, but it is most probable, that they are, at all events for a great part, fully developed forms. To be sure all intermediate sizes are seen between the given sizes, but certain sizes seem to predominate and I am inclined to think, that three different, independent sizes are present (Pl. IV fig. 1 c.). When intermediate sizes are found between them, this may be due partly to the variation of the single sizes, but perhaps also partly to the fact, that a number of developmental stages are present among them. The thickness is, in relation to the length, about 0·0010—0·0028^{mm}; the latter thickness was only reached by the longest rhaphides and consequently not found in all individuals. The rhaphides occur in great multitude both in the dermis, and otherwise in the tissue of the sponge; they occur both in dragmata and singly and scattered; I have however only seen the large rhaphides in dragmata; all rhaphides in a bundle seem to have the equal ends turned in the same direction.

To show the variation in the length of the different spicules in various individuals and how the lengths with regard to all three forms of spicules are in the main related to each other I may give some measurements:

Styles	tylotes	rhapides
0·30—0·35^{mm}	0·25—0·32^{mm}	0·055—0·25^{mm} (small specimen).
0·35—0·47^{mm}	0·27—0·33^{mm}	0·053—0·29^{mm}
0·44—0·49^{mm}	0·31—0·38^{mm}	0·064—0·320^{mm}
0·43—0·53^{mm}	0·35—0·41^{mm}	0·064—0·329^{mm}
0·51—0·68^{mm}	0·35—0·47^{mm}	0·064—0·50^{mm}

Remarks: As Schmidt's type-specimen is found in my material, the identification is certain. I have also examined a type-specimen of *Tedania increscens* O. Schmidt, and have thus been able to decide with certainty, that this species is identical with *suctoria.* Thiele thinks l. c. that *increscens* might be a good species, because its styles are larger than the measurements given by Schmidt for *suctoria:* but the variations of the spicules given above show however, that from this no character can be drawn. Topsent himself (Rev. Suisse de Zool. IV, 1897, 454) has abolished *Tedania conuligera* as identical with *suctoria,* and his description also shows, that this is correct. The specific characters for the species of *Tedania* seem especially to lie in the shape of the dermal tylotes, and this is not astonishing, as the dermal spicules in other *Myxillæ* are also characteristic. Besides *T. suctoria* I have examined *T. digitata* O. Schmidt, *tenuicapitata* Ridl. and *massa* R. and D., and of these species I have examined specimens of *suctoria* from the whole Ingolf territory and from the Willem Barents

Expedition, and of *digitata* from Trieste, Senegal and the Antilles, and I have in these species found the dermal spicules characteristic and constant. *T. suctoria* has tylota with generally weak and elongated end-swellings, *T. digitata* has tylota with more or less weak end-swellings bearing some spines on the end, *T. tenuicapitata* has tornota, and when Ridley and Dendy say (Chall. Rep. Monaxonida, 52), that the dermal spicules in this species may also have round end-swellings, but in a foot-note declare, that such spicules were only found in one specimen, in which also tornotes occurred, then no doubt a mistake or confusion must have taken place. Finally *T. massa* has dermal spicules which may best be termed strongyla but with a little mucro on the end, and the latter may be quite slightly swollen.

The rhaphides in the species of *Tedania* have been somewhat differently understood; Schmidt only mentions them as "feine umspitzige Nadeln", but does not mention, that they are spinulous; this fact is first stated by Ridley (Proc. Zool. Soc. 1881, 124) in the description of *T. tenuicapitata* and in the same place the author explains, that such is also the case in a couple of Bowerbank's species (*aspera* and *rudis*) and in *suctoria* O. Schmidt; the author speakes of it as "roughness", and says that it is distinct from "spination" or "microspination". Later the fine spinulation of the rhaphides is mentioned by several authors as Carter, Ridley and Dendy, Lambe, Topsent, Lindgren and Thiele. In the four species I have examined, the rhaphides are mainly of the same shape, and they are always finely spinulous in all specimens; I take it therefore as very probable that the *Tedania*-rhaphides are always spinulous, and I consider it as certain, that smooth and spinulous rhaphides cannot occur in different individuals of the same species. Ridley describes originally the rhaphides in *T. tenuicapitata* as "roughened almost imperceptibly", but in the Chall. Report it is declared, that the authors in the specimens which they then had for examination had only found spinulation of the rhaphides in one specimen and moreover only in a spiculum which was not fully developed; I have however examined specimens of *T. tenuicapitata* from the Challenger Expedition and found the rhaphides spinulous; the spinulation is fine, but rather well distinguishable already by a magnifying power of 300; when the authors have seen the spinulation in a small spiculum, this is easily understood, as in the small rhaphides it is most distinct, and, as said above, it is also probable, that the small rhaphides are not developmental stages, but fully developed spicules. With regard to the rhaphides in *T. massa* the authors say: "they often exhibit a roughening of the surface ..."; my examination of the species showed, that the rhaphides are always spinulous. About the rhaphides in *T. commixta*, *infundibuliformis* and *actiniiformis* Ridley and Dendy do not mention whether they are spinulous or not, but as spinulation is not mentioned, it has probably not been seen; it is yet undoubtedly present. Topsent records (Rev. Suisse de Zool. IV, 1897, 451) a *T. digitata* and says, that he refers it to this species, though it has spinulous rhaphides, which have not been described with regard to *T. digitata*; this however is not correct, as Carter already in 1880 (Ann. Mag. Nat. Hist. 5, XVII, 52) has declared, that the rhaphides in *T. digitata* are spinulous. Topsent is therefore of the opinion, that the rhaphides in *T. digitata*, and on account of the declaration of Ridley and Dendy, also in *massa* and *tenuicapitata* and moreover in *suctoria*, are able to vary, being either smooth or spinulous; according to what has been said above it must be considered as certain, that they are always spinulous. A statement of Lindgren (Zool. Jahrb. XI, 1898, 299) about the variation in the species of *Tedania* and which is based on the statement, that: "Topsent dargethan, dass die Raphides bei dieser Art sowohl glatt als auch stachelig sein können", therefore loses its relevancy. Thiele describes in 1903 (Abhandl. Senckenb. nat. Gesell. XXV, 945—947, Taf. XXVIII, Fig. 12—15) four new species of *Tedania:* about one of these is stated, that it has distinctly spinulous rhaphides, with regard to two others is said respectively "ziemlich glatt" and "kaum rauh"; only about the fourth it is said, that the rhaphides are smooth; I think that a sufficient magnifying power would show, that they all have spinulous rhaphides. In 1905 the same author further describes (Zool. Jahrb. VI, 430—33, Taf. 30, Fig. 50—53) four new species; these are declared to have spinulous rhaphides, only with regard to one this is not mentioned. With regard to the forms mentioned by Baer (Arch. für Naturgesch. 72, I, 1906, 17—19) as *T. digitata* varr. *sansibarensis*, *fragilis* and *conica* the rhaphides are only spoken of in a few words, and it is not said, that they are spinulous. Topsent describes (Bull. du Mus. d'hist. nat. 1907, 69, and Exp. Antarct. Fr. 1903—05, 30, Pl. V, fig. 6) a new species *T. Charcoti* and mentions, that the rhaphides are spinulous; they are present in two forms, of which one is shorter than the other and has a swelling near one end, a shape already noticed by Thiele for one of his species. — Finally I may note that the two species described by Kirkpatrick (Nat. Antarct. Exp. Nat. Hist. IV, 1908, 32—33) *variolosa* and *Coulmani*, and by the author referred to *Tedania*, are without rhaphides.

Still it must be noted, that Ridley and Dendy in the description of *T. actiniiformis* advance as probable the theory, that the rhaphides in this and in other species of *Tedania* are developmental stages of the dermal spicules; the special shape and the whole structure of the rhaphides, however, show with full certainty, that such cannot at all be the case, and besides the real developmental stages of the dermal spicules are not difficult to find.

Locality: Of this species we have a very large material from the whole Ingolf territory; station 27, 64° 54′ Lat. N., 55° 10′ Long. W., depth 393 fathoms; station 34, 65° 17′ Lat. N., 54° 17′ Long. W., depth 55 fathoms; station 46, 61° 32′ Lat. N., 11° 36′ Long. W., depth 720 fathoms; station 52, 63° 57′ Lat. N., 13° 32′ Long. W., depth 420 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 87, 65° 02′ Lat. N., 23° 56′ Long. W., depth 110 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 204 fathoms; station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms; station 127, 66° 33′ Lat. N., 20° 05′ Long. W., depth 44 fathoms; further it has been taken in the Davis Strait, depth 100 fathoms (Th. Holm), at East Greenland, depth 100 fathoms (Ryder), Axarfjord on Iceland, depth 20 fathoms, ("Beskytteren" Otterstrom), at the East coast of Iceland, depth 38 fathoms (Horring), Borgarfjord on Iceland, depth 85 fathoms, (Hallas, the type-specimen of Schmidt), on 64° 56′ Lat. N., 11° 48′ Long. W., depth 115 fathoms, East of the Faröe Islands, depth 220 fathoms, (Ad. Jensen, the cruise of "M. Sars" 1902), 64° 58′ Lat. N., 12° 40′ Long. W., depth 70 fathoms, (the fishery investigation steamer "Thor"); South-east of Nolso, depth about 70 fathoms, (Th. Mortensen), between the Faröe Islands and Shetland Islands, depth 255 fathoms (Wandel); in all about 25 larger and smaller specimens. The localities are situated in the Davis Strait, the Denmark Strait, North, East and South of Iceland, between Iceland and the Faröe Islands, at the latter and between these and the Shetland Islands.

Geogr. distr. The species has earlier been taken South-west of Bukenfjord, Norway, depth 106 fathoms (Schmidt), the Barents Sea, depths 112, 128 and 180 fathoms ("Willem Barent"), off New-foundland, 46° 50′ Lat. N., 50° 12′ Long. W., depth 82 fathoms and at the Azores in depths of 318 and 664 fathoms (Topsent). The species is thus distributed between 74° 36′ and 38° 35′ Lat. N. and between 36° Long. E. and 56° Long. W. The bathymetrical range varies somewhat greatly, from 20 fathoms (Axarfjord, Iceland) to 799 fathoms (station 78, on the eastern slope of the Reykjanes Ridge).

Histoderma Cart.

Sponges of more or less bladder-like consistence; the shape globular or roundish in the free, not attached forms, more flattened in the attached forms. The body provided with somewhat long tubular fistulæ, or with shorter or longer papillæ. An outer, solid dermal layer present, furnished with a skeleton of close-lying spicules. The skeleton of the inner body formed of partly regularly arranged, thin fibres, not forming a reticulation, or of more scattered spicules. Spongin not present. Spicula: megasclera only of one form, the same in the dermal layer and the inner body, they are diactinal, tylota, strongyla or tornota, sometimes the ends are unequal, the spicules then being tylostrongyla or tylotornota; microsclera: the characteristic microsclera are chelæ arcuatæ; to these sigmata are generally added, and further trichodragmata may occur; the sigmata may be of one or two sizes, and a peculiar small chela may occur (navicelligerum).

1. **H. appendiculatum** Cart.

Pl. I Figs. 6—11, Pl. IV, Fig. 2.

1874. *Histoderma appendiculatum* Carter, Ann. Mag. Nat. Hist. 4. XIV, 220, Pl. XIV, figs. 23—25, Pl. XV, figs. 39 a—b.

Globular or more irregularly tuberous, provided with more or less numerous, tubular fistulæ; free, not attached. Surface smooth. The body surrounded by a solid, bladder-like dermal layer. Oscula in the apex of some of the fistulæ, pores in the apex of others. The dermal skeleton formed of close-lying, tangential spicules in several layers; the skeleton of the inner body consisting of thin fibres, running irregularly, being regular only at the surface and parallel with this; there are no transverse fibres. Spicula: megasclera tylota passing by intermediate stages into unequal-ended strongyla, 0·27—0·05mm; microsclera two forms, chelæ arcuatæ 0·040—0·046mm, sigmata 0·047—0·003mm.

Of this curious and interesting species — the type on which Carter founded the genus the Ingolf-Expedition has taken a somewhat rich material. The shape is in the whole as described by Carter; the sponge consists of a globular or tuberous body, from which some few shorter or longer tubular fistulæ issue. The body may be nearly quite globular, which especially seems to be the case with the smaller individuals, but generally it is of a more or less irregular shape, often somewhat flattened. The fistulæ are, in the specimens to hand, in most cases broken off, only some single ones are whole; they are cylindrical and straight or more or less curved, the sponge thus strongly reminds one of a potato with stolons; it grows freely, without attachment. The body has in the largest specimen a diameter of 20mm and in the smallest of 8mm; the length of the undamaged fistulæ is about 25mm, they are of the same length in the small as in the large specimens, while on the other hand the thickness is somewhat different, from 2 to 4^{mm} in proportion to the size of the specimen. The colour is (in spirit) yellowish white. The consistency is hard and firm, the dermal rind forming a very firm layer, the inner body on the contrary is soft; in most specimens the inner body has therefore contracted strongly under the influence of the alcohol and lies like a clump in one side of the firm capsule formed of the dermal layer. By exsiccation the tissue of the inner body contracts strongly, becomes hard and of a yellow colour, so that it resembles wax, just as is mentioned with regard to the tissue of the inner body in *Oceanapia robusta* (The Ingolf-Expedition VI, 1, Porifera, part I, 79). The *surface* is smooth, only showing such a slight roughness as may be caused by the spicules imbedded in the dermal layer and parallel to the surface. The sponge has outermost a very solid *dermal layer* of a thickness of about $0{\cdot}25^{mm}$; in places it may become thicker, up to 1^{mm}; it surrounds the inner body like a mail and is very easily loosened from it, and contains close-lying spicules in several layers. *Pores* and *oscula:* Carter says: "Pores and vents not distinctly seen, but probably situated at the extremities of the tubuli respectively". This is also the case, but I too cannot solve the question with full certainty, because most of the tubular appendages are broken off. The oscula are certainly situated at the end of some of the fistulæ; these latter are tubular, hollow and somewhat thin-walled; a couple of them give the impression of being undamaged, and these terminate with a simple opening which in consequence should be the osculum; a couple of the fistulæ terminate with a formation quite as described by Carter, it is with a conical spout, placed at the end of the fistula; whether this is possibly the normal, closed osculum I do not venture to decide. Of poriferous fistulæ there is in the material only one present, a loose tube which is broken off and has a length of 20^{mm}; this tube shows, that the fistulæ become more thin-walled outwards, and that the skeleton in the wall becomes more scattered. The end of the fistula is rounded and forms a slightly swollen knob of a length of about $2{\cdot}5^{mm}$; in this knob the skeleton of the wall is transformed and passes into the formation of a reticulation, in the meshes of which the pores are situated (Pl. I, fig. 11); the pores are oval or circular, of a diameter of $0{\cdot}047$—$0{\cdot}17^{mm}$. In the dermal layer on the other parts of the body no pores are found. — As mentioned the inner body is inclined to get strongly contracted in alcohol and become hard and brittle, and there is then a large hollow space inside the dermal layer. But in single cases the inner body has on the contrary preserved its original shape and consistency; it then quite fills out the cavity formed by the dermal layer. When a section is made of such a well preserved specimen, the canal system is shown; some large canals are seen terminating in some of the tubes, and thus shown to be excurrent canals (Pl. I, fig. 8); besides, a multitude of smaller canals are seen. The inner body lies quite loose in the cavity within the dermal rind, and it seems only to be attached at the points where the fistulæ issue; thus there are extended spaces below the dermal layer. The lumen of the fistulæ is not directly continued into the canals of the inner body, as there is a diaphragm present at the origin of the fistulæ; this diaphragm has in some cases a circular opening in the centre, but it seemed in other cases to be quite closed. When the dermal rind is removed, the surface of the inner body is shown; this surface is then quite undamaged, and it has the netted appearance which is so often seen on the surface of species of *Reniera* (Pl. I, fig. 9); on examining a specimen which wanted the dermal layer, one might, therefore, think that it must be an entire and undamaged sponge. The netted appearance of the surface is due to the same cause as in the species of

Reniera, being caused by the close-lying, circular openings of the incurrent canals which shine through the thin, transparent outer layer, in which there are fine pores leading to the canals. The poriferous fistulæ probably do not lead into canals, but are in connection with the space below the dermal layer; perhaps it is these fistulæ whose diaphragm shows no opening in the centre. The course of the water-current will then probably be: it passes in through the poriferous fistulæ into the space below the dermal layer, from here through the pore-shaped openings on the surface of the inner body and into the canal system, then in due course passing into the larger canals and finally out through the oscular fistulæ.

The *skeleton*. The *dermal skeleton:* the outer rind is highly provided with spicules lying very closely and in several layers, parallel to the surface; the spicules are not scattered, but arranged somewhat circularly round the bases of the fistulæ, as is already distinctly visible with a lens; on the inner side of the rind there are some spicules which lie singly and rectangularly to the direction of the other spicules, and thus more or less radiating in relation to the circlets. In the fistulæ the ring-like arrangement of the spicules is retained, which is the cause why the fistulæ are very easily broken; some fine fibres, consisting of few spicules, run lengthwise out through the fistulæ, lying on the inside of the wall, and continue from the base to the end of the fistulæ in longitudinal direction; these fibres do not belong to the dermal skeleton, in so far as they are not found in the dermal layer of the body, on the contrary they issue from the inner body, and they are probably of importance in attaching it, and thus it is that the inner body, as said above, is attached only at the bases of the fistulæ. In the ends of the fistulæ the dermal skeleton gets more scattered, and in the oscular fistulæ the spicules are here irregularly scattered, crossing each other, while in the poriferous fistulæ the skeleton outwards first becomes somewhat scattered, but outermost forms a reticulation. The *main skeleton* or the skeleton of the inner body: In the inner body some fine fibres are found, but they have no regular course and form no reticulation; they seem mainly to run in directions parallel to the surface. At the very surface of the inner body such fibres are found numerously, running just below the surface and parallel with this, and they show a definite arrangement. They run together at the bases of the fistulæ and continue, as said before, out in the fistulæ; as they radiate from the base of the fistulæ out in the surface, they become in the larger part of this parallel with each other, but at places where the systems belonging to different fistulæ meet, the fibres run in different directions. Transverse fibres are not found, and thus there is no reticulation formed. The fibres are somewhat loose, they have an average thickness of 0·05^{mm}, and the distance between them is generally 0·15–0·25^{mm}. — It was said above, that the inner body lies loose in the cavity of the dermal layer; as the fibres mentioned continue from the fistulæ inwards and form a carpentry along the surface of the inner body, this latter is in reality kept in its place by this carpentry, otherwise lying freely in the cavity and only attached at the bases of the fistulæ. Spongin was not observed, neither in the inner skeleton nor in the dermal skeleton. Carter has not seen the construction of the skeleton of the inner body; in his material the inner body has probably been destroyed. Both in the dermal layer and in the inner body many foreign particles are imbedded, especially Globigerinae.

Spicula: a. *Megasclera:* these are only of one form, tylotes, but with some single intermediates to strongyles. They are more or less curved, but rather slightly; the shaft is thickest at the middle and tapers somewhat towards the ends. The spicules vary very much in size, and at the same time somewhat in shape; the smaller and thinner they are, the more distinct are the end-swellings; these smaller spicules have equal or nearly equal ends; the larger and thicker the spicules are, the smaller are relatively the end-swellings, so that in the largest of the spicules they may be only slightly pronounced; in the largest spicules the ends are most often not equal, one has a somewhat roundish swelling the other an elongated swelling tapering slightly outwards; not rarely the swellings quite disappear, and then we get a strongyle with unequal ends, one rounded the other more tapering, nearly truncately pointed. The various sizes must be taken to be fully developed spicules, since fine developmental stages in various lengths are found; the developmental stages have unequal ends, the shaft being a little thicker in one end but a little thinner in the other, and here with a more marked swelling. Quite single very fine developmental stages were found, which had one end quite pointed. The length of the spicules is in all 0·27—0·95^{mm}, with a diameter of 0·005—0·021^{mm}. The length of the spicules is different in the different parts of the sponge; in the dermal layer the largest are found, while the smaller and smallest are found in the inner body, the separation is however not quite sharp. In the inner body they generally do not exceed 0·60^{mm}, and about at the same size also lies the lower limit for the spicules of the dermal layer. In the skeleton of the fistulæ large and small spicules are mingled. In the fibres running along the surface of the inner body the spicules belong for the most part to the larger forms of the group with the smaller spicules, and among them some of the largest spicules are found, and with this composition the fibres continue out through the fistulæ. Carter mentions and figures two forms of megasclera; to this result he arrives only by taking a pronounced tylote and a form without end-swellings, and in which one end is truncately pointed; a form such as his figure 39a may be found, but not frequently, and there is, as said, only one kind of megasclera. b. *Microsclera;* there are two forms, chelæ arcuatæ and sigmata. 1. The chelæ arcuatæ have an evenly curved shaft, lobe-shaped alæ and an elliptical tooth; their length is 0·040—0·046^{mm} and the diameter of the shaft is 0·004^{mm}. 2. The sigmata are of common shape and more or less contorted; they are rather large, but they vary somewhat in size, the length is 0·047—0·093^{mm} and the thickness 0·0028—0·0057^{mm}. The microsclera are present through the whole sponge, they are scattered in the inner body and in the dermal layer strewn rather numerously among the megascleres, and they are specially numerous on the inside of the fistulæ; the sigmates are everywhere more numerous than the chelæ.

Embryos. In one of the specimens which was cut through an embryo was found, lying in a cavity in the inner body. It was globular and rather large, 3^{mm} in diameter. It was lying in the cavity distinctly surrounded by a membrane. It was richly provided with spicules, both megasclera and microsclera. The megasclera were fine tylotes of a greatest length of about 0·47^{mm}, many of them were very thin and had still one end pointed. They were scattered in the interior of the embryo, but they were already close-lying at the surface and parallel to this, thus forming a layer with however no boundary inwards. The microsclera were developmental forms of chelæ in various stages, they were of somewhat different sizes, but reached a length of up to 0·057^{mm}, thus to a greater size than in the fully developed sponge. Sigmates were not seen.

We have a specimen of this species which I at first thought was a distinct form on account of its smaller spicules, but which on closer examination proved to be a very young specimen of *appendiculatum*. The specimen is globular, with a single fistula, and very small, about 3^{mm} in diameter, and thus not larger than the examined embryo. It shows quite the same structure as the full-grown specimens; it has a distinct dermal layer with subdermal cavities below, and also distinctly shows the skeletal structure of the inner body. The specimen is interesting in showing, that such small specimens may have considerably smaller spicules than the grown specimens. It is yet no doubt only the very small specimens which show in this respect any difference worth mentioning, and it is certainly the case, that they very soon get spicules of the size normal to the species. The examined specimen has probably just left the mother-sponge. The megascleres do not reach beyond $0{\cdot}41^{mm}$, the chelæ are $0{\cdot}050^{mm}$, and the sigmates are of the same sizes as in the full grown sponge. It is interesting to notice, that the chelæ in this specimen are intermediate in size between the chelæ in the embryo and those in the grown sponge. The relatively long and fine megascleres in the embryo seem here to be replaced by shorter but thicker spicules.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, about 29 more or less damaged specimens; station 90, 64° 45′ Lat. N., 29° 06′ Long. W., depth 568 fathoms, two specimens and some loose fistulæ; further at 61° 15′ Lat. N., 9 35′ Long. W., depth 478 fathoms, a very small specimen (The fishery investigation steamer "Thor"). The localities are situated on the eastern slope of the Reykjanæs Ridge, in the Denmark Strait and West of the Faröe Islands.

Geogr. distr.: Carter had the species from the west coast of Ireland, depths 808 and 109 fathoms. (Porcupine).

2. H. physa O. Schmidt.

Pl. I Figs. 12—13, Pl. IV, Fig. 3.

1875. *Desmacidon physa* O. Schmidt, Jahresber. der Comm. zur wissensch. Unters. deutsch. Meere in Kiel für 1872—73, 118, Taf. I. Fig. 8—9.

1887. *Cornulum ascidioides* Fristedt, Vega Exp. wetensk. Jakttag. IV, 495. Pl. 25, figs. 1—2, pl. 29, fig. 21.

1903. *Histoderma physa*. Arnesen. Berg. Mus. Aarbog 1903, 16, Taf. II, Fig. 5, Taf. III, Fig. 6.

1903. — —. Thiele, Arch. für Naturgesch. Jahrg. 1903, 385, Taf. XXI, Fig. 16 a—b.

1909. — —. Lundbeck. Meddel. om Grönland, XXIX, 443.

Roundish or more irregular, sometimes somewhat erect, attached with a [illegible] with one or a couple of conical spouts. Surface smooth. The sponge surrounded by [illegible] thick, bladdery dermal layer. Oscula at the summit of the conical sp[illegible] The dermal skeleton formed of close-lying spicules parallel to the surface. [illegible] body consisting of fine fibres and bundles of spicules, running [illegible] with this; without transverse fibres. Spicula: Megasclera strongyla [illegible] 0·50—0·80^{mm}; microsclera of two forms, chelæ arcuatæ 0·035—0·058^{mm}, [illegible]

This species has a shape mainly as described by Schmidt. It consists (on account of contraction or destruction of the inner body) of a bladder, formed of the dermal layer. This bladder may be more or less roundish or of a more irregular, sometimes somewhat erect shape. The largest specimen in my material has a greatest extent of fully 30^{mm}; it has two spout-shaped tubes and a height of 18^{mm} from the base to the end of the tubes; the smallest specimen has an extent of about 5^{mm}. My specimens are attached to stones with a broad base, one is growing on a crab. The consistency of the outer layer is firm and hard; the inner body is brittle; in all specimens the latter is contracted and forms only a clump at the base of the bladder, and the same can be seen to have been the case with the specimen figured by Schmidt. The colour (in spirit) is whitish. The *surface* is smooth. Outermost is found the *dermal layer*, it is constructed mainly in the same way as in the preceding species, and has a thickness of about $0{\cdot}15^{mm}$. *Pores* and *oscula:* My specimens are all in a rather bad condition, so that the examination of the arrangement of the pores and oscula, which would seem to be rather interesting, may be somewhat deficient, and as the inner body is destroyed, we get from this no information about the canal system. Only the largest specimen is in such a condition, that it gives some information about pores and oscula, and I think, that the structures shown by this specimen are typical for the species, especially as the figure given by Schmidt seems to show a quite similar structure. This specimen has, as said, two tubular or conical spouts, formed of the dermal layer; these spouts have a shape as shown on Pl. I figs. 12—13. The osculum is found as a simple opening at the summit of the conical end part of the spout; the spicules of the dermal layer lie parallel with each other here and with one end towards the oscular opening. On the side of the tube is found a circular opening, surrounded by a low, projecting wall; the opening is covered by the poriferous membrane. The skeleton of the dermal layer forms here a reticulation, as fibres go inwards from the edge of the wall and support the membrane. The pores are numerously present in the membrane, they are small, of an average diameter of $0{\cdot}06^{mm}$.

The *skeleton.* The *dermal skeleton;* as in the preceding species we find outermost a firm dermal rind which, however, in the present species is somewhat thinner and less solid than in *appendiculatum.* It is provided with close-lying spicules parallel to the surface, and the spicules lie in several layers; they are mainly more or less parallel to each other, but there are also, especially on both surfaces of the layer, spicules present, both in bundles and lying singly, which are scattered and cross the other spicules in all directions. The *main skeleton;* on account of the condition of the material I have only been able to examine the skeleton of the inner body somewhat incompletely, it seems however to be constructed quite as in *appendiculatum;* in the interior there are fibres and bundles, and at the surface there are parallel fibres without transverse fibres; the fibres were measured to a thickness of $0{\cdot}08^{mm}$ with a distance between them of $0{\cdot}29^{mm}$. Spongin is not present in the skeleton.

Spicula. a. *Megasclera;* these are of one form, strongyles, sometimes approaching to subtylotes; they are slightly curved, generally irregularly and most frequently doubly. They are fusiform, tapering somewhat towards each end. The length when all examined specimens are considered is $0{\cdot}50$—$0{\cdot}89^{mm}$, and the thickness $0{\cdot}008$—$0{\cdot}020^{mm}$, but in the single individuals they do not vary so much, as examples may be given $0{\cdot}50$—$0{\cdot}74^{mm}$ with thickness of $0{\cdot}008$—$0{\cdot}015^{mm}$ and $0{\cdot}62$—$0{\cdot}89^{mm}$ with thickness of $0{\cdot}010$—$0{\cdot}020^{mm}$. Fine developmental stages are seen singly, the finest are monactinal. b. *Microsclera:* these are of two forms, chelæ arcuatæ and trichodragmata. 1. The chelæ arcuatæ are of the common shape, the shaft not much curved with the curvature mainly lying in the middle, the alæ and tooth are of the same length, the tooth narrowly elliptical with a long, narrow tuberculum. In all the length is between 0·035 and 0·058 ^{mm} with a diameter of the shaft of 0·0028—0·007 ^{mm}, but the chelæ also vary somewhat in different individuals, e. g. 0·035—0·043 ^{mm}, 0·045—0·054 ^{mm} and 0·050—0·058 ^{mm}, and the diameter of the shaft may be 0·0028—0·004 ^{mm} and 0·004—0·007 ^{mm}. 2. The trichodragmata: the single rhaphides are exceedingly, nearly immeasurably fine, less than 0·0006 ^{mm}, the bundles have a length of 0·11—0·12 ^{mm} and a thickness of about 0·021—0·035 ^{mm}, the single rhaphides were measured to a length of about 0·10 ^{mm}. The rhaphides seem not to occur singly, but only in bundles. The chelæ occur both in the dermal layer and in the inner body, here rather numerously, the trichodragmata are mainly seen in the inner body at its surface.

The identification of this, otherwise rather characteristic species, is certain, as I have examined a piece of one of Schmidt's type-specimens. Also of the *Cornulum ascidioides* Fristedt I have examined a type-specimen and thus been able to decide, that this is the present species; Fristedt has overlooked the trichodragmates, and the length, 0·07 ^{mm}, he gives for the chelæ is erroneous, as in his type-specimen I found the chelæ to be of a length of 0·058 ^{mm}.

Locality. Station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 16, 65° 43′ Lat. N., 26° 58′ Long. W., depth 250 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 94, 64° 56′ Lat. N., 39° 19′ Long. W., depth 204 fathoms; station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms; further the species has been taken at 62° 26′ Lat. N., 4° 49′ Long. W., depth 228 fathoms and 62° 53′ Lat. N., 9° 06′ Long. W., depth 245 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902); seven specimens or fragments in all. The localities are situated in the Denmark Strait and between Icelands and the Faröe Islands.

Geogr. distr. The species has earlier been taken South-west of Bukenfjord, Norway, depth 100 fathoms (Schmidt), Ostfjord at Bergen, depth 292 fathoms (Arnesen), and in Baffin Bay 68° 08′ Lat. N., 58° 47′ Long. W., depth 169—183 fathoms (Fristedt). The southern limit of the species is thus at 59° Lat. N.

Histodermella nov. gen.

Sponges which in appearance and structure are like Histodermas; the consistency more or less bladder-like. The shape varies from round or roundish forms through longish to tube-shaped, often slightly branched forms; the body provided with shorter or longer tube-shaped fistulæ, or with shorter papillæ. The sponge surrounded by an outer, very solid dermal layer with close-lying spicules parallel to the surface. The skeleton of the inner body consisting of scattered spicules or irregular fibres, [illegible] more regular at the surface, but not forming a reticulation. Spongin not present. Spicules: megasclera of two forms, but these are intermingled so that the spicules are the same in the dermal layer and the inner body; the megasclera are diactinal, of the two forms one is smooth, the other spined; the [illegible] megasclera are tylota or strongyla, sometimes with the ends finely spined; the spined [illegible] acanthoxea or acanthostrongyla. Microsclera may vary somewhat in composition; [illegible] microsclera are chelæ arcuatæ, to these are added sigmata, and further trichodragmata may [illegible] besides (natalensis) curious spined bodies (transformed chelæ or forceps?). [illegible]

1. H. Ingolfi n. sp.

Pl. II, Figs. 1—4, Pl. IV, Fig. 4.

Of somewhat various shape, more or less roundish with a number of tubiform fistulæ which may be branched; or of more irregular shape, showing several swellings or finally quite without swellings; growing freely without attachment. Surface smooth. Outermost a solid, bladder-like dermal layer. Oscula at the summit of some of the fistulæ, (pores at the summit of others?). The skeleton of the dermal layer formed of close-lying spicules parallel with the surface; the inner skeleton consisting of fine, irregularly running fibres, which are regularly arranged at the surface parallel with this, without transverse fibres. Spicula: megasclera of two forms, tylota 0·29—0·65^{mm}, acanthoxea 0·17—0·21^{mm}; microsclera two forms, chelæ arcuatæ 0·021—0·028^{mm}, sigmata 0·050—0·061^{mm}.

This species in its exterior shape somewhat recalls *Histoderma appendiculatum*, but it is generally less regular. Most frequently it consists of a more or less roundish body with a varying number of tube-shaped appendages. These appendages or fistulæ may vary much in length and thickness, and there are often, besides the larger, also some short and thin fistulæ; these may be branched in different ways, and they may be more or less curved; the appendages also may form swellings, the sponge in this case consisting of more than one roundish swollen part connected by the appendages. Finally there are specimens which have no pronounced swelling, or no swelling at all, the sponge then consisting of a somewhat sinuous, slightly branched tube of somewhat different thickness in different places. In the largest specimen the body has a diameter of fully 20^{mm}, the longest fistula has a length of 42^{mm} and its thickness is 4^{mm}; then we have specimens in all sizes down to quite small, the smallest one has a body with a diameter of 2·5^{mm} and a fistula of a length of 14^{mm} and a thickness of 1·7^{mm}. The sponge grows freely without any attachment. The colour (in spirit) is yellowish white. The consistency is somewhat bladder-like, the outer layer is hard and firm, the inner body brittle, the latter is as usually highly contracted, so that it only occupies a small part of the cavity within the dermal rind. The *surface* is mainly smooth, yet the ends of the tangential spicules of the dermal layer may sometimes be a little projecting. The sponge is outermost surrounded by a solid and hard *dermal layer*, formed of close-lying spicules, the layer has a thickness of about 0·2^{mm}. *Oscula* and *pores:* A part of the fistulæ are distinctly seen to be oscular fistulæ, they terminate with a simple opening, or they are in most cases more or less closed and terminate in a conically pointed part which is either quite closed or shows an opening at the summit. Pores I have not observed, but they are certainly placed at the end of some of the fistulæ; in my material however the outer part of these is often broken off; at all events pores are not found otherwise on the body. The inner body is in nearly all specimens strongly contracted or quite destroyed, yet in some single specimens it may be seen to have had a surface as in *Histoderma appendiculatum*, with pores leading into canals; the direction of the water-current therefore is probably the same as in that species.

The *skeleton.* The *dermal skeleton:* the skeleton of the dermal layer is constructed as in *H. appendiculatum:* it consists of close-lying tangential spicules in several layers, the spicules are more or less circularly arranged around the bases of the fistulæ, and here likewise, especially on the inside of the layer, we find spicules which lie at right angles to the others, these latter spicules being for a great part spined oxea. The skeleton of the fistulæ is also here arranged ring-like, but outwards it soon becomes more irregular and scattered; fibres running through the fistula in longitudinal direction are not found here, or they are at all events only very little pronounced and soon dissolved into spicules lying more scattered in the longitudinal direction. The *skeleton of the inner body* is constructed quite as in *H. appendiculatum:* there are fine, parallel fibres running along the surface and without connecting transverse fibres, and they run together at the bases of the fistulæ, some of them may continue out in the fistulæ; in the interior of the inner body similar fibres are found, but they are scattered without observable order; besides there is found a number of single, scattered spicules, which for a great part are spined oxea. Spongin could not be observed in the skeleton.

Spicula: a. *Megasclera:* these are of two forms, tylota and acanthoxea. 1. The tylota are straight or slightly curved, they have a well developed swelling at either end, the shaft is thickest in the middle. The length varies much, from 0·29—0·65$^{\text{mm}}$, with a diameter of the shaft relatively of 0·007—0·017$^{\text{mm}}$. Some developmental stages are found down to quite fine, the thinnest of them are monactinal, the older show one end rounded or slightly swollen, while the other end has a pointed swelling which represents the original apex, and the shaft is thinnest at this end. There is no difference between the tylotes in the dermal layer and those in the inner body, but the developmental stages are found in the interior. 2. The spined oxea or acanthoxea are curious and characteristic spicules; they are straight or quite slightly curved, and relatively short and thick, the points are middle-long and sharp; the spicule is coarsely spined in the whole length, only the points are smooth to a greater or smaller extent. The length varies from 0·17—0·21$^{\text{mm}}$ and the diameter from 0·008—0·014. Some single developmental stages were seen, the thinnest of them slightly spined, these had a thickness of 0·004$^{\text{mm}}$. The tylotes form the dermal layer and the fibres in the inner body are also found scattered singly in the interior; the spined oxea are seen scattered singly in the dermal layer, but are for the rest present, as said, on the inner side of the layer, lying at right angles to the other spicules, further they are found scattered in the inner body. b. *Microsclera:* these are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ are somewhat small, they have a slightly curved shaft, the alæ are incised below and drawn out in a point, the tooth is narrow. The length is 0·021—0·028$^{\text{mm}}$, and the thickness of the shaft about 0·002$^{\text{mm}}$. Chelæ of somewhat deformed shape were not infrequent. 2. The sigmata are rather fine, they are contorted generally about a quarter of a turn; the length is 0·056—0·061$^{\text{mm}}$ and the thickness 0·002—0·0028. The microscleres occur on the inside of the dermal layer and in the inner body, but they are on the whole not numerous.

"*Cellules sphéruleuses*". In this species the so-called cellules sphéruleuses occur, often in enormous numbers; they occur especially on the inside of the dermal layer and the fistulæ and in the inner body, chiefly at the surface of the latter. They are roundish or more elongate and filled with relatively large, refracting granules; their size is generally 0·011—0·017$^{\text{mm}}$. Sometimes they are somewhat confluent to larger heaps of granules.

Locality: The species has only been taken on station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, on the eastern slope of the Reykjanes Ridge; a somewhat large number of specimens.

2. **H. coriacea** n. sp.

Pl. II, Figs. 5–6, Pl. IV, Fig. 5.

Elongate, somewhat fusiform, sometimes cylindrical or more irregular and somewhat branched; provided with generally short, papilla-shaped fistulæ in greater or smaller number. Growing freely, without attachment. Surface somewhat rough, but without projecting spicules. The sponge is surrounded by a very solid dermal layer. Oscula and pores each at the summit of their own papillæ. The dermal skeleton formed of close-lying, tangential spicules. The skeleton of the inner body consisting of scattered spicules. Spicula: megasclera of two forms, strongyla with spinulous ends 0·24–1·02^mm, acanthostrongyla 0·12–0·238^mm. No microsclera.

This species has an exterior which certainly resembles that of the preceding species but however is somewhat different, and it is larger and more robust. It consists of a body with fistulæ, but the body is never globular but elongated, generally somewhat fusiform, thickest in the middle and somewhat tapering towards the ends; it is otherwise generally more or less irregular. Sometimes it is not fusiform, and the sponge is then nearly cylindrical; sometimes it is somewhat branched. The fistulæ are generally rather short, often nearly papilliform and they are for the rest very irregular both in shape and arrangement, and they may also be branched. When they are somewhat larger they appear as branches, so that the sponge then assumes the branched shape. Most of my specimens are somewhat damaged, but to judge from not damaged specimens the species is not attached, but grows freely, which is also by far the most probable. The largest specimen, which is not quite entire, has a length of about 100^mm and a greatest thickness of 17^mm; the other specimens are somewhat smaller, down to about 50^mm in length. The colour (in spirit) is in most specimens whitish grey or dirty greyish violet, the inner body is darker than the dermal layer and is obscurely reddish violet; some of the smallest specimens are nearly quite white, but also in these the inner body is somewhat darker. Whether the colour is original or due to the influence of alcohol has not been observed. The consistency is, on account of the very thick dermal rind, very firm, the inner body is also in its present condition rather firm, but brittle; it is strongly contracted and lies generally up to one side of the dermal layer. The *surface* cannot be termed smooth as the close-lying spicules cause it to be rough both to the sight and to the touch, but it has no projecting spicules. The sponge is outermost surrounded by a very solid and hard *dermal layer*, provided with close-lying spicules; this layer is very thick, from 0·4–0·8^mm. *Pores* and *oscula:* Some of the fistulæ or papillæ are oscular papillæ; they are distinguished by their conical shape, pointed towards the end, with an oscular opening at the summit. The papilliform ends of the sponge-body itself are oscular papillæ. From the oscular opening a canal, which is surrounded by a film-like membrane, leads down into the body. The other papillæ, which bear no oscula, are pore-papillæ. These fistulæ or papillæ are of a different shape from the oscular papillæ, they have rounded ends which are as a rule a little swollen; they are present in greater numbers than the oscular papillæ. The pores are only present in the outermost, rounded end-part of the papillæ. In the middle, through the interior tissue of the papilla, runs a canal which in the outer end-part of the papilla is divided into branches; these branches go to the surface and are the incurrent canals into which the pores lead; these latter are lying in an irregular reticulation and they have a diameter of 0·036—0·10 ^{mm}. The circulation of the water-current is then the same as was mentioned under *H. appendiculatum:* there is also here a space below the dermal rind, and in a section of the inner body parallel with the surface the small, round incurrent openings to the canals are, under the microscope, seen lying very closely.

The *skeleton.* The *dermal skeleton:* the skeleton of the dermal layer is formed of close-lying, tangential spicules, which lie in several layers and form a solid and protective rind. The greatest part of the spicules lie parallel to each other in a direction which goes more or less distinctly circularly round the sponge, thus the spicules lie at right angles to the longitudinal direction of the body of the sponge; at the same time they are, in the environs of the fistulæ, arranged ring-like around the bases of these. When the surface is undamaged, there is outermost a layer of more loose-lying spicules which lie crossing each other in all directions; between the regularly arranged spicules of the layer there are spicules placed at right angles to the others. A section through the layer parallel to the ring-like arranged spicules will thus show entire spicules lying parallel to each other on the inside, and cut, irregularly lying spicules on the outside. The spined strongyla occur especially at the outer side. The skeleton in the fistulæ is ring-like arranged at the base, but outwards it passes soon into an irregular skeleton with spicules intercrossing in all directions; in the oscular fistulæ the spicules are in the conical summit arranged parallel to the longitudinal direction and with one end towards the oscular opening; in the pore-fistulæ there is at the end an irregular reticulation, in the meshes of which the pores lie. The *skeleton of the inner body* is difficult to get a clear idea of on account of the brittleness and contracted condition of the tissue, and also on account of its very dark colour. It is however not regular as in the preceding species, but seems only to consist of scattered spicules; at the surface they are present in greatest numbers while they are much scattered in the interior, and they are on the whole not numerous. Spongin is not present in the skeleton.

Spicula: a. *Megasclera:* these are of two forms, smooth strongyla and acanthostrongyla. 1. The smooth strongyla are straight, more rarely quite slightly curved, they are thickest in the middle and taper slightly towards the rounded ends, which latter sometimes may be quite slightly swollen. The ends are very finely spinulous on the rounded part; the spinulation may be very little apparent but is generally rather distinct, it is most obvious on the smaller spicules. The length varies much, from 0·24 ^{mm} and up to 1·02 ^{mm}, and the thickness is 0·008—0·021 ^{mm}. In the dermal layer strongyla of all sizes are found, the larger are present in greatest numbers, in the inner body on the contrary only the smaller forms are found, up to a length of 0·47 ^{mm}, but at the surface of the inner body they are somewhat larger up to 0·71 ^{mm}. 2. The acanthostrongyla or spined strongyla are relatively short and thick; they are generally sligtly curved, coarsely spined strongyla, sometimes each end terminates in a point, but as this is not, or only very slightly, larger than the other spines, it must be taken as such and the spicule must be termed a strongyle. The length is about 0·12—0·238 ^{mm}, the shortest forms occur most rarely, the thickness is 0·011—0·017 ^{mm}. The acanthostrongyla occur both in the dermal layer and the inner body scattered between the other spicules; in the dermal layer they are especially present towards the outer side. *Microsclera* are not present.

Locality: This is the same as for the preceding species, viz. station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms.

This species seems to be very like *Phlocodictyon birotuliferum* Cart. (Ann. Mag. Nat. Hist. 5. XVIII, 147), to judge from Carter's figure and description. This resemblance however is probably only an analogy, without consequence in regard to affinity of the species (see below under the remarks about the species of the genera in question).

The two *Histodermella* species established here, *Ingolfi* and *coriacea*, are certainly rather nearly related to each other; the outer shape, the dermal rind and the arrangement of the canal system are in agreement; the differences lie mainly in the construction of the skeleton of the inner body and the shape of the spined megasclera as also in the absence of microsclera in one species.

Inflatella O. Schmidt.

(Joyeuxia Topsent.)

The shape roundish or the sponge more or less club-shaped, sometimes pedunculated. The consistency bladder-like. The body provided with more or less numerous papillæ. An outer, solid dermal layer present, with a skeleton of close-lying spicules; the skeleton in the inner body weak, consisting of thin fibres, not forming any reticulation. Spongin not present. Spicula: Megasclera of one form, diactinal, strongyla; microsclera not present.

1. **I. pellicula** O. Schmidt.

Pl. II, Figs. 7—9, Pl. IV, Fig. 6.

1875. *Inflatella pellicula* O. Schmidt, Jahresber. der Comm. zur wissensch. Unters. der deutsch. Meer. in Kiel für 1872—73, 117, Taf. I, Fig. 5.

1885. *Reniera inflata* Armauer Hansen, The Norwegian North-Atlant. Exp. XIII, Spongiadæ, 7, Pl. I, fig. 4.

1903. *Inflatella pellicula*. Thiele, Arch. für Naturgesch., 1903, 385, Taf. XXI, Fig. 17.

1904. *Joyeuxia viridis* Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 205, Pl. III, fig. 12.

Club- or pear-shaped, pedunculated, with some few conical papillæ above. The surface smooth. The sponge surrounded by a solid dermal layer. Oscula and pores at the summit of the papillæ. The dermal skeleton formed of close-lying, tangential spicules; the inner skeleton consisting of bundles or loose fibres. Spicula: Megasclera strongyla 0·42—0·64^{mm}.

The outer shape of this species is somewhat well known from the descriptions cited. It is elongate, pear-shaped and is attached below by a shorter or longer peduncle to a substratum. The peduncle may with regard to the manner of fixation be somewhat various; either it is only fixed by means of a little dilatation, or it emits stolons which may shoot out at various heights, and each of which has its own attachment. This is already mentioned by Schmidt l. c. Of the figures cited above that given by Schmidt shows stolons, while the others show a single peduncle; the figure by Topsent, however, shows a small projection above on the peduncle, evidently a beginning stolon, as is also mentioned by the author. Above, the peduncle passes into the pear-shaped body which bears one to four slender, conical papillæ above. The specimen described by Topsent shows an osculum without papilla. Of the specimens in my material the largest is 19^{mm}, the smallest 10^{mm} high;

the specimens previously described are of similar sizes. The papillæ vary in length from 1·5 to 4. The colour (in spirit) is in one specimen green, but otherwise whitish, presumably on account of decolouration. The consistency is bladdery, the dermal layer being firm and solid, while the inner body is soft and strongly contracted. The *surface* is smooth. The *dermal layer* is a rather thin, firm membrane, provided with close-lying spicules. *Pores* and *oscula:* The pores are certainly found at the summit of certain papillæ, as in one of the papillæ I found a very distinct, sieve-like pore-membrane with close-lying, circular pores, but as my material is somewhat damaged and only shows few papillæ, I can say nothing further, but there are no pores found otherwise on the surface. Some others of the papillæ are oscular papillæ with a simple opening at the summit. That the papillæ are partly oscular, partly pore-papillæ is also confirmed by what is found in the following species *I. viridis*.

The *skeleton*. The *skeleton of the dermal layer* consists of close-lying, tangential spicules, intercrossing each other in all directions; they lie rather closely, but not more closely however than that the membrane may be seen everywhere between them. In the peduncle they lie quite closely and here they are all arranged parallel to the longitudinal direction; the layer is also here considerably thicker, and the spicules lie in several layers; the peduncle, however, is not compact, but the inner cavity continues down through it. In the wall of the papillæ the spicules likewise lie quite close to each other and all parallel to the longitudinal direction with one end towards the opening of the papilla. The *skeleton of the inner body* I have only been able to examine somewhat incompletely, as the specimens in my material for the most part want the inner body; it is however not at all devoid of a skeleton; there are bundles and loose fibres present which seem mainly to have a course along the surface, but whether there is otherwise any definite arrangement I have not been able to see. Spongin is not present in the skeleton.

Spicula: a. *Megasclera:* these are of one form, strongyla; they are slightly, generally somewhat irregularly curved; they are thickest in the middle and taper a little towards the ends; these latter are sometimes, either one or both, slightly swollen; there is often a little difference between the ends, one being slightly thinner than the other, but most frequently such a difference is not observable. The length is 0.42—0.64^{mm}, most frequently about intermediate between these sizes, the thickness is 0.010—0.0128^{mm}. Fine developmental stages were found singly, they are monactinal, and they are especially found in the inner body. *Microsclera* not present.

As I have examined the type-specimen of the *Reniera inflata* Arm. Hans. the identification of this with the present species is certain. — While the *Joyeuxia viridis* Tops. (l. c. 1904) must be the present species, the two specimens which this author described in 1892 for the first time (l. c. Fasc. II, 94.), and on which he founded the genus *Joyeuxia* and the species *viridis*, are on the contrary probably a distinct species and identical with the species described below.

Locality: The Ingolf-Expedition has taken three specimens of this species on the following localities: station 32, 66° 35′ Lat. N., 56° 38′ Long. W., depth 318 fathoms; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms, and station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms. The localities lie in the Davis and the Denmark Straits.

Geogr. distr. The species has earlier been taken South-west of Bukenfjord, Norway, depth 100 fathoms (Schmidt l. c.) and at 38° 31′ Lat. N., 26° 50′ Long. W., depth 140 fathoms. The species is thus distributed in the Atlantic Ocean together with the Denmark and Davis Straits between 66° 35′ and 38° 31′ Lat. N., and with a bathymetrical range from 106 to 485 fathoms. For the specimens from the Norwegian North-Atlantic Exp. no particular locality is known.

2. I. viridis Tops.

Pl. II, Figs. 11—12, Pl. IV, Fig. 7.

1892. *Joyeuxia viridis* Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. II, 94, Pl. II, fig. 8, Pl. X, fig. 19.

Erect, somewhat club-shaped, or of a lower and somewhat semiglobular shape; there are more or less numerous papillæ in the upper part. Surface smooth. Outermost there is a solid dermal layer. Oscula and pores each at the summit of their own papillæ. The dermal skeleton formed of close-lying tangential spicules in several layers; the inner skeleton consisting of bundles and thin fibres running parallel with the surface, without transverse fibres. Spicula: Megasclera strongyla 0·66—1·10^{mm}.

This species differs from the preceding one externally in being considerably larger and in having no peduncle. Of the specimens in my material only three are tolerably entire; of these the two are erect and somewhat club-shaped, being a little narrowed below, the third is lower and relatively broader. Above, the sponge has more or less numerous conical papillæ; below, it has been attached, and it would seem as if it had grown on the bottom itself, the base of attachment being beset with gravel and other small particles. The largest of the entire specimens has a height of 30^{mm}, and a breadth of about 18^{mm}, and at the base a breadth of fully 10^{mm}; another specimen of a similar shape is somewhat smaller; the lower and broader specimen has a height of about 20^{mm} with a breadth of about 15^{mm}. The colour is (in spirit) light brownish yellow or olive; the colour of the inner body is deeper than that of the dermal layer. The consistency is bladdery, the outer layer hard and firm, the inner body brittle and soft. The *surface* is smooth. The *dermal layer* is provided with tangential spicules in several layers, and it is somewhat thicker than in *I. pellicula* and reaches a thickness of about 0·5^{mm}, in places even more. *Oscula* and *pores:* the papillæ mentioned are partly oscular and partly pore-papillæ. The oscular papillæ are conical, of a height of 3^{mm}, but they may contract themselves and are then quite low. When they are open the osculum is a simple opening at the summit. In the wall of the papillæ the spicules are close-lying; they do not lie, however, in the longitudinal direction but in two directions crossing each other almost rectangularly and both obliquely to the longitudinal axis of the papilla; when the papilla is quite extended the two sets of spicules are arranged in rather distinct, but close-lying bands, but when the papilla is contracted and the osculum closed the spicules form a compact mass and when the papilla is then examined from the end the ends of the close-lying spicules are seen. The pore-papillæ are of another construction and easily distinguishable from the oscular papillæ; they are larger, especially broader, and they are not conical but cylindrical; they are generally placed on the sides of the upper part of the sponge, and they are not directed straight outwards but somewhat upwards so that their opening points upwards, they are at the same time somewhat adpressed in towards the sponge and hence elliptical in circumference; they have a breadth of 6—10^{mm}; on account of the manner in which they are attached, their anterior wall is higher than the posterior, which is towards the sponge, e. g. 6 and 3 [illegible] respectively. The elliptical opening is covered by a somewhat immersed pore-membrane, with very close-lying pores, so that the membrane is sieve-like; the pores have an average diameter of 0·17 [illegible]. The walls of the papillæ are provided with spicules which do not lie in the longitudinal direction, as is also the case in the oscular papillæ; they are here distinctly arranged in two sets of bands crossing each other more or less rectangularly, and placed more or less obliquely to the longitudinal axis of the papilla; this oblique direction shows for the rest a definite arrangement; while the bands on the hinder side of the papilla form an angle of 45° to the longitudinal axis, those on the anterior side are more erect and most so on the middle of the anterior side; the bands form by their arrangement a close reticulation with square or subquadrangular meshes. In the pore-membrane no spicules are found. The oscula are present in greatest number e. g. up to seven, of pore-papillæ on the contrary only one or two are found.[1] The surface of the inner body shows under the microscope an appearance almost as in *Histoderma appendiculatum*; through the surface shine the openings of close-standing incurrent canals; the course of the water-current will thus be through the pore-sieves into the extended subdermal spaces, from here through the fine pores in the surface of the inner body into the canal system, and then out through the oscula.

The *skeleton*. The *skeleton of the dermal layer* consists of tangential spicules in several layers; the spicules are rather close-lying, but yet the tissue may everywhere be seen between them; they intercross each other in all directions without any observable order, only a slight tendency towards collecting into bundles is seen, with only few spicules in the bundles. The skeleton of the oscular and pore-papillæ is described above. The *skeleton of the inner body*. As in *I. pellicula* a close examination shows that the inner body also in the present species is provided with a skeleton; in the interior this skeleton consists only of quite single scattered bundles, but on the other hand it forms distinct fibres at the surface, running parallel with this, and it is thus in the main constructed as in the species of *Histoderma*. As far as I could observe no spongin is found in the skeleton.

Spicula: a. *Megasclera* are of one form, strongyla, they are more or less, generally somewhat irregularly curved, more rarely straight; sometimes the curve is somewhat sharp; they are thickest in the middle and taper somewhat towards the ends but most frequently only to a slight degree. The length varies a deal, from 0·66—1·10^{mm}, they are rather slender, the thickness is in the middle 0·011—0·014^{mm}. Fine developmental stages, which are monactinal, are found in the inner body.

Embryos. In a couple of specimens embryos were found; they were lying in the inner body close to the dermal layer; they are globular, of a diameter of about 0·48 [illegible]; the examined embryos showed no spicules.

Whether this species is really identical with Topsent's *viridis* it is difficult to decide, but as the only difference is, that the spicules in Topsent's species are somewhat smaller, 0·70 [illegible], there is good reason to take them as identical. When Topsent declares, that the inner body is quite

[1] Since this was written the work of Kirkpatrick (Nat. Antarct. Exp. Nat. Hist. IV, 1908) has appeared; here the author describes a very interesting species I. Belli [illegible] (p. 41, Pl. XVI, figs. 1—5 a); this beautiful [illegible] has on the surface numerous papillæ, easily seen to be oscular and pore-papillæ; the pore-papillæ are about 15 [illegible] long, trumpet-shaped, with a pore-sieve over the wide opening; the oscular papillæ are simple and smaller, about 4 [illegible] long. In this species the facts with regard to oscula and pores are thus principally the same as described above, but both kinds of papillæ are much more developed.

without spicules, these have surely only been overlooked. Topsent's specimen had lost the upper part, and oscula and pores therefore were unknown to him, and consequently it is incorrect, when he says, that pores pierce the dermal layer singly.

Locality: Station 92, 64° 44' Lat. N., 32° 52' Long. W., depth 976 fathoms; about five more or less damaged specimens.

Geogr. distr. The species has been taken 25° right south of the Ingolf locality between 38° and 39° Lat. N., at the Azores in depths of 241 and 391 fathoms (Topsent l. c.).

Remarks. Topsent says (l. c. 1904, 207) that still another species belongs to *Inflatella* (= *Joyeuxia*), viz. *ascidioides* Fristedt; this species, however, is identical with *Histoderma physa*, as mentioned above under this species. When Topsent says in his generic diagnosis, that chelæ may occur in the genus, this is therefore erroneous.

Inflatella sp. Vosmer (1885. Bijdr. tot. de Dierk. 12^te Afl. 3^die Gedeelt. 21, Pl. I, fig. 8, Pl. V, figs. 17—19) is a *Vosmaeria*.

Cornulum Cart.

The shape somewhat various, the sponges being erect and obconical or more roundish or semi-globular with a broad base. The consistency somewhat bladder-like. With or without fistulæ. Outermost a solid dermal layer with close-lying spicules. The skeleton somewhat solid, consisting of rather thick fibres, dendritical or reticulated. Spongin present. Spicula: Megasclera diactinal, oxea or strongyla, the latter sometimes with the ends finely spinulous; the megasclera are either of one form and equal through the whole sponge, or of two forms, oxea in the skeleton and strongyla in the dermal layer; microsclera: the characteristic microsclera are isochelæ palmatæ either solely, or (textile) together with toxa.

1. **C. textile** Cart.

Pl. II Figs. 13—14, Pl. V, Fig. 1.

1876. *Cornulum textile* Carter, Ann. Mag. Nat. Hist. 4, XVIII, 309, Pl. XII, fig. 9, Pl. XV, figs. 28 a—b.
1887. — — . Fristedt, Vega Exp. vetensk. Jakttag. IV, 446.
1909. — — . Lundbeck, Meddel. om Grønland, XXIX, 443.

Erect, obconical, with a flat upper surface. Outermost a thin but solid dermal layer. Surface smooth. Oscula lying to one side in the upper, flat plane, pores occupying the rest of the plane. The dermal skeleton formed of rather close-lying spicules in one layer. The inner skeleton strongly developed, regularly dendritical, consisting of fibres which go upwards from the base and bend out to the surface, they are connected by transverse fibres. Spicula: Megasclera one form, strongyla with finely spinulous ends, 0·32—0·530 mm; microsclera of two forms, chelæ palmatæ 0·014—0·017 mm, toxa, long and fine, 0·21—0·30 mm.

This curious and interesting species has on the whole a shape as described by Carter l. c. It is erect and has been attached with its lower, quite slightly dilated or swollen base to some object on the bottom; all the specimens in my material are, however, torn off, but the flat attachment is distinct. Carter also says: "attached to hard objects". From the base it rises upwards with a stalk-shaped part, but it gradually increases evenly in thickness and reaches its greatest diameter at the upper end. To judge from a couple of specimens which have the upper end tolerably undamaged, the sponge is here suddenly and slightly obliquely cut, with a plane upper surface, which perhaps has had an oscular tube; it is thus of a slender obconical shape, and is generally quite slightly curved, so that it may very well be compared with a horn, as Carter says; further the sponge has some more or less distinct, ring-like contractions. The size is about the same in all the specimens in my material, the length $30-40^{mm}$, the thickness above $6-10^{mm}$. Carter's specimen had a similar size. The consistency is bladdery but, on account of the firmness of the outer layer, somewhat solid. The colour (in spirit) is yellowish white. The *surface* is smooth. The *dermal membrane* is a thin, but firm and solid membrane, provided with close-lying spicules arranged in one layer. *Oscula* and *pores:* Carter supposed that oscula and pores were placed in the upper end of the sponge, but his specimens were damaged here; my specimens also are more or less damaged in the upper end, yet a couple are so much undamaged, that they give some information with regard to the place and structure of the oscula and pores. The upper surface of the sponge is, as said, somewhat obliquely cut and is thus in the main plane; on this lie an osculum and the pores. The osculum is a nearly circular opening with a slightly projecting edge, it has a diameter of $1{\cdot}5^{mm}$; it is in both the examined specimens placed close to the margin of the upper surface and a wide canal leads from it down towards the base of the sponge. In the other part of the upper surface lie the pores, they are circular or oval and so close-lying that a sieve is formed; the incurrent openings to a number of canals are seen shining through the pore-membrane; the pores are of a size of $0{\cdot}023-0{\cdot}12^{mm}$.

The *skeleton:* The *dermal skeleton.* The outer membrane is provided with spicules lying close to each other in one layer, but they are not closer than that the membrane may be seen everywhere between them; the spicules are parallel with the surface and mainly arranged in the longitudinal direction of the sponge; on the inside of the membrane some spicules are found which are arranged at right angles to the others and thus lying transversely, they lie singly or a few together. The membrane thus furnished is a little projecting above in the circumference of the sponge, and here the spicules also project; the pore-membrane, which covers the upper surface of the sponge, is provided with a skeletal reticulation, forming the meshes in which the pores lie; this reticulation is for a great part unispicular and irregular. In the part of the membrane surrounding the oscular aperture, there are some short fibres, directed towards the aperture. The *main skeleton* is of a regular, dendritical construction; from the base fibres go upwards through the sponge; in the centre they are most powerful, and from here fibres steadily bend outwards which, running obliquely upwards, go to the surface; these fibres have a somewhat regular course and are parallel with each other, and they are connected by transverse fibres, which, however, are placed more irregularly; the fibres are strong and consist of many spicules; they have an average thickness of $0{\cdot}12^{mm}$, those in the middle being still thicker; the transverse fibres are thinner. The distance between the longitudinal fibres is about $0{\cdot}5^{mm}$. Above, the fibres spread themselves out and support the membrane of the upper surface, and the spicules are here a little projecting. As will be seen the skeletal reticulation thus formed is rather regular, and the skeleton is intermediate between a dendritical and a reticulate skeleton. In the skeleton a distinct amount of spongin is found, which in most places may be seen to coat the fibres with a layer; spongin is also present in the dermal membrane, and on examination the membrane gives the impression of being quite or partly a spongin-lamella; the spongin of the skeletal fibres continues directly over into the membrane. It is this consistency of the membrane about which Carter uses the expression "a horny sarcodic membrane". In the membrane there are found fine thickenings or slightly elevated lists running circularly round the sponge, they seem to be thickenings of the spongin, and are possibly phenomena of growth.

Spicula: a. *Megasclera* are somewhat curved strongyla, they are thickest in the middle and taper towards the ends, more towards one end than towards the other, and they are thus unequal-ended. The ends are quite slightly spinulous outermost on the rounded part, sometimes they may be smooth. The length is 0·32—0·536 mm and the thickness is 0·017—0·022 mm. Some finer to quite fine developmental stages were seen, the finest are monactinal and thus show that these unequally-ended strongyles originate from styles. b. *Microsclera:* these are of two forms, isochelæ palmatæ and toxæ. 1. The chelæ palmatæ are very small and of the typical shape, the tooth is of the same length as the alæ and of the same breadth as these together; the alæ seem to be only very slightly refolded laterally so far as I could see under a high magnifying power (× 1400). The length is 0·014—0·017 mm and the breadth about 0·0028 mm. 2. The toxa are long and fine, the curvature is most frequently very slight; sometimes they are only curved in the middle, but most frequently also the end parts are slightly recurved; sometimes they may be somewhat irregular, so that their shape as toxa is not distinct; they are of the same thickness in the whole length, only the ends are finely pointed. The length is 0·21—0·30 mm and the thickness about 0·0016 mm. Carter mentions and figures as "subskeleton spicules" some fine spicules, which he terms "acuate", but his figure shows two, of which one is a style, the other pointed at both ends; it is presumably a confusion of developmental stages of the strongyles and toxa which forms his "subskeleton spicules". I have not seen toxa quite so strongly curved as shown by Carter's figure, but no doubt they may vary a good deal in curvature. The microsclera occur everywhere in the soft tissue of the sponge, the chelæ are present in very great numbers.

Embryos. In one of the specimens an embryo was found; it was situated about in the middle of the sponge and had a size of about 0·6 mm. It contained numerous megascleres, but there seemed to be no microscleres present. The megascleres are similar to those in the grown sponge, only considerably smaller, of a length of about 0·20 mm.

Locality: Station 4, 64° 07′ Lat. N., 11° 12′ Long. W., depth 237 fathoms; station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms, (bottom temperature ÷ 0° 4 C.); further it has been taken at 62° 40′ Lat. N., 1° 56′ Long. W., depth 365 fathoms (bottom temperature ÷ 0° 3 C.), 62° 29′ Lat. N., 4° 12′ Long. W., depth 283 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902); finally it has been taken at East-Greenland, 74° 17′ Lat. N., 15° 20′ Long. W., depth 127 fathoms (The East-Greenland Exp. 1891—92). Five specimens or fragments in all.

Geogr. distr. The species was earlier taken on the "Porcupine" Expedition, 61° 10′ Lat. N., 2° 21′ Long. W., depth 345 fathoms (bottom temperature ÷ 1° 1 C) (Carter l. c.), and in the Baffin Bay, 72° 32′ Lat. N., 56° 05′ Long. W., depth 116 fathoms. The species is accordingly distributed between 1° 56′ and 56° 05′ Long. W., and between 61° 10′ and 74° 17′ Lat. N., in the Baffin Bay, at East-Greenland and around the Faröe Islands. The depths are from 116—388 fathoms. The species presumably belongs mainly to the cold area, as the localities, as soon as they are deeper than 300 fathoms, show a negative temperature, but it may also go higher up and here occur in water with a positive temperature.

Remarks about the species of the genera Histoderma, Histodermella, Inflatella and Cornulum:

Of species which belong here, or have been supposed to belong here, there are at present described the following:

1874. *Histoderma appendiculatum* Cart. (cited above)	Tylota to strongyla — chelæ arcuatæ — sigmata.
1875. *Desmacidon physa* O. Schmidt (cited above)	Strongyla — chelæ arcuatæ — trichodragmata.
1875. *Inflatella pellicula* O. Schmidt (cited above)	Strongyla.
1876. *Halichondria phlyctenodes* Cart. (Ann. Mag. Nat. Hist. 4, XVIII, 314, Pl. XIII, fig. 17, Pl. XV, fig. 35)	Tornota — chelæ arcuatæ — sigmata.
1876. *Cornulum textile* Cart. (cited above)	Strongyla with spinulous ends — chelæ palmatæ — toxa.
1883. *Phloeodictyon singaporense* Cart. (Ann. Mag. Nat. Hist. 5, XII, 326, Pl. XIII, fig. 17 a—b)	Oxea — short strongyla — chelæ palmatæ.
1885. *Sideroderma navicelligerum* Ridley and Dendy, (Challeng. Rep. XX, Monaxonida, 115, Pl. VIII, fig. 9, Pl. IX, figs. 5, 8—9)	Tylota — small peculiar chelæ — sigmata of two sizes — trichodragmata.
1886. *Histioderma verrucosum* Cart. (Ann. Mag. Nat. Hist. 5, XVIII, 452)	Tylostrongyla — chelæ arcuatæ — sigmata.
1886. *Histioderma polymastoides* Cart. (Ann. Mag. Nat. Hist. 5, XVIII, 453)	Tylota to tylotornota — chelæ arcuatæ?
1886. *Pseudohalichondria clavilobata* Cart. (Ann. Mag. Nat. Hist. 5, XVIII, 454)	Tylotornota — chelæ arcuatæ, curious, spined.
1887. *Cornulum ascidioides* Frstdt. (cited above)	= *Histoderma physa*.
1887. *Cornulum enteromorphoides* Frstdt. (Vega Exp. vetensk. Jakttag. 447, Pl. 25, figs. 3—6, Pl. 29, fig. 22)	se below.
1888. *Sideroderma Zitteli* Lendenf. (The Austral. Mus. Descrip. Catal. of Sponges, 211)	Styli — oxea — chelæ — raphides.
1892. *Joyeuxia viridis* Tops. (cited above)	Strongyla.
1903. *Histoderma natalense* Kirkpatrick, (Marine Invertebr. in South Africa, III, 250, Pl. V, fig. 17, Pl. VI, figs. 18 a—e)	Tylota — acanthoxea — chelæ arcuatæ — sigmata — trichodragmata — curious spined bodies (transformed chelæ? or forcipes?).
1904. *Joyeuxia tubulosa* Tops. (Résultats des camp. sc. du Prince de Monaco, Fasc. XXV, 206, Pl. V, fig. 5, Pl. XIV, fig. 16)	Strongyla.

1905. *Histoderma vesiculatum* Dendy (Rep. of the Pearl Oyster Fisheries of the Gulf of Manaar, Part III, 166, Pl. XI, figs. 8—9)	Oxea — strongyla — chelæ palmatæ.
1908. *Joyeuxia Belli* Kirkpatrick, (Nat. Antarct. Exp. Nat. Hist. IV, 41, Pl. XVI, figs. 1—5 a)	Strongyla.
Histodermella Ingolfi mihi	Tylota — acanthoxea — chelæ arcuatæ — sigmata.
Histodermella coriacea mihi	Strongyla with spinulous ends — acanthostrongyla.

Of these species *Cornulum ascidioides* Frstdt. is shown above to be identical with *Histoderma physa* O. Schmidt. I have also examined a piece of the type-specimen of *Cornulum enteromorphoides* Frstdt., and this species proved to be identical with — *Myxilla fimbriata* Bow., which for the rest may already very well be seen from the description. The specimen, which Fristedt had to examine, was of an elongated shape, and this in connection with the rather strong dermal membrane of this species has led him to refer this typical *Myxilla* species to *Cornulum*. Hereafter these two species of *Cornulum* must be dropped. — *Sideroderma Zitteli* Lendenfeld scarcely belongs to the group of sponges here in question.

The remaining species will have to be distributed in the four genera treated above, *Histoderma*, *Histodermella*, *Inflatella* and *Cornulum*. After Carter had established the genus *Cornulum* with the typical and sole species *textile*, this genus has hitherto only contained the same species, the two erroneous species of Fristedt excepted. With a generic diagnosis as given above, in which the distinguishing characters are first the palmate chelæ, and next the dendritical or reticulate skeleton, formed of strong fibres, two of the above enumerated species, viz. *singaporense*[1]) and *vesiculatum* must belong to this genus, and the genus seems very natural. *Histodermella*, which I have founded mainly on characters in the spiculation and for which the typical species is *Ingolfi*, also includes, besides the two species described here, the *Histoderma natalense* established by Kirkpatrick in 1903.

The above enumerated species will, according to the facts mentioned, have to be distributed in the following way:

Histoderma:	*Histodermella:*	*Inflatella:*	*Cornulum:*
appendiculatum Cart.	*natalensis* Kirkpatr.	*pellicula* O. Schmidt	*textile* Cart.
physa O. Schmidt	*Ingolfi* mihi	*viridis* Tops.	*singaporense* Cart.
phlyctenodes Cart. (*vide* remark on page 27)	*coriacea* mihi	*tubulosa* Tops.	*vesiculatum* Dendy.
navicelligerum Dendy		*Belli* Kirkpatr.	
verrucosum Cart.			
polymastoides Cart.			
clavilobatum Cart. (belongs perhaps not here but may be an *Espериopsis*)			

Topsent has (l. c. 1904, 198) established a new genus *Phlyctaenopora* with one species, *bistorquis*.

[1]) Dendy (1905, l. c.) has shown, by examination of Carter's type specimen, that the species has chelæ.

which, according to the author, should be placed near to *Histoderma*; I cannot express myself more particularly about this species, but its relationship with the forms here in question seems to me somewhat doubtful.

The four genera mentioned are distinguished among the *Myxilleae* by the megascleres being the same in the dermal skeleton and in the skeleton of the inner body; this at all events holds quite good with regard to *Histoderma*, *Histodermella* and *Inflatella*; among the species of *Cornulum* it holds also good for *textile*; in *singaporense* and *vesiculatum* there are, to be sure, two forms of megascleres, but they are both diactinal, and they seem not to be sharply divided with regard to their occurrence in the sponge-body. The four genera are certainly nearly related to each other, and as their starting point I think we may take *Histoderma* as most probable, which shows the least deviating structures; as the genus nearest related to this I take *Inflatella*, which, especially in the skeletal structure, presents the greatest accordance, and on the whole mainly differs only in the want of microscleres, a difference which, when the other structures agree, is of very slight consequence, indeed even the right of *Inflatella* as a separate genus is perhaps doubtful, but at present I think, there is some reason to keep it. Also *Histodermella* must be nearly related to *Histoderma*, one species, *Ingolfi*, shows both in its exterior and in the skeletal structure great agreement; the curious, spined spicules which are present in this genus, are somewhat surprising, but I think they must probably be taken to have their origin from original special skeleton spicules. *Cornulum* stands a little more apart, distinguished by its palmate chelæ. — I thus take these four genera to be nearly related and to represent a type of *Myxilleae* in which the original skeleton spicules have disappeared. As said, *Histoderma* might be thought to form the starting point; the genus outside the group, nearest related to *Histoderma*, is perhaps *Hymedesmia* (= *Leptosia* Tops.); in several species of this genus we find a strong dermal skeleton formed of diactinal spicules, and at the same time the inner skeleton, consisting of the basal acanthostyles, may be very little developed; the acanthostyles may be present in so small numbers, that great care is necessary to avoid mistakes, just in *Hymedesmia*-species of this latter structure we find at the same time a strongly developed dermal skeleton which also has well developed fibres going from the dermal membrane inwards, and here consisting of the same diactinal spicules which form the dermal skeleton itself. Finally such species may have long, tubular papillæ (e. g. *Hymedesmia filifera* O. Schmidt, and several other species). — It is perhaps a question whether *Histoderma phlyctaenodes* Cart. will not prove to be a *Hymedesmia*. When now such species get quite roundish and grow without attachment, as e. g. *H. appendiculatum*, the elimination of the acanthostyles is easily understood, and the transition to the freely growing species is formed by such attached species as for instance *Histoderma physa*. The genus *Melonanchora* seems to me to form a beautiful and interesting instance of the opinions here advanced; one species of this genus has the spiculation and skeletal structure typical for the *Myxilleae*, with skeletal styles and diactinal dermal spicules; these latter, however, form a very dense dermal skeleton, and the species has oscular and pore-papillæ, the other species of the genus has a similar construction, but the skeleton spicules have disappeared and the whole skeleton is formed of dermal spicules.

Finally I may direct attention to the fact, that I have in the present work placed the genus *Hymedesmia* in the subfamily *Ectyoninae*, which perhaps might seem to go against the views given above about the relationship of this genus to the group treated here; yet this is not so, since firstly, the subfamilies *Mycalinae* and *Ectyoninae*, as I have already mentioned earlier, are scarcely quite natural, and even if so it was not impossible, that genera, which on account of their characters must now be placed in the *Mycalinae*, should be thought to have originally been derived from Ectyonine forms.

In the first part of this work I broke up Carter's *Phlocodictyinae* and placed its two genera *Phlocodictyon* and *Oceanapia* in the *Renierinae* and *Gelliinae* respectively. In a work published in 1905 (Rep. of the Pearl Oyster Fisheries of the Gulf of Manaar, Part III, 165) Dendy keeps the subfamily *Phlocodictyinae* under the family *Desmacidonidae*, and he refers to it the genera *Phlocodictyon*, *Oceanapia*, *Histoderma*, *Sideroderma* and *Amphiastrella*. His reasons for keeping these forms together are mainly the same as those of Carter on founding the group, viz. the hard dermal layer and the presence of fistulæ, but on account of the chelæ in *Histoderma* Dendy now removes the group to the *Desmacidonidae*. In Part I of this work pag. 56—57 I gave the reasons which seemed to me to necessitate the breaking up of the *Phlocodictyinae*, and the same reasons are still valid. While Dendy thus lays stress on the outer shape and the presence of a solid dermal layer as the distinguishing characters, but pays no attention to the spicules, I on the contrary follow the opposite way and take first, as the most important character, the spicules and what may be deduced from them with regard to the relationship of the forms. Dendy would also have difficulties in delimiting his subfamily; *Phlocodictyon* and *Petrosia* are, as I have already declared (Part I, l. c.), nearly related; Thiele says (Zoologica XXIV, 2, 1899, 19) that *Phlocodictyon (Rhizochalina) medium* is an intermediate form; *Melonanchora*, which has a solid dermal layer and papillæ should, I think, also be referred to the *Phlocodictyinae* and the same holds good with regard to several *Hymedesmia*-species; also some species of *Gellius* should be placed here according to the views of Dendy. On the other hand, I think that the spicules give good hints towards a natural grouping; the oxea present in *Phlocodictyon* are spicules typical for the *Homorrhapidae*; *Oceanapia* and the species of *Gellius*, which are provided with a solid dermal layer, have oxea of quite the same kind, and these together with their microscleres refer them to the *Heterorrhaphidae*. The facts are quite otherwise with regard to the spicules in the four genera in question; their spicules are diactinal (when fully developed), but of quite another type from those occurring in the *Homorrhaphidae* and *Heterorrhaphidae*. That this is the case is shown, and beyond doubt, by the development, since while the spicules in *Homorrhaphidae* and *Heterorrhaphidae* are really diactinal, and also originate in this form, the spicules in the four genera mentioned are on the contrary only secondary diactinal, but originate as monactinal; they have thus a development quite as the dermal spicules in other *Myxilleae*, as I have described in Part II of this work, pag. 125. I therefore take it to be quite certain, that these genera belong to the *Myxilleae*, and that their spicules answer to the dermal spicules in the more typical *Myxilleae*, but here form the whole skeleton, of which the interior skeleton however is generally weak. The facts present in *Melonanchora emphysema* seem to me in the highest degree to confirm this view. The occurrence of chelae also shows that these genera have nothing to do with *Phlocodictyon* or *Oceanapia*; that the chelæ may sometimes disappear does not invalidate the value of this character. Dendy has also in his subfamily *Phloeodictyinae* the genus *Amphiastrella* with the species *birotulifera* Cart.; this species has birotulæ for microscleres and otherwise a structure almost the same as a *Histoderma* — it shows especially a striking resemblance, both in outer shape and in structure, to *Histodermella coriacea* —; this species certainly belongs to *Iotrochota*, but is a species in which only the dermal spicules are present, and if we form a special genus for it, this genus must be placed near to *Iotrochota*.

After the manner in which I understand the classification of the above-mentioned forms, we will thus in the various families find the phenomenon, that certain forms have a specially developed dermal skeleton, as a rule together with a reduction of the inner skeleton and occurrence of longer or shorter papillæ, by which these forms, in spite of their belonging to different families, get a certain mutual resemblance. It is then an obvious conclusion, that a common factor must be of influence, but it seems not possible in our present state of knowledge to point out such a factor. It is easy enough to understand that all these sponges get provided with papillæ, since the hard dermal layer, furnished with close-lying spicules is not adapted to be pierced by pores and oscula and there must therefore be special contrivances for these, viz. the fistulæ or appendages, and somewhat similar reasons hold good with regard to the reduction of the inner skeleton. But the cause of the development of the hard dermal layer is therefore not explained, and the only thing, that can be said, is that it seems to be in some connection with the fact, that these forms show a tendency to get free, without attachment, or at all events without attachment by a fast-grown basis. The forms which are attached, either with a broad base as *Histoderma physa*, or by a peduncle as two of the *Inflatella*-species, have no specially strong dermal layer; in the quite free forms as most *Phloeodictyon*-species, *Oceanapia*, *Histodermella*, especially *coriacea*, and *Amphiastrella*, the dermal layer on the contrary gets very strong and solid.

Grayella Cart.

(*Yvesia* Topsent, 1892)

The external shape varying from thinner or thicker incrustations through massive or cushion-shaped forms to more or less erect and finally quite erect, club-shaped, stalked and sometimes branched forms. The skeleton consisting of, often rather thick but loose, fibres, formed of smooth spicules; in the incrusting and massive forms the fibres radiate from the base upwards and outwards, in the erect there is formed a central axis from which fibres radiate to the surface. The dermal skeleton consisting of tangential, generally very close-lying, spined spicules, making the dermal membrane very firm. Spongin present or wanting. Spicula: megasclera: the skeletal spicules are smooth, they are most frequently diactinal, tornota, strongyla or tylota, but they may be monactinal, styli; the dermal spicules are spined, monactinal or diactinal. Microsclera are chelæ arcuatæ, to which may be added sigmata; sometimes sigmata are found solely, and microsclera may be quite absent.

1. G. pyrula Cart.

Pl. II, Figs. 15—19, Pl. V, Fig. 2.

1876. *Cometella pyrula* Carter, Ann. Mag. Nat. Hist. 4, XVIII, 388, Pl. XIV, fig. 20, Pl. XV, fig. 38.
1885. *Sclerilla arctica* Armauer Hansen, The Norwegian North Atl. Exp. XIII, Spongiadæ, 12, Pl. II, fig. 4, Pl. IV, fig. 15.
1885. *Sclerilla dura* Armauer Hansen, ibid. 13, Pl. II, fig. 5.
1892. *Yvesia pedunculata* Topsent, Résultats des camp. sc. du Prince de Monaco, Fasc. II, 105, Pl. V, fig. 6, Pl. X, fig. 17.
1903. *Yvesia lobata* Arnesen, Bergens Mus. Aarb. 18, Taf. II, Fig. 7, Taf. V, Fig. 1, Taf. VI, Fig. 2.
1904. *Yvesia pertusa* Topsent (non *pertusa* Tops. 1892), l. c. Fasc. XXV, 196, Pl. XV, fig. 20.
1909. *Grayella pyrula*, Lundbeck, Meddel. om Grønland, XXIX, 443.

Erect, club-shaped, generally with a shorter or longer peduncle, above sometimes divided into a couple of branches, or somewhat lobate; sometimes it may be compressed. Surface smooth, densely beset with small, round or oval, more or less distinct pore-areas: the dermal membrane is stretched over the pore-areas as a thin membrane, between these it is not sharply marked, resting on the ends of the fibres of the main skeleton. The pores are found in the pore-areas; oscula spout-shaped, present in varying numbers on the upper part, or scattered. The dermal skeleton formed of close-lying, tangential acanthostyli; the pore-areas have only chelæ. The main skeleton consisting of a central axis from which fibres radiate to the surface more or less regularly; there are no transverse fibres, but between the fibres lie scattered acanthostyli. Spicula: megasclera: the skeletal spicules smooth tornota 0·357—0·58 mm, the dermal spicules acanthostyli 0·119—0·196 mm; microsclera chelæ arcuatæ 0·021—0·0257 mm.

Of this interesting species we have a somewhat considerable material of specimens of various sizes. The species is always erect and more or less distinctly club-shaped, and the deviations which may occur are easily traced back to the club-like shape. The small specimens are all regularly club-shaped with a shorter or longer peduncle; it is when the sponge grows larger that the shape may vary somewhat, thus the upper part of the body may be thicker or thinner in relation to the peduncle, the sponge may be high and slender or relatively short and thick, in the latter case it may be without any pronounced peduncle, only narrowed below; further it may be divided into a couple of branches in its upper part, or be more irregularly lobate, or finally it may instead of being round be rather strongly compressed. All previously described specimens are small, and they all have also a club-shaped exterior, only the specimen described by Armauer Hansen l. c. is larger and shows the branched and compressed shape. One of the smallest of my specimens has a height of 11 mm, the peduncle is 1·5 mm thick and the upper part about 5 mm thick; then we have specimens of all sizes upwards, the largest has a height of 50 mm of which the peduncle makes the half part; this latter, which is rather thin, has a diameter of about 2 mm, and the upper part is about 10 mm in thickness. The peduncle is slightly dilated below and shows here a surface of attachment, but most specimens are torn from the substratum, a single one sits on a fragment of a mussel-shell. The consistency is rather hard and somewhat elastic, but it may be different according to the degree of contraction; when the sponge is strongly contracted, as is often the case, the consistency gets very hard. The colour (in spirit) is whitish yellow, sometimes somewhat greyish. The *surface* has, as commonly in the genus *Gravella*, a very characteristic aspect, being densely beset with pore-areas. These areas are circular or generally oval and have a slightly elevated edge which surrounds the somewhat immersed pore-membrane. Such is the structure in the specimens which are least contracted, but as a rule the sponge is more highly contracted, and then the pore-areas become indistinct or are only seen as small tubercles, and when the sponge is very strongly contracted they nearly quite disappear, and at the same time the surface becomes rugose or wrinkled. For the rest the surface is all but smooth, the spicules not being projecting or only to a very slight degree. The *dermal membrane* is in the pore-areas a thin membrane, between the areas it is not sharply bounded inwards, and it is here richly provided with spicules. *Pores* and *oscula:* The pores lie in the mentioned pore-areas in a number of about ten or more in each area, they are circular or oval and were measured from quite small up to 0.09^{mm} in largest diameter; the pore-areas have a greatest size of 0.5^{mm}. The oscula are spout-shaped, as the opening is surrounded by a conical collar, supported by spicules. The number of oscula is various, in the small specimens there is most frequently only one osculum, which is then placed at the upper end, but in the larger specimens there are several oscula, in a single specimen even eight. The *canal system* seems to be very lacunous; there are especially extended cavities somewhat below the surface, and they are extended somewhat parallel to the surface; they evidently belong to the excurrent system, as they are in direct connection with the oscula. If a piece of the skin is cut off, the openings of the incurrent canals, which are vertical to the surface, may be seen below the pore-areas by aid of the microscope. These structural features are tolerably observable, when the sponge is not too strongly contracted, but often the specimens are contracted to so high a degree, that these structures are quite indistinct, at the same time that the pore-areas on the surface are closed and disappearing. The sponge is evidently able to contract itself very strongly, and even the least contracted specimens in my material are certainly contracted to no slight degree; the structures seem to show that they are able to be considerably more distended, and the inner cavities, the pore-areas and the canals are in this state certainly considerably larger.

The *skeleton:* The *dermal skeleton* consists of close-lying, tangential acanthostyles, which lie in more than one layer; they are only found in the membrane between the pore-areas, while the membrane of the pore-areas themselves is quite devoid of them; they do not form any real reticulation but by their arrangement around the pore-areas a kind of network is however formed. In the pore-membrane, as said, no acanthostyles are found, but here chelæ occur in great numbers. The *main skeleton* is of a dendritical structure; upwards through the peduncle and up towards the upper end of the sponge goes a spicula-axis, and from this fibres issue which go out to the surface and at the same time branch somewhat; outermost they are spreading and support the dermal membrane, but do not project beyond the surface; as the outermost spicules in the fibres do not go to the pore-areas, but only to the membrane between them, they become partly arranged circularly around the pore-areas, as may be seen, when a piece of the skin is cut off and examined from above. A transverse section of the sponge shows the fibres radiating regularly from the axis to the surface. Between the fibres no connecting fibres are found, but some scattered spicules occur between them; these spicules are all acanthostyles, while the fibres are formed exclusively of tornotes. Downwards on the peduncle the layer of tissue outside on the axis is thin, but the skeleton is of the same construction, with radiating fibres. The skeleton in the wall of the oscular cones is formed of a dense layer of tornotes all parallel to the longitudinal direction of the cone; they are partly divided into bands or fibres; this skeleton is formed in such a way that the fibres going to the surface continue out in the oscular cones at the places, where oscula are found. On the outer side of the oscular cone there is found a layer of acanthostyles, and further there are many chelæ in the wall. This structure of the oscular cone shows, that it is not formed of the dermal membrane solely. As a rule the spicular axis is very thick and strong, it is thus in one of the larger specimens 2 ^{mm} thick below in the peduncle, and above, at the upper end, 0·6 ^{mm} thick. The skeleton is constructed in the described way in the specimens where it is regular, but a good deal of irregularity may occur, I think partly caused by the presence of the inner cavities. Between the ordinary fibres some very thick ones may occur, which present themselves as branchings of the axis; the fibres going towards the surface may be curved in different ways, as they bend round about the cavities, and they may bend round to such a degree, that they do not go upwards but downwards. Some of these irregularities are certainly due to the contraction, and I think the skeleton would show more regularity, if it was examined in a sponge in a quite distended condition. — Spongin is found in the spicular axis, especially below, towards the base, but the amount is only slight, and I could not observe any spongin outside the axis.

Spicula: a. *Megasclera;* 1. The skeletal spicules are tornota, they are straight or slightly, and then as a rule somewhat irregularly, curved, they are slightly fusiform and have somewhat short, sharply pointed ends; the length may vary a little in various individuals, it is 0·357—0·58 ^{mm}, and the thickness may in all vary between 0·005 and 0·011 ^{mm}, by far most frequently it lies between 0·007 and 0·008 ^{mm}. The tornotes sometimes show a quite slight tendency to become polytylote. The fully developed tornotes have quite equal ends, but quite fine developmental stages were observed, and these were styles; when they have grown a little older, they have still unequal ends, but they get equal-ended already at an early stage. 2. The dermal spicules must be termed acanthostyli, as one end is pointed, but the apex is short; sometimes, but rarely, the apex is indistinct or quite wanting, so that the spicules are near to, or are really strongyles. They are more or less curved, and it is worthy of note, that the curvature nearly always lies nearest to the rounded end: the spicules are distinctly fusiform. The spinulation is dense and coarse, the spines have a length of about half the diameter of the spicule. The spinulation may vary somewhat with regard to density and the size of the spines and this is in relation to the variation of the spicule in size, in such a way, that the larger the spicule is the more densely it is generally spined, and the larger are the spines. To be sure these variations may generally be found in the same individual, but there may, however, be the difference between the individuals that in some the smaller, in others the larger spicules are by far the most numerous, in a single specimen the acanthostyles are on an average more diffusely spined than in the others. The length of the acanthostyles is 0·119—0·196 ^{mm} and the thickness in the middle, the spines not included, 0·005—0·014 ^{mm}. A number of developmental forms in different stages were present, the finest of them being already distinctly and somewhat strongly spinulous; the developmental stages are all distinctly monactinal. As said above the tornotes form the fibres, while the acanthostyles form the dermal skeleton, but are also found in the interior of the body, especially between the fibres.

b. *Microsclera:* these are of one form, chelæ arcuatæ, they have a curved shaft, the free middle part of which is more than one third of the length of the chela, the tooth is elliptical, of the same length as the pointed lobe-shaped alæ. The length is 0·021—0·0257 mm, the diameter of the shaft is 0·0028 mm. The chelæ occur richly especially in the pore-areas and the oscular wall, but they are also otherwise found round about in the tissue.

Embryos: In several specimens embryos were found round about in the tissue, and they are thus not only found innermost, close to the axis, as declared by Carter l. c. They are globular or oval, of an average diameter of about 0·29 mm. Most of the examined specimens contained no spicules, but some single were developed so far, that they contained spicules; these were dermal spicules, and they quite resembled the developmental stages of the dermal spicules in the grown sponge. It is worthy of notice, that the first occurring spicules here are the spined dermal spicules, while elsewhere in the *Myxilleae* it is the skeletal spicules which occur first.

Remarks: As I have examined preparations of Carter's type-specimen, the identification is certain. For the rest the description given by Carter is by far the best of all the descriptions published, as he describes the skeleton and the inner cavities in somewhat detail. The species is also rather well recognizable after his description, when the curious, diagrammatic way in which Carter made figures of the exterior, is borne in mind. The points on the surface which Carter mentions and figures, are, of course, the closed pore-areas; he mentions that they form low conical projections, which are formed of acanthostyles "arranged in a whorl-like manner" and he figures this structure. Anything similar I have not found in my specimens, but I think, that by a certain degree of contraction the spicules around the pore-areas may very well present themselves in a way answering to Carter's expression. Armauer Hansen's type-specimens of *Sclerilla arctica* and *dura* I have also examined, and they proved to be the present species; his figure of the acanthostyles as oxea is erroneous. Armauer Hansen concludes with a remark which shows, that he has well seen the conformity of his two species, and the remark at the same time is very curious as he says: "Probably it would be more correct to assign them to one species". I have also examined the type-specimen of Arnesen's *Y. lobata.* — I also refer Topsent's *Y. pedunculata* and the same authors *Y. pertusa* from 1904 (but not *Y. pertusa* 1892) to the present species; the first named species has relatively small and somewhat diffusely spined acanthostyles, but this is a character, which according to my observations may be found in *G. pyrula,* and otherwise the two species exactly conform. *Y. pertusa* Tops. 1904 seems to me to be quite the same as the present species, and I really do not understand, why Topsent refers it to his *Y. pertusa* established in 1892, which latter has typical acanthoxea as dermal spicules.

Locality: Station 4, 64° 07' Lat. N., 11° 12' Long. W., depth 237 fathoms; station 8, 63° 56' Lat. N., 24° 40' Long. W., depth 136 fathoms; station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms; station 57, 63° 37' Lat. N., 13° 02' Long. W., depth 350 fathoms; station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; station 94, 64° 56' Lat. N., 36° 19' Long. W., depth 204 fathoms; station 95, 65° 14' Lat. N., 30° 39' Long. W., depth 752 fathoms; further it has been taken on 63° 15' Lat. N., 9° 35' Long. W., depth 270 fathoms and 61° 23' Lat. N., 5° 04' Long. W., depth 255 fathoms (Wandel), and East of the Faröe Islands, depth about 150 fathoms (Th. Mortensen). In all twelve specimens. The localities are situated in the Denmark Strait, between Iceland and the Faröe Islands and South of the Faröe Islands.

Geogr. distr. The species is earlier known from the following localities: 65 miles North North-West of the Orkneys, depth 290 fathoms ("Porcupine"); 61° 00' Lat. N., 4° 49' Long. E., depth 200 fathoms, Vestfjord, depth 341 fathoms, 74° 08' Lat. N., 31° 12' Long. E., depth 147 fathoms, (The Norwegian North Atlantic Exp.); in the Bergensfjord and at Trondhjem, depths 70 to 266 fathoms (Arnesen). If the interpretation of Topsent's two species is correct it has further been taken on 43° 47' Lat. N., 9° 27' Long. W., depth 160 fathoms, 38° 27' Lat. N., 28° 03' Long. W., depth 277 fathoms and 37° 57' Lat. N., 29° 15' Long. W., depth 106 fathoms. According to these localities the species is distributed between 74° and 38° Lat. N., and between 36° Long. W. and 31° Long. E. with a bathymetrical range from 70 to 752 fathoms.

2. G. gelida n. sp.

Pl. II, Fig. 20, Pl. V, Fig. 3.

Erect, club-shaped and pedunculated. Surface smooth, densely beset with more or less distinct pore-areas. The dermal membrane over the areas a thin membrane, supported by the ends of the fibres of the main skeleton. Pores situated in the pore-areas, osculum spout-shaped, at the summit of the sponge. The dermal skeleton formed of close-lying, tangential acanthostrongyla, in the pore-membrane there are only chelæ. The main skeleton consisting of a powerful median axis from which fibres radiate to the surface; there are no transverse fibres, but between the fibres lie acanthostrongyla. Spicula: megasclera; the skeletal spicules smooth tornota, more or less polytylote, 0·40—0·53 mm, the dermal spicules acanthostrongyla 0·11—0·10 mm; microsclera chelæ arcuatæ 0·024—0·028 mm.

This species, of which we have only one specimen, has an outer shape almost like the preceding; it is erect and slender club-shaped, the lower part forms a peduncle which is broken below. The thickened part of the body is bent rectangularly above, but this is certainly only due to contraction. The length of the sponge, when straightened out, is 50 mm of which the peduncle has 18 mm; the thickness is above 7 mm. The consistency is hard, and the sponge is evidently highly contracted. The colour (in spirit) is whitish yellow. The *surface* is in most places beset with warts or knobs, as the pore-areas, on account of the strong contraction, are closed and form in this state only small protuberances; only in a few places they are open and show here the ordinary, characteristic appearance. There are no projecting spicules. The *dermal membrane* is a thin membrane over the pore-areas, and between the areas it is richly provided with spicules. *Pores* and *oscula:* With regard to pores and oscula quite the same holds good, as was said about the preceding species. The pores lie in a similar way in the sieve-like pore-membranes on the pore-areas; they had a diameter of up to 0·06 mm. Of oscula only one is found on the specimen, it forms a somewhat high collar just at the top of the sponge.

The *skeleton.* This is also constructed quite as in the preceding species. The *dermal skeleton* consists of close-lying, tangential acanthostrongyla, they seem mainly lying only in one layer; they are not present in the pore-membrane, but here chelæ are found. The *main skeleton* consists of a powerful axis and of fibres radiating out from it, which are divided outwards towards the surface and support the dermis; the outermost spicules in the fibres meet the dermis especially along the edges of the pore-areas; connecting fibres are not found, but acanthostrongyla are lying between the fibres;

the fibres are formed of the smooth tornota. The skeleton in the oscular cone is formed of parallel tornota, outwards it has acanthostrongyla. In the axis a distinctly observable amount of spongin is found.

Spicula: a. *Megasclera:* 1. The skeletal spicules are tornota, they are straight and slightly fusiform and slightly, but rather distinctly polytylote or show at all events an uneven contour; the ends are rather short and somewhat stubby. The length is 0·40—0·53 ^{mm}, and the thickness is 0·007—0·011 ^{mm}. 2. The dermal spicules are acanthostrongyla, they are slightly curved or sometimes straight and of the same or nearly the same thickness in the whole length; the spinulation is dense and coarse, and the spines are generally longer than half the diameter of the spicule; the spines are placed a little more densely at each end. The length is 0·11—0·19 ^{mm}, and the thickness 0·005—0·012 ^{mm}. Whether these spicules are really and primarily diactinal, I have not been able to decide, as no young developmental stages occurred; the shape of the spicule does not point towards a monactinal origin, as also the few older developmental stages, I have seen, are quite diactinal; also the curvature, which is not localized at one end, but nearly always goes evenly from the middle towards both ends, points towards a real diactinal spicule, as also does the fact, that the spines on both halves are somewhat recurved towards the middle, while those standing in the middle are directed straight out. On the other hand the dermal spicules occurring in the embryos are monactinal (see below under Embryos.) b. *Microsclera:* these are of one form, chelæ arcuatæ; they have an evenly curved shaft, lobe-shaped, somewhat pointed alæ and a pointed elliptical tooth of the same length as the alæ. The length of the chelæ is 0·024—0·028 ^{mm}, and the thickness of the shaft is 0·0021—0·0028 ^{mm}. The chelæ occur numerously in the pore-membranes and the oscular wall, but also otherwise round about in the tissue.

Embryos: Also in this species embryos were found round about in the tissue in great numbers; they are globular, of a diameter of about 0·29 ^{mm}. They were found both with and without spicules. The spicules are either only chelæ or chelæ and dermal spicules; the chelæ seem thus here to be the first occurring spicules, and next the dermal spicules; in single cases only developmental stages of chelæ were found and some few, thin developmental stages of dermal spicules. The dermal spicules were not, as is elsewhere generally the case, fine developmental stages, but on the contrary with regard to shape fully developed spicules; they were, however, smaller than in the grown sponge, viz. 0·085 ^{mm}; both these spicules and the developmental stages were monactinal with one end pointed.

This species is, as seen from the description, very nearly related to *G. pyrula:* the outer shape and the skeletal structures are the same, only in the spicules is a difference present, but this difference is constant; the differential character lies in the dermal spicules, these being in *gelida* always diactinal and of the same thickness in the whole length, and they are on the whole characteristically different from the acanthostyli in *pyrula:* if the difference had only consisted therein that the pointed end here was rounded, no stress would have been laid upon this fact; further the tornota are distinctly polytylote and have stubby ends, and finally the chelæ are larger. To be sure I have only had one specimen of the species, but as this also shows a special condition with regard to locality, being an inhabitant of the cold area, I have no doubt, that the species is certain and distinct.

Locality: Station 116, 70° 05' Lat. N., 8° 26' Long. W., South of Jan Mayen, depth 371 fathoms (bottom temperature ÷ 0·4° C.). One specimen.

5

3. **G. carnosa** Tops.

Pl. III, Figs. 20—21, Pl. V, Fig. 4.

1904. *Fibularia carnosa* Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 198, Pl. XV, fig. 19.

Plate-shaped and incrusting, or higher and more massive. Surface rugose and wrinkled, without projecting spicules. Oscula spout-shaped. The dermal membrane a thin film. The dermal skeleton formed of acanthoxea which are very scattered and often only found in the dermis in very small number. The main skeleton consisting of fibres which from the base or the middle radiate towards the surface; there are no transverse fibres, but the acanthoxea are scattered between the fibres. Spicula: Megasclera: the skeletal spicules are polytylote tornota, 0·37—0·47 mm, the dermal spicules acanthoxea 0·137—0·178 mm; microsclera not present.

The Ingolf-Expedition has taken three specimens of this species; one grows as a plate on a specimen of *Biemma rosea* and has a greatest extent of about 25 mm, and a greatest thickness of 3 mm, the second specimen grows on a shell of *Pecten aratus* as an incrustation with a greatest extent of 15 mm; these specimens have thus in outer shape a resemblance with the specimens described by Topsent, which latter, however, reached to a greatest extent of 55 mm. The third specimen is a small, oval body, of a length of 7 mm; it has two oscular cones in one end, the other end shows a somewhat broken surface and besides some adhering bottom material; the specimen has thus probably been attached with this end and has thus been erect. The colour (in spirit) is lighter or darker brown, in one specimen quite white; Topsent's specimens were blackish, one or the other of the colours is certainly due to the action of alcohol. The consistency is somewhat firm and elastic. The *surface* is somewhat wrinkled and folded, but otherwise smooth. The *dermal membrane* is thin but somewhat solid, it is not easily separable, and it is provided with spicules only to a very slight degree. *Pores* or pore-areas I have not seen, probably they are closed and must have disappeared in the folded and wrinkled dermal membrane. Of *oscula* as said two were found on one of the specimens, while the two others showed none.

The *skeleton*. The *dermal skeleton* is in this species almost not developed, as there are, at all events in by far the most places, only rather few, scattered acanthoxea in the dermis. The *main skeleton* has a somewhat similar structure as in the other species; it consists of fibres which radiate towards the surface, are branched and support the dermis, but do not pierce it; the outermost fibres are as a rule thin, but here and there also very thick fibres go to the surface; in the interior the fibres are very thick and strong. The fibres go in the plate-shaped specimens not parallel from the base to the surface, but they seem to have a more or less extended centre at the base, from which they radiate to the surface; in the erect specimen there are thick spicular parts at the base and in the middle, from which fibres radiate out. There are no transverse connecting fibres, but acanthoxea are scattered between the fibres. The fibres consist of tornotes; the skeleton in the oscular cones are formed of fibres of tornotes, but no acanthoxea were seen here. Spongin was not observed.

Spicula: a. *Megasclera:* 1. The skeletal spicules are tornota, they are straight, the ends are somewhat long-pointed, but outermost often a little stubby; they are distinctly polytylote. The length is 0·37—0·47 mm and the diameter is between 0·005 and 0·007 mm. The ends are generally not equal, but one is a little shorter and a little more stubby, the other longer and more pointed; the fine developmental stages are quite monactinal, and the thinner spicules or developmental forms are generally more pronounced polytylote than the thicker. 2. The dermal spicules are acanthoxea, they are evenly curved, sometimes the curve forms an angle in the middle of the spicule; they are fusiform and long-pointed, tapering from the middle outwards. The spinulation is dense, the spines are largest in the middle but decrease in size outwards. The length is 0·137—0·178^{mm} and the diameter 0·004—0·007^{mm}. Some developmental stages were found, which were quite fine and more weakly spinulous. The tornotes form the fibres, the acanthoxea occur in the dermal membrane but much scattered, and besides they occur in the tissue, between the fibres. *Microsclera* are not present.

I think it quite certain that this species is identical with *carnosa* Tops., as the description answers precisely; the outer shape, the skeleton and the spicules agree, only the spicules are declared to be a little larger, the tornotes 0·53—0·60^{mm} with a thickness of 0·007—0·010^{mm} and the acanthoxea 0·16—0·18^{mm} with thickness 0·005—0·006^{mm}, but this difference is certainly of no consequence with regard to specific distinction; a fact which also contributes to the settlement that the species are identical is the communication by Topsent, that at the surface: "s'accumulent de large cellules sphéruleuses à sphérules dissociées, grosses, brillants...", since my specimens show the tissue at the surface filled with densely crowded, curious, rather large, elliptical granules[1].

Locality: Station 9, 64° 18' Lat. N., 27° 00' Long. W., depth 295 fathoms; station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms. The localities lie near to each other in the Denmark Strait.

Geogr. distr. The species has earlier been taken at the Azores at 38° 46' Lat. N., 27° 17' Long. W., depth 543 fathoms and 38° 35' Lat. N., 28° 06' Long. W., depth 664 fathoms (Topsent. l. c.).

I shall here try to give a list of the *Grayella* species in the consecutive order in which they have been described, at the same time noting their spiculation and outer shape:

	Spicules: skeletal.	dermal.	microsclera.	shape
1862. *G. rubiginosa* O. Schmidt (Spong. d. adriat. Meer. 72, Taf. VII, Fig. 5) *(Myxilla)*	tylota	styli	:	crust.
1864. — *albula* Bow. (Mon. Brit. Spong. II, 253, III, Pl. XLV, figs. 21—24) *(Halichondria)*	styli	styli	chelae arcuatae	crust.
1869. — *cyatophora* Cart. (Ann. Mag. Nat. Hist. 4, IV, 190, Pl. VII)	strongylotornota	oxea	:	massive crust.
1870. — *papillosa* O. Schmidt (Grundzüge einer Spongienf. Atl. Meer. 57) *(Cribrella)*	strongyla	oxea	chelae arcuatae	tuberous.

[1] What these granules may be I cannot say; whether they really have something to do with Topsent's cellules sphéruleuses is, I think, doubtful.

		Spicules: skeletal.	dermal.	microsclera.	shape.
1876.	*G. pyrula* Cart. (Ann. Mag. Nat. Hist. 4, XVIII, 388, Pl. XIV, fig. 20, Pl. XV, fig. 38) (*Cometella*)	tornota	styli	chelæ arcuatæ	club-shaped.
1882.	— *armigera* Bow.[1] (Mon. Brit. Spong. IV, 73, Pl. IV, figs. 10—17) *Hymeniacidon*)	oxea	styli	chelæ arcuatæ	crust.
1885.	— *dura* Arm. Hans. (Norw. North. Atl. Exp. XIII, 13, Pl. II, fig. 5) (*Sclerilla*)	oxea	oxea	chelæ arcuatæ	club-shaped.
	— *arctica* Arm. Hans. (ibid. 12, Pl. II, fig. 4, Pl. VI, fig. 15 (*Sclerilla*) ...	oxea	oxea	chelæ arcuatæ	club-shaped.
	— *membranacea* Arm. Hans.[2] (ibid. 4, Pl. I, fig. 11, Pl. VI, fig. 12.) (*Reniera*)	?	oxea	?	?
1892.	— *pedunculata* Tops. (Résultats des camp. sc. du Prince de Monaco, II, 105, Pl. V, fig. 6, Pl. X, fig. 17.) (*Yvesia*) ..	tornota	styli	chelæ arcuatæ	club-shaped.
	— *fallax* Tops. (ibid., 106, Pl. VI, fig. 13, Pl. X, fig. 14.) (*Yvesia*)	tornota	styli	chelæ arcuatæ	massive.
	— *Hanseni* Tops. (ibid., 106, Pl. VI, fig. 9 a, Pl. X, fig. 13) (*Yvesia*)	tylota	styli	chelæ arcuatæ, sigmata	crust.
	— *Richardi* Tops. (ibid., 107, Pl. X, fig. 15.) (*Yvesia*)	tylota	styli	chelæ arcuatæ, sigmata	crust.
	— *Guernei* Tops. (ibid., 105, Pl. III, fig. 7, Pl. X, fig. 16) (*Yvesia*)	styli	styli	sigmata	thick crust.
	— *Ridleyi* Tops. (ibid., 107, Pl. X, fig. 12) (*Yvesia*)	tylota with spinulous ends	tornostrongyla	÷	crust.
	— *pertusa* Tops. (ibid., 107, Pl. IV, fig. 10, Pl. X, fig. 18.) (*Yvesia*) (non *pertusa* Tops. 1904)	tornota	oxea	chelæ arcuatæ	crust.
	— *linguifera* Tops. (ibid., 108, Pl. X, figs. 10—11) (*Yvesia*)	strongyla	oxea	chelæ arcuatæ	massive crust.
	— *rosacea* Tops. (Arch. Zool. exp. et gén. 2, X, XXIII) (*Yvesia*)	tornota	styli	chelæ arcuatæ	thick crust.
1898.	— *alecto* Tops. (Mém. de la Soc. Zool. dé Fr. XI 248, fig. 2 e—e″) (*Yvesia*).	strongyla	oxea, with large spinulous spines and transformations to asters	÷	massive.
1903.	— *polymastia* Thiele (Arch. für Naturgesch. 1903, 391, Taf. XXI, Fig. 2 a—c)	strongyla	styli	chelæ arcuatæ	semiglobular.
	— *mammillata* Arnesen (Berg. Mus. Aarb. 1903, 17, Taf. II, Fig. 6, Taf. VII, Fig. 2.) (*Yvesia*)	tylota, single styli	styli to strongyla	chelæ arcuatæ	massive.

[1] Perhaps a *Crella*. — [2] This species might perhaps be a *Crella*, but the point cannot be decided, only the dermal membrane being known.

	Spicules. skeletal.	dermal.	microsclera	shape
1903. *G. lobata* Arnesen (ibid. 18, Taf. II, Fig. 7, Taf. V, Fig. 1, Taf. VI, Fig. 2) (*Yvesia*)	oxea	styli	chelae arcuatae	club-shaped.
1904. — *carnosa* Tops. (l. c. Fasc. XXV, 198, Pl. XV, fig. 19) (*Yvesia*).	tornota, polytylote	oxea	÷	massive.
— *gelida* mihi	tornota, polytylote	strongyla	chelae arcuatae	club-shaped.

Of these species, four: *G. arctica* Arm. Hans., *dura* Arm. Hans., *pedunculata* Tops., and *lobata* Arnesen, disappear as identical with *G. pyrula* Cart. as shown above, (the shape of the spicules of these species is in the above list given as recorded by the authors); the total number of the species belonging at present to *Grayella* is thus twenty, of which two, *G. armigera* Bow. and *membranacea* Arm. Hans. are doubtful.

Cribrella hospitalis O. Schmidt (Grundzüge einer Spongienf. des Atlant. Gebiet. 1870, 56, Taf. IV, Fig. 12) was by Topsent (l. c. 1892, 103) taken to be an *Yvesia*, and I thought the same (The Danish Ingolf Exp. VI, 2, 1905, 127); Topsent had also good reasons for his interpretation, but yet it seems not to be correct, and there is every reason to take this species to be a *Stylostichon*, as I have declared more particularly (Meddel. om Grönland, XXIX, 1909, 447). Schmidt also says nothing about the arrangement of the oxea and the acanthostyli in this species, whereas he does so with regard to his next species *C. papillosa*, and I think it rather sure, that Fristedt's and Carter's *hospitalis* are identical with Schmidt's species, and that the species is thus a *Stylostichon*; the figure by Carter (Ann. Mag. Nat. Hist. 4, XVIII, Pl. XIII, fig. 18) of the outer shape of the sponge also points in this direction.

Subfam. 2. **Ectyoninae.**

Hymedesmia Bow.

(*Leptosia* Topsent, 1892.)

Incrusting and generally very thin forms; sometimes, on account of the manner [illegible] assuming a massive appearance, but also then in reality incrusting. The surface generally simple, sometimes with more or less developed papillæ to which oscula and pores are connected. The main skeleton consists of vertical acanthostyli with their heads based on the substratum; it may [illegible] less dense, sometimes rather diffuse and little developed. The dermal skeleton [illegible] fibres of dermal spicules, which generally stretch from the main skeleton, [illegible] upwards to the dermal membrane; it may be very differently developed, sometimes consisting of scattered bundles, sometimes of relatively long fibres, and it is not rarely by far the most developed part of the skeleton. The dermal membrane itself, which is supported by the outermost bundles of the dermal skeleton, may be with or without horizontal spicules; it is generally charged with [illegible] that they form a layer. At the base of the sponge there is a generally small [illegible] which the heads of the acanthostyli are imbedded. Spicula: megasclera: the skeletal spicules are acantho-styli, the head is generally more or less swollen; they always vary greatly [illegible] *into two groups of sizes, large and small; the dermal spicules are as a rule diactinal, generally strongyla, sometimes tylota, tornota or oxea; in a few cases they are monactinal, styli. Microsclera are chelæ arcuatæ, solely or together with sigmata, rarely sigmata alone, in a single case rhaphides alone; sometimes there are no microsclera.*

The species of *Hymedesmia* are all incrusting forms, as it is a generic character, that the skeletal spicules are all based on the substratum; the species are therefore all of insignificant appearance, forming flat and generally very thin crusts; only rarely they may assume another appearance, showing a massive exterior, but this is then due to the manner of growing, such species more or less enclosing their substratum, which is in such cases loose bottom material, and getting thereby the massive outer shape, but being in reality incrusting and with all the skeletal spicules fixed on particles of the imbedded bottom material. The dermal skeleton may sometimes be strongly developed, giving the sponge some thickness, and this is also the case just in the species appearing massive, which also contributes to their massive appearance. The main skeleton is very uniformly constructed, all the acanthostyles having their heads placed on the substratum and being more or less vertical; only the density in which the spicules are placed may be somewhat different; generally the acanthostyles are placed uniformly scattered over the substratum, but in some cases this is not so, the acanthostyles being gathered in small bundles, from which then the fibres of the dermal skeleton issue, and in the species, which enclose their substratum, this is generally so. The dermal skeleton, which is less influenced by the incrusting growth, may be a little more varied, and is sometimes by far the most developed part of the sponge; in the thin, incrusting forms, however, it only consists of more or less scattered bundles or short fibres. In the species in which the microscleres are chelæ, which is by far the greatest number, these may be more or less numerously scattered in the dermal membrane, and not rarely they form a more or less dense, sometimes very dense, layer; this feature reaches, I think, its climax in *H. crux* where the spined chelæ form a very dense layer constituting a protective mail. When the chelæ are so strongly gathered in the dermis, I think this is to some degree due to contraction, a state which generally prevails in spirit material and therefore is so often present in the material for examination; when the sponge is living and expanded I think the chelæ would be found much less concentrated; if this is so, it would also be easily understood, that the chelæ, when the living sponge is disturbed and contracts, form a strong, protective layer.

The surface is generally simple, more rarely it bears papillæ, which may be very low, conical warts, or somewhat long papillæ, or they may finally be very long and thread-like; the papillæ as a rule bear the oscula and pores. I think that special adaptations for oscula and pores are also otherwise often present, but they are often so insignificant, that they are difficult to detect, e. g. the pore-sieves in *H. Dujardinii*, and when no special adaptations are seen I think the oscula are simple openings and the pores lie in more or less pronounced groups over the subdermal cavities.

The colours of the species are generally the ordinary yellow, greyish or brownish colours; more rarely other, more lively, colours are present, as reddish, green or blue.

As said above, some species grow on loose bottom material as sand, gravel, sponge-spicules and the like; otherwise the numerous species form incrustations on every kind of substratum present on the bottom, as large and small stones, shells of every kind, corals, Bryozoa and hydroids, worm-tubes, other sponges etc. The shells and other objects are generally dead, but the sponges incrust also not rarely living Molluscs and Brachiopods. Often several different species grow together on the same object, and when their outer apperance, as generally, is the same, it may be a matter of no little difficulty to make out the borders for the different species.

The genus *Hymedesmia* in its present conception was established by Topsent in 1892 (Arch. de Zool. exp. et gén. 2. X, XXII) under the name of *Leptosia*, but Thiele has correctly shown (Abhandl. Senckenberg. naturf. Gesellsch. XXV, 1903, 955), that the genus must bear the name *Hymedesmia* Bow. as Topsent enumerates *H. zetlandica* as one of its species, and this species is the type of Bowerbank's *Hymedesmia*.

Topsent placed the species in his subfamily *Dendoricinae*, but I prefer to include it, together with the nearly related *Hymenancora* n. g. and *Leptolabis* Tops.[1], in the subfamily *Ectyoninae*; the whole construction of the skeleton points towards the *Ectyoninae*, the acanthostyli are always much varying in size and often divided into two different groups; among the *Mycalinae* we have no genus with a similar skeleton; there is also no doubt that *Hymedesmia* is nearly related to the Ectyonine genera *Stylostichon* and *Plumohalichondria*.

To the genus *Hymedesmia* I refer only such species which are quite incrusting and in which the base of the main skeleton is in one plane, that is to say that all the skeletal styles have their heads based on the substratum. This character is then the main distinguishing character in contrast to *Stylostichon*, in which genus the main skeleton forms columns, and if we wish to have a sharp distinction it is necessary to make sure, that the main skeleton in *Hymedesmia* must be quite basally arranged; if the dividing line is not drawn in this way, we get no sharp distinction, and I am also inclined to think, that this division is somewhat natural. The group of genera which may here be taken into consideration are: *Hymedesmia*, *Plumohalichondria*, *Eurypon* (= *Hymeraphia*) and *Microciona*. These genera I understand in the following way: *Hymedesmia* and *Stylostichon* are nearly related, but are distinguished by the character mentioned; a character which is often found in *Hymedesmia* and which may also be found in *Stylostichon* is the above mentioned crowding of the chelae in the dermal membrane, so that a more or less distinct layer is formed; *Plumohalichondria* stands a little more remote, distinguished by having smooth, diactinal spicules in the fibres; *Eurypon* and *Microciona* are still more remote, and nearer towards the *Clathria*-like forms; they are, so far as I know them, characterised in contrast to the three first-named genera by a greater difference between the skeletal and the accessory spicules and by (generally) monactinal dermal spicules, the chelae are (always?) palmate chelae, and toxa are very often present; I think these characters will prove valid in most cases; the two genera are distinguished from one another by the character that *Eurypon* has a basally arranged main skeleton, while *Microciona* has columns. Some single species of *Eurypon* without microscleres may perhaps be difficult to distinguish from some species of *Hymedesmia* likewise without microscleres, but as a rule I think that the mentioned characters from the megascleres will be sufficient.

The genus *Hymedesmia* is rather large, and it was therefore of some importance, if it could be divided; Topsent has already separated the species with forcipes, forming for them the genus

[1] I think *Leptosastra* Tops. and perhaps also *Dragmatyle* Tops. are likewise to be placed in the

Leptolabis; below I have separated off the species with ancoræ, forming for them my genus *Hymenancora*; though it is only a small number of species which are thus separated from *Hymedesmia*, the division is, however, of importance, making the remaining genus more uniform and natural. The possibility might also be suggested of dividing the remaining genus into two, containing respectively the species with and those without microscleres, but such a division I consider as not natural, as some species of both groups are nearly related; quite the same holds good with regard to the possibility of separating off the species which possess sigmates, e. g. *H. zetlandica* Bow. with sigmates is nearly related to *H. Bowerbanki* n. sp., *truncata* n. sp. and *latrunculioides* n. sp. all without sigmates.

1. **H. Koehleri** Tops.

Pl. V, Fig. 5.

1896. *Leptosia Koehleri* Topsent, Résultats scient. de la camp. du "Caudan", 284, Pl. VIII, fig. 7—9.
1904. — — Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 188.

Incrusting; oscula present as low and indistinct cones, with a dense skeleton of dermal spicules in the wall. Spicula: megasclera: the skeletal spicules acanthostyli with a somewhat distinct head, and spined in the whole or nearly the whole length, 0·09—0·33^{mm}, not divided into two groups; dermal spicules polytylote strongyla 0·196—0·30^{mm}; microsclera chelæ arcuatæ 0·028—0·050^{mm}.

Of this species, which I refer to *H. Koehleri* Tops. (see below under remarks), we have a rather large material. The specimens form thin incrustations on stones, some single ones grow on tubes of *Placostegus tridentatus*. The greatest extent to which my specimens reach is 24^{mm}; the thickness reaches scarcely 0·5^{mm}. The colour (in spirit) is generally white, sometimes a little darker and then greyish brown or light brown. The *surface* is in the undamaged specimens smooth, without projecting spicules, but under a good lens it appears finely gritty, which is caused by the styles. The *dermal membrane* is an easily separable, thin and transparent membrane; it is filled with microscleres and is supported by scattered bundles of dermal spicules. *Pores* I have only observed with certainty in a couple of specimens, and in these they were seen as scattered, circular openings of a diameter of about 0·047^{mm}; when the pores are normally open they probably lie in groups over the subdermal cavities. *Oscula* could in several specimens be observed with a good lens. They are scattered on the surface and appear as very weakly pronounced and low cones of a diameter of about 1^{mm}. In the centre an opening appears which is larger or smaller in relation to the degree of opening of the osculum; on account of the slight thickness of the sponge the opening only appears as a deepening; when the osculum is closed, the cone appears slightly stellately corrugated. The dermal spicules form an oscular skeleton, as they lie very close in the wall of the oscular cone and are arranged subparallel, so that they radiate stellately towards the oscular opening; above the dermal spicules, however, lies the dense layer of chelæ; this layer is only wanting just at the very summit of the oscular cone. Larger and smaller subdermal cavities or canals may be seen shining through the dermis, especially in the lighter coloured specimens.

The *skeleton*. The *dermal skeleton* may be said for the greater part to be formed of the chelæ, which form a very dense layer in the dermal membrane. Moreover, short and loose fibres or bundles of dermal spicules stretch, generally in a more or less oblique direction, from the interior of the sponge out to the dermis; besides, they are also found in the dermis, below the layer of chelæ, as scattered bundles or single spicules; finally they form, as said, the skeleton of the oscular wall, also lying here below the layer of chelæ. The *main skeleton* is formed of the acanthostyli which all have the heads fixed on the substratum and are vertical; the largest acanthostyli reach with the point up to the dermal membrane, but in the undamaged sponges they scarcely project beyond it. The smaller styles are placed between the larger. Spongin was not observed with certainty.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are generally straight, sometimes slightly curved; they have a somewhat distinct head, and from this they taper evenly, thus forming a long apex which is often a little more abruptly pointed at the very point. The spinulation is somewhat dense in the lower part of the spicule, but becomes more scattered outwards, and the outermost part is generally smooth; the longer the spicules are the point is to a greater extent smooth, and in the smaller spicules the spines are found quite out to the point. The spines are somewhat reclined. The head is densely covered with spines, which are considerably larger than the others, and also have a different shape; they are not reclined but more or less straight radiating, and they are as a rule not pointed but obtuse at the end; this obtuse or cut end is not rarely somewhat jagged or crenulated. The styles vary much in size and as the intermediate forms occur somewhat sparingly, the styles would seem divided into two groups with regard to size, but there is certainly no principal division into two groups. The length varies in all between 0·09 and 0·33^{mm}, and the diameter at the head, including the spines, varies from 0·014—0·035. With regard to the size of the styles there may be some difference in different individuals, in some the greatest length was thus 0·23^{mm} and the diameter 0·024^{mm}; when the spicules thus only reach a smaller length, the mentioned division into two groups is generally still less distinct. 2. The dermal spicules are rather slender, straight strongyla; the two ends are often a little different, one being slightly thicker than the other, and sometimes one or both ends are slightly swollen; in other cases the ends are somewhat narrowed. The strongyla are always polytylote with a row of swellings; this may be more or less pronounced, but is rarely or never quite wanting. The strongyla have a length of 0·106—0·30, and a diameter in the middle of 0·005—0·007^{mm}. These spicules do not vary much in the various individuals. b. *Microsclera:* these are chelæ arcuatæ; they have a more or less, but always rather strongly, curved shaft, the alæ are lobe-shaped, the tooth is narrowly elliptical with the end rounded, and there is a long, narrow tuberculum. The shaft is not cylindrical but somewhat flattened, which may be present to a higher or lower degree. The chelæ may vary a little in shape and size in the various individuals, the shape, however, is chiefly the same. The length is, all variations concerned, 0·028—0·050^{mm}; as instances of variation in size in various individuals I may note the following: 0·028—0·038^{mm}, 0·035—0·042^{mm}, 0·037—0·045^{mm} and 0·032—0·050^{mm}; the diameter of the shaft is 0·004—0·010^{mm} in relation to the size of the chela, and to whether it is seen in front or side view. As said, the chelæ occur in the dermal membrane forming a dense layer; they are also seen singly through the whole body.

Remarks: I have determined the above species as *H. Koehleri* Tops., but not without hesitation. When Topsent in 1896 founded the species, he laid stress especially on the polytylote strongyles, but this is not a very safe character, as strongyles more or less polytylote are of frequent occurrence in *Hymedesmia*; already when he founded the species, Topsent mentioned, that it varies somewhat with regard to the spicules, and in 1904 he again states that this variation takes place to a high degree, the three forms of spicules varying both in size and in shape; according to this I am not at all sure, that all the specimens mentioned by Topsent belong really to the same species. When I have determined my species as *Koehleri*, my reason is especially the somewhat robust, conical acanthostyli, generally with large, somewhat obtuse or crenulated spines at the head-swelling, the polytylote strongyla with unequal ends and also the shape of the chelæ. Now, as already stated, my specimens may also vary to a certain degree, and the acanthostyli are not always so robust, or with so large spines at the base as in the more typical specimens, and the possibility, that there may be more than one, very nearly related species in my material is not quite excluded.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 16, 65° 43′ Lat. N., 26° 58′ Long. W., depth 250 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 57, 63° 37′ Lat. N., 13° 02′ Long. W., depth 350 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; further it has been taken East and West of the Faröe Islands in depths of 250 and 180 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities are situated in the Denmark Strait, between Iceland and the Faröe Islands and East of the latter.

Geogr. distr. Topsent mentions the species from the Bay of Gascogne, depth 648 fathoms, and from the Azores in depths of 318 to 1350 fathoms. At present the species would thus be known from about 66° to 38° Lat. N., and between about 2° and 31° Long. W., with a bathymetrical range from 138 to 1350 fathoms.

2. **H. lacera** n. sp.

Pl. V, Fig. 6.

Incrusting; surface smooth. Spicula: megasclera: the skeletal spicules slender acanthostyli with a slightly marked head, spined only in the lower half part, 0·13—0·51mm, not divided into two groups; dermal spicules large, generally slightly polytylote strongyla, 0·327—0·47mm; microsclera chelæ arcuatæ 0·045—0·054mm.

Of this species one specimen grows as an irregular incrustation on a worm-tube which is attached to a *Hornera lichenoides*, another specimen grows on a mussel-shell; the greatest extent of the specimens is about 15mm, and the thickness is about 0·5mm or a little more. The colour (in spirit) is whitish grey or dirty brownish grey, but it is stated to be light dirty green in the fresh state. The *surface* is smooth, without projecting spicules. The *dermal membrane* is a somewhat solid film.

The *skeleton*. The *dermal skeleton* is formed of bundles or short fibres, stretching from beneath up to the dermis, upwards they are somewhat penicillately spread; moreover, bundles or somewhat longer fibres are found lying horizontally in the dermal membrane, and finally there are scattered chelæ. The *main skeleton* is constructed in the ordinary way; the styli are very dispersed. So far as I could observe there is some spongin at the base.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli, which are very slender and straight or quite slightly, rarely a little more, curved; the head is generally only very slightly swollen, and the shaft tapers into a long, fine apex. The spinulation is both in the large and in the smaller styli restricted to about the lower half part; in the small styli there are, however, generally some scattered spines more apically. The spines are only somewhat large on the head, outwards they become small and still further outwards they are small grits, but generally more or fewer larger spines are found between them. The spines are directed straight out, not reclined. The length is 0·13—0·51 mm, and the diameter of the head is 0·014—0·025 mm. The styli are not divided into two separate groups, but the intermediate sizes are rare. 2. The dermal spicules are rather large, straight strongyla; one end is generally a little thicker than the other, but this feature is not always distinct; the thicker end, or both ends may be quite slightly swollen; the shaft is slightly polytylote, but sometimes this is hardly apparent. The length is 0·327—0·47 mm, and the diameter 0·007—0·011 mm. b. *Microsclera*, these are chelæ arcuatæ; they have an evenly, not specially strongly curved shaft; the tooth is narrow, lanceolate, the alæ are of the same length as the tooth, but they are relatively narrow, they may therefore, in a certain view be of a somewhat claw-shaped appearance, and the chela may remind one somewhat of an ancora. The length is 0·045—0·054 mm, the shaft is somewhat flattened, the diameter relatively from 0·0028 to 0·0057 mm. The chelæ occur rather numerously scattered in the dermal membrane.

The slender, often straight styli, generally showing some large spines among the small, are characteristic for this species together with the large dermal spicules and the large chelæ with relatively long, narrow alæ.

Locality: Station 113, 69° 31′ Lat. N., 7° 06′ Long. W., depth 1309 fathoms (bottom temperature ÷ 1° 0 C.), one specimen; Forsblads Fjord in East-Greenland, 72° 28′ Lat. N., depth 50—90 fathoms (The Amdrup Expedition 1900), one specimen. The species must, according to these localities, be a native of the cold water.

3. H. storea n. sp.

Pl. V, Fig. 7.

Incrusting: surface smooth? Spicula: megasclera: the skeletal spicules somewhat densely spined acanthostyli with a globular head, the longer of them with a smooth apical part, 0·10—0·35 mm, not divided into two groups; the dermal spicules polytylote strongyla 0·20—0·37 mm; microsclera small chelæ arcuatæ recalling in shape the palmate chelæ, 0·033—0·038 mm.

This species grows as extended but thin incrustations on stones; it reaches a greatest extent of 65 mm, the thickness is very slight, below 0·5 mm. The colour (in spirit) is whitish grey. In the present state of the sponge the *surface* is densely and finely hispid, caused by the skeletal spicules, but this seems to be due to the fact, that the dermal membrane is wanting for the greatest part; where the membrane is present, the surface seems to be smooth. The *dermal membrane* is a thin membrane, resting on the skeleton below.

The *skeleton*. The *dermal skeleton:* the dermal spicules form a skeleton of bundles and fibres stretching from the basal skeleton up to the dermis; the fibres run more or less obliquely or bend horizontally under the membrane. The *main skeleton* is constructed in the ordinary way, consisting of vertical acanthostyli not placed specially densely. At the base an amount of spongin is present.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, they are straight, more rarely slightly curved, with a distinct, globular, but however only slightly swollen head. The spinulation is dense, consisting of large, more or less reclined spines; on the head, where the spines are largest, they radiate straight out, and also on the lowermost part of the shaft; the larger styli become dispersedly spined outwards and have a smooth apical part; the smaller ones are spined in the whole length, but they have often, however, the spines somewhat dispersed towards the apex. The length is 0·10—0·30 mm, and the diameter of the head is 0·014—0·028 mm; the styli are not divided into two groups of size. 2. The dermal spicules are straight strongyla; they are of the same thickness in the whole length and more or less polytylote; one end may be quite slightly swollen. The length is 0·29—0·37 mm and the diameter 0·005—0·007 mm. b. *Microsclera* are chelæ arcuatæ, they are rather small and slender, the tooth is narrowly elliptical, the alæ are connected with the shaft in their whole length, viewed from in front they are only slightly incised below, the chela thus approaches to the palmate chelæ; the shaft is slender and evenly but not much curved. The length is 0·033—0·038 mm, and the diameter of the shaft 0·002 mm. The chelæ occur in somewhat great numbers in the dermal membrane.

This species in its acanthostyli somewhat resembles *Koehleri*, but it has larger strongyla, and more slender chelæ of another shape; from *baculifera* Tops. it is distinguished by the chelæ.

Locality: Station 105, 65° 34′ Lat. N., 7° 31′ Long. W., depth 762 fathoms (bottom temperature ÷ 0° 8 C.); station 125, 68° 08′ Lat. N., 16° 02′ Long. W., depth 729 fathoms (bottom temperature ÷ 0° 8 C.); the species is thus limited to the cold area. The localities lie North and North-east of Iceland.

4. H. lamina n. sp.

Pl. V, Fig. 8.

Incrusting; surface smooth. Spicula: megasclera: the skeletal spicules acanthostyli with a rather small, globular head, spined in the whole length, but the spines in the longer spicules very dispersed towards the point, 0·12—0·33 mm, not divided into two groups; the dermal spicules strongyla, 0·22—0·30 mm; microsclera small chelæ arcuatæ of a shape reminding one somewhat of palmate chelæ, 0·028 mm.

Of this species we have five specimens, three growing on two different Bryozoa, one on a stone and one on a living Brachiopod; it has a greatest extent of 10—17 mm, the thickness is about 0·5 mm. The colour (in spirit) is greyish white. The *surface* is smooth, without projecting spicules. The *dermal membrane* is a rather thin, but somewhat solid membrane, resting on the skeleton below. Some canals were seen shining through the membrane.

The *skeleton.* The *dermal skeleton* consists of bundles and fibres of dermal spicules, stretching from the lower part of the sponge up to the membrane; they have a more or less oblique direction, and below the dermal membrane they may run as horizontal or nearly horizontal fibres, but there is no skeleton in the dermal membrane itself; the fibres have many spicules alongside, but they are however not specially thick. The *main skeleton* is formed in the ordinary way, it is somewhat dispersed. At the base an amount of spongin is found in which the heads of the acanthostyli are imbedded.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight or very slightly curved acanthostyli; the head is globular, but not however much swollen, the apex is long and evenly tapering; the spines are distinct also in the larger styli; the small styli are entirely spined, in the larger the spines are very dispersed towards the point, but they are most often present out to the point, or only a small part of the apex is smooth; more rarely the styli may be smooth for a longer distance. The length is 0·12—0·33^{mm}, and the diameter of the head is 0·012—0·022^{mm}. 2. The dermal spicules are straight strongyla; they are of the same thickness in the whole length and slightly polytylote; the length is 0·22—0·36^{mm} and the diameter about 0·005^{mm}. The size of the megascleres may vary a little in various individuals. b. *Microsclera:* these are chelæ arcuatæ; they are small and of a particular shape, by which they approach somewhat to the chelæ palmatæ; the shaft is evenly curved, the tooth is lanceolate, and the alæ are connected with the shaft in their whole length, it is therefore chiefly only the curved shaft which distinguishes them from the palmate chelæ. The length is 0·028^{mm} and the diameter of the shaft about 0·002^{mm}. The chelæ occur scattered in the dermal membrane.

This species is characterised already by its chelæ.

Locality: Station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 25, 63° 30′ Lat. N., 54° 25′ Long. W., depth 582 fathoms; at Angmagsalik on the East coast of Greenland, depth 140 fathoms (The Amdrup-Expedition 1900); 61° 40′ Lat. N., 7° 40′ Long. W., depth 135 fathoms (Ditlevsen); East of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities are situated in the Davis Strait, at East-Greenland and at the Faröe Islands.

5. **H. mollis** n. sp.

Pl. VI, Fig. 1.

Incrusting; surface smooth. Spicula: megasclera: the skeletal spicules acanthostyli with a small head, the larger slightly spined and smooth outwards, the smaller spined in the whole length, 0·19—0·53^{mm}, not divided into two groups; the dermal spicules strongyla 0·24—0·357^{mm}; microsclera chelæ arcuatæ 0·027—0·040^{mm}.

Most specimens of this species grow incrusting on Brachiopods, as well on living as on dead specimens, one grows on a shell of a *Buccinum*, one on a mussel-shell and finally one on an *Oculina*. The greatest extent measured is about 20^{mm}; the thickness generally does not exceed 0·5^{mm}. Two specimens grow in a remarkable manner; they are not attached to a definite substratum but grow on sand, gravel and small particles of very different kinds, especially sponge-spicules; they then envelop the substratum, so that the sponge together with the substratum forms irregular, wrinkled masses which seem rather thick, but the real thickness is not greater than given above. The colour (in spirit) is greyish brown. The *surface* is smooth or nearly so. The *dermal membrane* is a thin film, but it is for the greater part wanting on the specimens. *Oscula* and *pores* were not to be observed on account of the bad condition of the dermal membrane.

The *skeleton.* The *dermal skeleton:* the skeleton formed of the dermal spicules is strongly developed. Quite down at the base of the sponge the dermal spicules form fibres or fibre-like bands running parallel with the underlayer; further there are bundles stretching obliquely up to the surface, and at the surface there are again bundles or fibres present running more or less parallel with it; besides, there are also found scattered spicules at the surface. The bundles are often rather thick. The dermal spicules form thus the greatest part of the whole skeleton. The *main skeleton* consists of acanthostyli with their head-ends on the substratum; they do not reach beyond the surface. Spongin seems to be found at the base, but only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or slightly curved and have a rather small head-swelling; the apex is even and long. The spinulation is somewhat slight, as commonly the largest spines are found at the head-end; in the longer styli the spines become very small outwards, and the outer part of the spicules is smooth; the smaller styli are spined in the whole length, and the spines are generally larger. The styli vary much in size, but they are not divided into two groups. The length is 0·119—0·53 mm and the diameter of the head 0·014—0·027 mm. 2. The dermal spicules are strongyla, they are straight or, more rarely, slightly curved, and they are slightly fusiform. The ends are not uniform, one end is rounded and sometimes slightly swollen, the other end is thinner and rounded or with a stubby point. The length is 0·24—0·357 mm and the diameter about 0·004—0·0057 mm. The strongyla may be slightly polytylote on the middle part. b. *Microsclera:* these are chelæ arcuatæ; they have a curved shaft, the curvature of which is distinctly situated in the middle of the shaft; the end-parts occupy nearly always less than a third part of the length of the chela; the tooth is broadly elliptical, the alæ are lobe-shaped, of the same length as the tooth. The length may vary somewhat in the same individual and still more in various individuals, it is in all 0·027—0·040 mm, and the diameter of the shaft is 0·0028—0·004 mm. The chelæ occur rather numerously in the dermal membrane, and they seem exclusively or at all events chiefly confined to it.

Locality: Station 25, 63° 30′ Lat. N., 54° 25′ Long. W., depth 582 fathoms; station 28, 65° 14′ Lat. N., 55° 12′ Long. W., depth 420 fathoms; station 83, 62° 25′ Lat. N., 28° 30′ Long. W., depth 912 fathoms; station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms; further it has been taken at 64° 42′ Lat. N., 27° 43′ Long. W., depth 426 fathoms (Wandel), 62° 29′ Lat. N., 5° 17′ Long. W., depth 160 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902) and 63° 05′ Lat. N., 20° 07′ Long. W., depth 295 fathoms (The Fishery investigation steamer "Thor"). Nine specimens in all. The localities are situated in the Davis Strait, the Denmark Strait, South of Iceland and West of the Faröe Islands.

6. **H. curvichela** n. sp.

Pl. VI, Fig. 2.

Incrusting; surface diffusely hispid. The main skeleton not dense. Spicula: megasclera; the skeletal spicules acanthostyli with no distinct or only a slight head; the small spined in the whole length, the larger less spined until only spined at the base; the styli divided into two groups, large 0·53—0·80 mm, small 0·107—0·30 mm; the dermal spicules strongyla, slightly polytylote, 0·32—0·40 mm; microsclera chelæ arcuatæ, strongly curved, 0·031—0·037 mm.

Of the specimens of this species one grows on a stone together with *H. Koehleri, baculifera*

Tops., *dubia* n. sp. (to be described hereafter), a *Plocamia*, an *Eurypon* and a *Polymastia*; another specimen is sitting on a *Pecten*-shell, likewise covered with several other species, a third specimen grows on a Brachiopod-shell and finally a fourth on an erect Bryozoon. The species forms incrustations of a greatest extent of 25^{mm} with a thickness of about 0·5^{mm}. The colour (in spirit) is white or whitish, but with regard to two of the specimens it is stated, that they were deep blue in the living state. The *surface* is diffusely hispid from rather long projecting spicules. The *dermal membrane* is a thin and transparent film. *Pores* and *oscula* were not observed; some canals or canalicular cavities were seen to shine through the membrane.

The *skeleton*. The *dermal skeleton*: in the dermal membrane there are numerous, but somewhat scattered chelæ. The dermal spicules form fibres or bundles stretching far down in the skeleton and seen quite down at the base; they stretch in an oblique direction up to the dermal membrane, and above, at the membrane the direction becomes nearly quite horizontal; some spicules are also lying singly, quite horizontally in the membrane. Above, at the membrane the bundles are generally rather strong with numerous spicules. The *main skeleton* is of the typical construction and consists of basal acanthostyli with the head ends attached to the substratum, the longest styli pierce the dermal membrane and project beyond it. The skeleton is distinguished by the fact that the styli stand somewhat scattered, considerably more scattered than is commonly the case. At the base there is a distinct amount of spongin, in which the heads of the styli are imbedded; the spongin seems to form a continuous lamella at the base of the sponge.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli which are straight or, especially the larger ones, slightly curved; they have generally no distinct head marked off, or this is only the case to a slight degree, but the dense spinulation at the base gives however the impression of a swelling; they taper evenly into a somewhat fine apex. The spinulation is as usual, the spines being largest at the head-end and radiating, while they are generally reclined on the shaft in the smaller styles. The smallest styles are spined in the whole length, the longer the styles are, the longer a part of the apex is smooth, in the longest styles only the lowermost part is spined, and the spines are here generally small, nearly gritty, and not reclined. The size of the styles varies greatly, the length from 0·107 to about 0·80^{mm}[1] and the diameter of the head is from 0·018–0·034^{mm}. To be sure there is no principal difference between the styles, but there is a break in size between the longest and those coming next in length, such that the longest do not go below 0·53^{mm} and the small not beyond 0·30^{mm}. 2. The dermal spicules are rather long, straight, slightly polytylote strongyla; they have always one end thinner than the other; the length is 0·32–0·40^{mm}, and the diameter in the middle is about 0·005–0·007^{mm}. b. *Microsclera*: these are chelæ arcuatæ; they are distinguished by the shaft being strongly, nearly semicircularly curved; there may in this respect be some difference, the chelæ may be both more or less curved, but the typical form is near the semicircular curvature; the end parts are relatively small, the tooth and the alæ are short and rounded. The length is 0·031–0·037^{mm}; the shaft is somewhat flattened and about elliptical in section, its diameter is, as seen from in front or from the side respectively 0·005–0·010^{mm}. The chelæ occur, as mentioned, numerously in the dermal membrane, but, however, somewhat scattered; they were not observed otherwise in the body.

[1]) The greatest length cannot be given exactly, as these styles generally have the apex broken.

This chela bears, in its mostly curved forms, strange to say, great resemblance to the chela found in a species standing rather remote, viz. the chela figured by Carter (Ann. Mag. Nat. Hist. 5, XV, Pl. IV, figs. 3 e, f.). Carter figures also a developmental stage (d), but considers this as an "ill-developed" spiculum.

Locality: Station 15, 66° 18' Lat. N., 25° 29' Long. W., depth 330 fathoms (bottom temperature ÷ 0° 75 C.); station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; both these localities lie in the Denmark Strait; further it was taken East of the Faröe Islands, depth about 250 fathoms, and West of the Faröe Islands, depth 160 fathoms, (Ad. Jensen, the cruise of "M. Sars" 1902). Four specimens in all. It is curious that one of the localities, station 15, shows a negative bottom temperature, while the other localities are positive, but it is to be remarked, that this station lies just at the border between the cold and the warm areas.

7. **H. rugosa** n. sp.

Pl. III, Fig. 1, Pl. VI, Fig. 3.

Incrusting: surface somewhat wrinkled, smooth; oscula present as very low cones, with a dense skeleton of dermal spicules in the wall. Spicula: megasclera; the skeletal spicules acanthostyli with a slight head, spined in the whole length, divided into two groups, large 0·30—0·429 ^{mm}, small 0·15—0·19 ^{mm}; the dermal spicules polytylote strongyla 0·31—0·417 ^{mm}; microsclera large chelæ arcuatæ with the ends a little recurved, 0·052—0·064 ^{mm}.

Of this species we have two specimens, one growing on a Brachiopod-shell, the other on a worm-tube. The sponge forms thin incrustations, which reach a greatest extent of 17 ^{mm}, with a thickness not exceeding 0·5 ^{mm}. The colour (in spirit) is yellow or light brownish. The *surface* is strongly wrinkled and rugose, the dermal membrane being folded, thus giving rise to the formation of irregular, sinuous furrows; this appearance is probably owing to contraction; for the rest the surface is smooth without projecting spicules. The *dermal membrane* is a somewhat solid, easily separable membrane, richly crowded with chelæ. On one of the specimens two *oscula* are seen; these have a structure similar to that of the oscula in *H. Koehleri*, they show in the centre a circular or oval impression, around which the dermal membrane forms stellately radiating folds; the dermal spicules form here a special skeleton, lying close together in the oscular wall with one end towards the opening, and from this radiating out in the membrane. The diameter of that part of the membrane which may be termed osculum is 1·5—2 ^{mm}. *Pores* were not to be seen in the membrane which is so densely charged with chelæ.

The *skeleton*. The *dermal skeleton:* the dermal skeleton proper is formed of the chelæ which are extremely close-lying in the membrane; when they are so close-lying, this is perhaps due to contraction. The dermal spicules partly contribute to the formation of the other skeleton of the sponge, as they form bundles or fibres, stretching from the very base up to the dermal membrane, generally in a very oblique direction; in many places they also form horizontal fibres just below the membrane; finally they form, as mentioned, the skeleton in the oscular wall. The fibres and bundles formed of the dermal spicules are rather thick. The *main skeleton* is of the typical construction, and consists of vertical acanthostyli with their heads based on the substratum; the longest of them reach the dermal membrane, but do not pierce it. Just at the base of the sponge there is, I believe, a slight amount of spongin, but I was not able to see it with absolute certainty.

Spicula: a. *Megasclera:* 1. The skeletal spicules are straight or slightly curved acanthostyli; they have a slightly swollen head and taper evenly into a long apex which outermost is a little more abruptly pointed. The spines on the head are large, they are not pointed but truncate and not rarely somewhat hook-shaped. The spines on the shaft are somewhat dense and continue out to the point, but they are more scattered in the outermost part; the spines are reclined and compressed, so that they get the shape of a tooth of a saw. The styli vary greatly in size, and as intermediate forms are very scarce they are divided into two groups, which are, however, not quite sharply limited. The length lies in all between 0·15 and 0·429^{mm}, and the diameter of the head is 0·025—0·040^{mm}. When the single intermediate sizes are not considered the two sizes will be about 0·15—0·19 and 0·30—0·429^{mm}. 2. The dermal spicules are slender, straight, or more rarely slightly curved, polytylote strongyla, the ends are generally slightly swollen, so that the spicules approach to subtylota; one end is as a rule a little thicker than the other, and the thinner end has the largest swelling; the swellings are the more distinct the thinner the spicule is, in the thickest strongyla they are very slight or quite wanting. The strongyla vary somewhat in size, the length is between 0·31 and 0·417^{mm}, and the diameter is 0·005—0·008^{mm}. b. *Microsclera* are chelæ arcuatæ; they have a curved shaft and the ends are somewhat recurved; the tooth is lanceolate, with a long tuberculum, and the alæ are of the same length as the tooth; the shaft is somewhat flat, and nearly always slightly dilated in the middle. The chela is rather large, and the size is somewhat constant, the length is 0·052—0·064^{mm}, and the diameter of the shaft varies from about 0·005—0·011^{mm} in relation to the chela being seen in front or in side view, and to the dilatation in the middle of the shaft being larger or smaller. Single developmental stages were seen. The chelæ occur, as said, in enormous numbers and densely crowded in the dermal membrane, and they do not seem to occur otherwise in the body of the sponge.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms. Two specimens. The locality lies in the Denmark Strait.

8. H. splenium n. sp.

Pl. VI, Fig. 4.

Incrusting: surface hispid. Spicula: megasclera: the skeletal spicules densely and entirely spined acanthostyli with a very slightly marked head, divided into two groups, large 0·23—0·27^{mm}, small 0·09—0·12^{mm}; the dermal spicules strongyla 0·25—0·31^{mm}; microsclera chelæ arcuatæ 0·041—0·047^{mm}.

This species grows as rather extended incrustations on a somewhat large stone; it has a greatest extent of about 16^{mm}, the thickness is small, below 0·5^{mm}. The colour (in spirit) is whitish grey. The *surface* is dispersedly hispid from projecting skeletal styles, and it seems to be so also when the dermal membrane is undamaged. The *dermal membrane* is a thin film, resting on the skeleton below. Here and there larger and smaller openings for the canal system were observed, partly placed in groups; they are probably both *pores* and *oscula*.

The *skeleton*. The *dermal skeleton:* the dermal spicules form partly bundles, partly they are also seen lying scattered; they lie horizontally or stretch obliquely upwards between the ends of the skeletal styli, without any regularity; they lie horizontally especially just below the dermal membrane, and when the sponge is viewed from above, the spicules are seen lying irregularly below the membrane. The *main skeleton* consists of vertical, somewhat densely placed acanthostyli, the longest of which project beyond the surface. At the base a slight amount of spongin is found.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight acanthostyli; the head-end is only pronounced to a very slight degree, and the styli are therefore somewhat club-shaped. The spinulation is dense and is both in the small and the large forms continued quite to the point, or the spines are at most a little more dispersed towards the point; the spines are directed downwards; they are distinct but not large. The length of the styli is 0·09—0·27 ^{mm} and the diameter of the head 0·015—0·024 ^{mm}. Though the styli do not vary much in length in all, they are divided however into two groups, the larger ones not going below 0·23 ^{mm} and the small not beyond 0·12 ^{mm}. 2. The dermal spicules are straight strongyla, they are always a little thicker at one end than at the other, but they are otherwise of the same thickness in the whole length; sometimes they are very slightly polytylote. The length is 0·25—0·31 ^{mm} and the diameter 0·005—0·007 ^{mm}. b. *Microsclera;* these are chelæ arcuatæ; they are of ordinary shape, the shaft is evenly curved, the tooth elliptical, the alæ lobe-shaped and broadly cut below. The length is 0·041—0·047 ^{mm} and the diameter of the shaft is 0·003—0·004 ^{mm}. The chelæ occur numerously in the dermal membrane, but not, however, forming a layer.

This species is somewhat related to *H. storea*, but it is characterised by the styli being more densely spined, and spined to the very point, and the spines are smaller; besides, the styli are divided into two groups; the chelæ are of another shape, and finally also the dermal spicules show a difference.

Locality: Station 125, 68° 08′ Lat. N., 16° 02′ Long. W., depth 729 fathoms (bottom temperature ÷ 0° 8 C.); the locality lies North of Iceland.

9. H. tenuicula n. sp.

Pl. VI, Fig. 5.

Incrusting; surface somewhat hispid. Spicula: megasclera; the skeletal spicules acanthostyli with a slightly swollen head and divided into two groups, large, with the apical part slightly spined or smooth, 0·286—0·47 ^{mm}, small, spined in the whole length, 0·12—0·15 ^{mm}; dermal spicules strongyla 0·238—0·31 ^{mm}; microsclera chelæ arcuatæ 0·032—0·037 ^{mm}.

Of this species we have four specimens growing as thin incrustations on a *Hamacantha implicans*, on a Brachiopod-shell, on a tube of *Placostegus tridentatus* and finally on a stone, bearing a specimen of *Petrosia crassa;* the largest specimen grows on the Brachiopod-shell, and it reaches the same extent as this, viz. 25 ^{mm}, but for the rest it grows on both sides of the shell which it thus quite covers. The sponge is very thin, scarcely reaching more than 0·25 ^{mm} in thickness; this is, as will be seen below, less than the length of the largest styli, which consequently project beyond the surface. The colour (in spirit) is slightly yellowish. The *surface* is distinctly hispid on account of the projecting of the longest styli. The *dermal membrane* may be traced as a thin film, supported by the dermal spicules. *Pores* and *oscula* were not to be seen.

The *skeleton.* The *dermal skeleton* consists partly of bundles of dermal spicules which stretch up to the membrane from the skeleton below, partly and chiefly of spicules lying horizontally in the membrane; the latter spicules are partly scattered, partly collected into bundles or short fibres. The *main skeleton* is formed of vertical acanthostyli, the shorter of which reach to the surface, while the longer project through it. At the base of the acanthostyli there is found an amount of spongin, but it is difficult to observe.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, they have the head-end slightly swollen and taper from here into a long apex. The styli are divided into two sizes which are to be sure not connected by transitional forms, but do not show, however, any principal difference in shape. The larger styli are straight or slightly curved; they have a densely spined head, the spines are here not pointed, but truncate or irregularly cut at the apex; on the lower part of the shaft the spines are still somewhat dense, but they are small, outwards they become more scattered, and the outermost part is smooth or has only some single spines; the spines on the shaft are reclined. The small styli are likewise straight or very slightly curved, they are spined in the whole length, and the spines are reclined; the head is most densely spined. The length of the large styli is 0·286—0·47 mm with a diameter at the head of 0·028 mm; the greatest length is only rarely seen; the small styli are 0·12—0·15 mm long and 0·020 mm thick at the head. 2. The dermal spicules are straight strongyla, one end is a little thinner than the other, and this thinner end is often slightly swollen; the length is 0·238—0·31 mm and the diameter about 0·004 mm. b. *Microsclera:* these are chelæ arcuatæ; they have an evenly curved shaft, an elliptical tooth and lobe-shaped alæ of the same length as the tooth; the free middle part of the shaft is not much more than the third part of the total length of the chelæ. The length is 0·032—0·037 mm, and the diameter of the shaft is about 0·004 mm. The chelæ are found in the dermal membrane, generally they are scattered, sometimes lying more densely.

This species is distinguished from *H. storea* by its more slightly spinulous acanthostyli which are divided into two groups, and by a different shape of the chelæ.

Locality: Station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 35, 65° 16′ Lat. N., 55° 05′ Long. W., depth 362 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; and East of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities are situated in the Davis Strait, the Denmark Strait and East and West of the Faröe Islands.

10. **H. similis** n. sp.

Pl. VI, Fig. 6.

Incrusting; surface smooth. Spicula: megasclera; the skeletal spicules acanthostyli with a small but distinct head, the spinulation slight, the larger styli smooth in a long apical part, the styli divided into two groups, large 0·41—0·65 mm, small 0·140—0·238 mm; the dermal spicules strongyla 0·208—0·35 mm; microsclera strongly curved chelæ arcuatæ 0·035—0·044 mm.

This species forms small incrustations on shells of Brachiopods, mussels and Gasteropods, and on small stones; one specimen grows on a dead *Oculina* and another on a specimen of *Iotrochota* *excata;* the greatest extent to which it reaches is 16^{mm}. The colour (in spirit) is whitish to light yellowish. The *surface* seems, in the places where the sponge is undamaged, to be without projecting spicules. The *dermal membrane* is a thin film with close-lying chelæ.

The *skeleton.* The *dermal skeleton;* the dermal spicules form fibres or bundles, which under various arrangements stretch more or less obliquely from the interior of the sponge out to the dermis; they may also be found in or below the membrane as horizontal bundles; the fibres may be of a considerable thickness; besides, the membrane has close-lying chelæ. The *main skeleton* consists in the ordinary way of more or less vertical acanthostyli with their heads attached to the substratum; the styli are placed somewhat dispersedly. Spongin was not observed.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli with a more or less marked, but small head and they taper into a long, fine apex; they are curved, and the curvature lies nearest to the head, it is found both in the large and small styli, for which latter it is especially characteristic. The spinulation is not strong; in the longer styli there are larger spines only on the head-end, the lower part of the shaft is grittily spinulous and the larger outer part, sometimes the whole shaft, is smooth; the smaller styli are a little more strongly spined and in the whole or nearly the whole length. The length is in all 0·149—0·65^{mm}; the styli are rather distinctly divided into two groups, the large not going below 0·41^{mm} and the small not beyond 0·238^{mm}; the diameter of the head is 0·014—0·025^{mm}. 2. The dermal spicules are straight strongyla, they are only very slightly thicker in the middle than towards the ends, one end is a little thicker than the other. The length is 0·298—0·35^{mm} and the diameter is between 0·004 and 0·005^{mm}. b. *Microsclera;* these are chelæ arcuatæ; they have an evenly but strongly, up to nearly semicircularly curved shaft, the end-parts are relatively small, the alæ lobe-shaped; the shaft is somewhat flattened. The length is 0·035—0·044^{mm}, and the diameter of the shaft 0·004—0·011^{mm} according as it is seen in profile or in front view. The chelæ occur numerously in the dermal membrane and sparingly otherwise in the tissue.

This species stands near to *H. longistylus* n. sp. (to be described hereafter), but it is distingushed by the more strongly curved small styli and by other dermal spicules and chelæ; it is also related to *H. curvichela*, but also from this it is distinguished by the characteristic, curved small styli. The species must moreover be allied to *H. (Hymeniacidon) paupertas* Bow. but the small styli figured for this species, and also the figure of the chelæ seem to prevent identification.

Locality: Station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 10, 64° 24′ Lat. N., 28° 50′ Long. W., depth 788 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 204 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; further it has been taken at 63° 12′ Lat. N., 20° 06′ Long. W., depth 270 fathoms (The Fishery investigation steamer "Thor"); and East of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902); in all about nine specimens. The localities lie in the Denmark Strait, South of Iceland and East of the Faröe Islands.

11. H. nummulus n. sp.

Pl. III, Fig. 11, Pl. VI, Fig. 7.

Incrusting; surface hispid? Spicula: megasclera; the skeletal spicules acanthostyli with no real head, divided into two groups, large, only spined below, 0·51—0·95^{mm}, small, entirely spined, 0·12—0·14^{mm}; the dermal spicules strongyla, somewhat tending towards tornota, 0·35—0·46^{mm}; microsclera chelæ arcuatæ, strongly curved with the ends somewhat recurved, 0·028—0·054^{mm}.

Two specimens of this species grow as small incrustations on stones, both of which are richly overgrown with several other sponges, a third specimen coats the broken base of a *Hornera* sitting on a stone. The greatest extent reached is only 10^{mm}. The colour (in spirit) is white. Beyond the *surface* project the long styli, but whether this is so in the undamaged sponge I cannot say, as the surface is in nearly all places not intact. The *dermal membrane* is a thin film and seems to have no proper skeleton, but it is for the greater part wanting. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton;* the dermal spicules form bundles stretching more or less obliquely from the lower part of the sponge to the dermal membrane; the bundles are often rather thick. The *main skeleton* consists in the ordinary way of acanthostyli with their heads placed on the substratum; the long styli reach through the whole sponge; the small styli are by far the most numerous, so that each of the large styli is placed in a group of small ones. Spongin is found at the base of the styli.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two very distinct groups, large and small; the large styli have the base a little thickened but not forming a real head, from here the style tapers evenly to the point; the base bears distinct, but not large spines, outwards they soon nearly disappear so that about the lower half part is only slightly gritty, the rest is smooth; the styli are generally somewhat curved near the base. The small styli also have the head but little pronounced, but it is beset with somewhat large spines, and for the rest the style is spined in its whole length, with somewhat reclined spines. The length of the large styli is 0·51—0·95^{mm} with a thickness at the base of 0·035—0·040^{mm}, the small styli are 0·12—0·14^{mm} long and at the base about 0·021^{mm} thick. 2. The dermal spicules are strongyla with some tendency towards tornota; they are straight and generally one end is a little more pointed than the other; they are of the same thickness in the whole length; their length is 0·35—0·46^{mm}, and the diameter 0·005—0·008^{mm}. *Microsclera* are chelæ arcuatæ; they have a strongly curved shaft, with the end-parts somewhat recurved, the alæ are lobe-shaped and the tooth elliptical; the chelæ vary somewhat in size, the length is 0·028—0·054^{mm} and the diameter of the shaft is 0·004—0·006^{mm}. The mentioned recurvation of the end-parts is very slight or quite disappears in the smallest chelæ.

This species bears some resemblance in spiculation to *H. rugosa*, but it has larger and much smoother styli, smaller chelæ of a different shape, and the strongyla are not polytylote; it is also allied to *H. stylata* n. sp. (to be described hereafter), but differs by the longer and thicker acanthostyli, and a different shape of the chelæ which in *stylata* have the end-parts not recurved.

Locality: Station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; and at 65° 50′ Lat. N., 26° 53′ Long. W., depth

208 fathoms (The Fishery investigation steamer "Thor"). The localities are in the Denmark Strait.

12. **H. dubia** n. sp.

Pl. VI, Fig. 8.

Incrusting; surface finely hispid. Spicula: megasclera; the skeletal spicules acanthostyli with a small head, divided into two groups, large, only spined below, 0·34—0·38^{mm}, small, entirely spined, 0·10—0·23^{mm}; the dermal spicules strongyla 0·26—0·32^{mm}; microsclera chelæ arcuatæ 0·040—0·051^{mm}.

Of this species we have a specimen growing on a stone together with specimens of *H. Koehleri*, *baculifera* Tops., *curvichela*, *Eurypon* sp. and *Plocamia* sp. The specimen has a greatest extent of only 10^{mm}, and it is very thin. The colour (in spirit) is whitish. The *surface* is finely hispid. The *dermal membrane* is thin, somewhat richly charged with chelæ. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules, stretching obliquely from the skeleton below up to the surface; the bundles may vary with regard to the number of spicules contained, but it is generally not great. The *main skeleton* is constructed in the typical way and consists of erect acanthostyli with their heads based on the substratum, the longest of them reach to the dermal membrane, and it would seem that they penetrate through it. Spongin seems to be present at the base, but to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are divided into two rather well separated groups; the larger styli are straight, or most frequently slightly curved, they have a small head-swelling and they taper evenly out into a long apex; on the head-swelling there are somewhat large spines, but for the rest the styli are nearly smooth, only on the lower part, near the swelling, they are slightly gritty; the small styli are similarly shaped, but they are straight, the shaft is totally spined, but the spines are sometimes somewhat dispersed. The length of the large styli is 0·34—0·38^{mm} and the thickness at the base 0·035^{mm}; the length of the small styli is 0·10—0·33^{mm} with a thickness at the base of 0·02—0·028^{mm}, the greatest of these sizes, which form transitions to the large styli, are of rare occurrence. 2. The dermal spicules are strongyla; they are straight and cylindrical, not thicker in the middle; their shape is in so far characteristic as they grow evenly thinner from one end to the other, so that one end is always distinctly thicker than the other. The length is 0·26—0·32^{mm}, and the diameter in the middle about 0·005^{mm}. b. *Microsclera* are chelæ arcuatæ; they have an evenly curved shaft, the alæ are lobe-shaped, slightly triangular and the tooth elliptical with a long, narrow tuberculum; generally the teeth have such a direction that they lie in a straight line connecting the two ends of the chela; the most characteristic feature in the chela is, that the shaft is flattened to a high degree and in such a way, that the front side is nearly flat, the hinder side on the other hand somewhat rounded. The length of the chela is 0·040—0·051^{mm}, the thickness of the shaft is 0·003^{mm} and its breadth 0·011^{mm}. The chelæ occur abundantly and somewhat close-lying in the dermal membrane.

The species is related to *H. Koehleri*, but is distinguished by the large styli, which are nearly smooth and by the strongyla being not polytylote; it is also related to *H. nummulus*, but from this it is distinguished by the chelæ with the flattened shaft and not recurved end-parts.

Locality: East of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902).

13. H. stylata n. sp.

Pl. III, Fig. 2, Pl. VI, Fig. 9.

Incrusting, of a thickness up to 2^mm; surface smooth, with some small, conical papillæ, bearing oscula (and pores), and with a dense skeleton of dermal spicules in the wall. The dermal skeleton strongly developed, the main skeleton weak. Spicula: megasclera: the skeletal spicules acanthostyli with a small, or nearly no head, divided into two groups: large, only spined below, and with the apex short pointed, 0·35—0·63^mm; small, entirely spined, longer pointed, 0·13—0·178^mm; the dermal spicules long strongyla 0·35—0·52^mm; microsclera chelæ arcuatæ 0·038—0·050^mm.

This species grows exclusively on loose bottom material as gravel, sand and the like; it may then sometimes grow all round the material and quite imbed it, so that the substratum in this case comes to lie in the interior of the sponge; this manner of growing recalls to some degree that of *Hamacantha implicans* described in the first part of this work. The thickness of the incrustation varies a good deal on account of the manner of growing, from 0·5 to about 2^mm; moreover parts of the sponge-tissue may reach in between the particles of the substratum. The specimens in hand form, together with their more or less imbedded substratum, roundish or elongate bodies of a greatest length of 14^mm and a thickness of 4–5^mm. The colour (in spirit) is whitish or yellowish grey. The *surface* bears some conical papillæ, which are generally more or less depressed; they may reach a length of 2^mm. The surface is otherwise smooth or at all events only slightly hispid from projecting dermal spicules. The *dermal membrane* is somewhat solid and not specially thin; it is densely filled with chelæ and rests on the skeleton below, but it has no proper skeleton. *Oscula* and *pores:* The above-mentioned papillæ bear the oscula, and I think also the pores; I have not observed pores, but there seems to be some difference between the papillæ, some being higher and with a distinct opening, others being lower, and, as it were, closed at the apex; the latter perhaps are pore-bearing, the case being as in the following species, *H. verrucosa.*

The *skeleton* is on account of the mode of growth of the sponge, irregular, especially in the deeper parts. The *dermal skeleton:* the skeleton formed of the dermal spicules is by far the most predominant, the other skeleton being only weakly developed. The dermal spicules form bundles or fibres stretching from the substratum and occupying nearly all the thickness of the sponge; they are somewhat irregularly arranged, but at the surface they form distinct fibres, running somewhat horizontally under the dermal membrane, but reaching it with the ends which have the spicules spread in a penicillate way and bear the membrane. Fibres from the skeleton stretch up in the wall of the papillæ and form here a layer of parallel and densely arranged spicules. The dermal membrane is moreover filled with chelæ. In the parts of the sponge found between the particles of the substratum, dermal spicules are also seen. The *main skeleton* is as said rather feeble in proportion to the whole skeleton; it is formed in the ordinary way and consists of acanthostyli with the heads inserted on the substratum, but the acanthostyli are rather scattered; they are turned in very different directions, and they are found in greatest numbers in the parts of the sponge which are distributed between the particles of the substratum; the spicules situated here may be directed in any direction. At the substratum there is a small amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two groups, large and small; the large styli are rather long and slender, they are straight or slightly and evenly curved; the head is weakly or not at all developed; they taper only a little outwards, and they are short and abruptly pointed. The spinulation is only present in the lower part of the style, at most stretching half the way out, but very dispersed in the outer part; the spines are somewhat robust, generally there are some larger spines among them, especially at or near the base, thus marking the otherwise weakly marked head. The small styli do not reach more than one fourth in length of the large, they are straight and longer pointed than the large; their spinulation resembles that on the base of the large, but they are spined in their whole length. The large styli are 0·35—0·63 ^{mm} long, and the diameter at the base is 0·020—0·028 ^{mm}. The small styli are of a length of 0·13—0·178 ^{mm} and a diameter at the base of about 0·014 ^{mm}. No intermediate forms between the two sizes of the styli are found. 2. The dermal spicules are long and straight strongyla; one end is generally a little thinner than the other, but otherwise they are nearly of the same thickness throughout their whole length. The length is 0·35—0·52 ^{mm} and the diameter 0·006—0·008 ^{mm}. b. *Microsclera.* These are chelæ arcuatæ, they have an evenly curved shaft, the alæ are strongly incised in the lower edge, and hence somewhat claw-shaped when viewed laterally, the tooth is pointed lanceolate. The length of the chelæ is 0·038—0·050 ^{mm}; the shaft is somewhat flat, the thickness is in relation to this 0·004—0·007 ^{mm}. The chelæ are seen in small numbers through the whole sponge and densely filling the dermal membrane.

This species is somewhat related to *H. nummulus*, but it is, as mentioned under this species, distinguished by smaller acanthostyli and a different shape of the chelæ.

Locality: Station 113, 69° 31′ Lat. N., 7° 06′ Long. W., between Iceland and Jan Mayen, depth 1309 fathoms (bottom temperature ÷ 1° 0 C.); about ten specimens.

14. **H. verrucosa** n. sp.

Pl. III, Fig. 3. Pl. VII, Fig. 1.

Incrusting; thickness about 2 ^{mm}; surface smooth, covered with wart-shaped papillæ with a dense skeleton of dermal spicules in the wall, bearing oscula (and pores). Dermal skeleton strongly developed, the main skeleton weak. Spicula: megasclera; the skeletal spicules acanthostyli with a generally small head, the longer only spined below, the smaller spined in the whole length, 0·095—0·62 ^{mm}, not divided into two groups; the dermal spicules long strongyla 0·37—0·52 ^{mm}; microsclera chelæ arcuatæ 0·035—0·044 ^{mm}.

Of this species we have four specimens, one has grown as an incrustation on a stone from which it has been peeled, in the basal part of it much gravel and the like is imbedded; the specimen is now separated into two pieces of a largest extent of about 25 ^{mm}, but they have certainly formed a single incrustation. Of the other specimens one forms an incrustation on a basalt-block, it has a greatest extent of 22 ^{mm}; two others cover *Astarte*-shells and are of similar dimensions. The thickness is about 2 ^{mm}. The colour is in the present state (in spirit) greenish white, but for one of the specimens it is stated to have been deep blue in the fresh state of the sponge. The *surface* is smooth, without projecting spicules, but it is densely beset with low wart-shaped papillæ, which may vary somewhat in height and therefore be more or less conspicuous. The *dermal membrane* is a thin, but somewhat solid membrane; it is densely charged with chelæ. *Oscula* and *pores:* The mentioned papillæ are, I suppose, both oscular and pore-papillæ, the fact is that there seems to be some difference in their structure; some of them are relatively pointed and have an opening above, while most of them are broader above and have here a prominent edge, but inside this are closed by a membrane; in this membrane I have not observed pores, but probably they are closed; in both cases there are large, hollow spaces below the papillæ.

The *skeleton.* The *dermal skeleton;* as the skeleton formed of the acanthostyli is quite inconsiderable, it is the skeleton consisting of the dermal spicules which forms by far the greatest part of the whole skeleton; it consists of fibres which stretch quite from the base of the sponge upwards and support the dermal membrane; the fibres run more or less vertical, outermost, at the surface, the spicules are somewhat penicillately spread, or the fibres bend off below the membrane and run under it as horizontal fibres. The fibres may have a rather variable thickness, but they are always relatively thick and consist of many spicules; the thickness was e. g. measured to 0·06—0·24 . Under their course outwards the fibres may be more or less branched. In the wall of the papillæ the dermal spicules form a dense skeleton, lying parallel with one end towards the edge of the papilla and here they are somewhat projecting. The dermal membrane itself is densely charged with chelæ, forming a dense layer. The *main skeleton* consists as commonly of acanthostyli with their head-ends attached to the substratum; the skeleton is much dispersed as there is only found a bundle of styles in each place where the fibres, formed of the dermal spicules, go down to the substratum, the styli thus forming the lowermost part of these fibres, just at the substratum. At the base a somewhat rich amount of spongin is found, in which the heads of the acanthostyli are imbedded.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight or, especially the larger ones, slightly curved acanthostyli; they taper into a long apex, which in the larger of them is a little more abruptly pointed outermost. The head may be somewhat various, it is generally not much swollen, but however somewhat pronounced on account of its spinulation. The spines are largest on the head: the larger styli are only spined below, when they are shorter the spinulation goes further out, and the smallest styli are entirely spined; in these latter the spines are rather large and they are reclined, in the larger styli the spines are most often smaller and less distinctly reclined. The length varies much, from 0·095—0·62 ^{mm}, and the diameter of the head from 0·014—0·039 ^{mm}. All transitions in size are found, but the intermediate sizes are rare. 2. The dermal spicules are long, straight or very slightly curved strongyla which are of the same or about the same thickness in the whole length: one end is short and rounded, the other is a little longer, nearly truncately pointed, this latter end is generally slightly swollen, not so much however that the spicule may be termed a tylostrongyle; the swollen end corresponds to the original end of the spicule; sometimes both ends may be very slightly swollen, the spicule thus approaching a tylote; the strongyla may be quite slightly polytylote. The length is 0·37—0·52 ^{mm} and the diameter about 0·004—0·008 ^{mm}. Quite monactinal developmental stages were found. b. *Microsclera:* these are chelæ arcuatæ, they are of ordinary shape, with a regularly and evenly curved shaft, the tooth is elliptical and the alæ lobe-shaped, short and rounded, and of the same length as the tooth. The length is $0.035-0.044^{mm}$, the shaft is flattened, its thickness is in relation to this $0.003-0.007^{mm}$. The chelæ occur through the whole sponge and in a dense layer in the dermal membrane.

This species is somewhat characteristic, besides from its exterior, from the small acanthostyli being straight and slender and with large, distinctly reclined spines, and from the large strongyla; it is to be noted that it is not the smallest styli, but those a little longer which especially have large spines. The species is nearly related to the preceding *H. stylata*, but it is distinguished by the small acanthostyli with their large, reclined spines and distinct heads; also the strongyla are different, and the alæ of the chelæ are longer and more pointed in *H. stylata*.

Locality: Station 54, 63° 08' Lat. N., 15° 40' Long. W., depth 691 fathoms; and at 64° 42' Lat. N., 27° 43' Long. W., depth 426 fathoms (Wandel). In all four specimens. The localities lie in the Denmark Strait and south of Iceland.

15. **H. procumbens** n. sp.

Pl. VII, Fig. 2.

Incrusting: surface slightly hispid. Spicula: megasclera; the skeletal spicules acanthostyli with a small head, spined in the whole or nearly the whole length, the longer only very slightly spined outwards, $0.089-0.35^{mm}$, not divided into two distinct groups; the dermal spicules tornota $0.23-0.327^{mm}$; microsclera chelæ arcuatæ, often strongly curved, $0.024-0.038^{mm}$.

This species grows as small incrustations on pebbles, one specimen grows on the shell of an *Arca*, and one on a dead *Oculina;* it has a greatest extent of about 12^{mm}, and the thickness is exceedingly small. The colour (in spirit) is nearest whitish or whitish grey. The *surface* is very slightly hispid on account of the generally only to a slight degree projecting spicules. The *dermal membrane* is a thin film, supported by bundles of dermal spicules; it has somewhat densely lying chelæ.

The *skeleton.* The *dermal skeleton* consists of bundles of dermal spicules which are generally somewhat fan-like spread; the bundles stretch out to the surface, but they are for the greatest part strongly decumbent in the membrane. The *main skeleton* has the typical construction; it is rather dispersed, the single styli standing somewhat scattered. Spongin I could not observe.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight or nearly straight acanthostyli with the head-end most frequently rather weakly marked; the longest styli are often somewhat curved near the base; the spines are large on the head-end, but decrease rapidly outwards both with regard to size and to number, and the largest styli have thus the spines on the outer part much dispersed, and the spines are here weak. The small styli are entirely spined, and the spines are larger, but there does not seem to be sharply divided groups. The length is $0.089-0.35^{mm}$ and the diameter of the head is $0.011-0.027^{mm}$. 2. The dermal spicules are tornota which are straight, or sometimes a little irregularly curved; one end is generally slightly thinner than the other; they are fusiform, being somewhat thicker in the middle, and some few are seen reaching a considerable thickness. The length varies much, from $0.23-0.327^{mm}$, and the diameter is $0.004-0.0075^{mm}$. b. *Microsclera;* these are chelæ arcuatæ; they have a more or less, sometimes very strongly, curved shaft, the end-parts are relatively small. The length is 0·024—0·038^{mm}, and the diameter of the shaft 0·003—0·005 . The chelæ occur numerously and rather densely in the dermal membrane.

This species may vary somewhat, especially with regard to the size and shape of the chelæ; it is most characterised by the fusiform tornota, and this character in conjunction with the shape of the acanthostyli distinguishes the species with certainty.

Locality: Station 54, 63° 08' Lat. N., 15° 40' Long. W., depth 691 fathoms; station 98, 65° 38' Lat. N., 26° 27' Long. W., depth 138 fathoms. The localities are situated in the Denmark Strait and South of Iceland.

16. H. perforata n. sp.

Pl. III, Fig. 4, Pl. VII, Fig. 3.

Incrusting; surface somewhat hispid; main skeleton rather dense. Spicula: megasclera: the skeletal spicules acanthostyli with a very small or no head, entirely spined, or the longer with a smooth apical part, 0·080—0·53, not divided into two groups; the dermal spicules slender tornota 0·178—0·22^{mm}; microsclera chelæ arcuatæ, very varying in size, 0·021—0·054^{mm}.

This species grows chiefly on Brachiopods, as well on dead shells as on living specimens; we have in all sixteen specimens, thirteen of which grow on Brachiopods; the other three grow respectively on a Bryozoon, a worm-tube and a *Pecten*-shell. The greatest extent to which the species reaches is about 16^{mm}, and the thickness is not beyond 0·5^{mm}. The colour (in spirit) is brownish yellow to dark greyish brown. The *surface* is hispid on account of the longer styli projecting beyond it. The *dermal membrane* is a thin and transparent film. In the membrane larger and smaller, circular or oval openings are found, which are *oscula* and *pores;* they were measured of sizes from about 0·05 to 0·3^{mm}, but there seem to be all intermediate sizes, so that it is often not possible to decide whether we have to do with incurrent or excurrent openings; the smaller openings, however, were most frequently collected in groups over the subdermal cavities, but the dermal membrane was much damaged and therefore the whole structure was not to be decided with certainty; probably there is the difference, that the pores form sieves while the oscula are larger, single openings. The somewhat close-lying, circular subdermal cavities or openings of the canals shine through the membrane, but they are only visible by the aid of a lens.

The *skeleton.* The *dermal skeleton:* in the dermal membrane occur the chelæ numerously, but somewhat scattered. The dermal spicules form bundles which stretch in an oblique direction from the skeleton out to the membrane; besides, both bundles and scattered spicules are found lying horizontally in the membrane. The *main skeleton* consists in the ordinary way of acanthostyli which have their heads attached to the substratum; the longest of the styli pierce the membrane, the surface thus getting strongly hispid, but as the largest styli are not numerous, the sponge is somewhat dispersedly hispid; on the other hand the styli are in this species very dense at the base, so that whether the sponge is seen in a vertical section, or the surface of attachment is seen from below, the styli are seen standing nearly head by head, only here and there divided by the cavities of the canal system. At the base of the sponge there is found a somewhat rich amount of spongin in which the heads of the styli are imbedded.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or generally slightly curved; they have no head-swelling marked off or this is only weakly pronounced, and they taper evenly into a long, rather fine apex, and accordingly they are of a more or less club-like shape. The size varies to a high degree, and in relation to the size the spinulation also varies, but separate groups of size do not exist. The smaller the styli are the relatively stronger they are spined, and the spines are on the small styli continued out to the very point; the longer the styli, the longer a part of the apex remains smooth; in the large styli also the close-standing, somewhat large spines on the head-end are relatively smaller than in the small styli, and the spines placed on the shaft are very small. The spines are in this species only slightly, or not at all reclined. The length varies from 0·080—0·53 ^{mm}, and the diameter at the head is about 0·011—0·031 ^{mm}. 2. The dermal spicules are thin tornota; they are straight, of the same thickness in the whole length or quite slightly thicker in the middle; the points are typical tornote points, short and bounded by straight lines, and they are very sharply pointed. The fully developed tornota have the two points uniform or nearly uniform. The length is 0·178—0·22 ^{mm}, and the diameter about 0·0028—0·0040 ^{mm}. b. *Microsclera* are chelæ arcuatæ; they have an evenly curved shaft, an elliptical tooth with a long tuberculum, and alæ of the same length as the tooth. The size varies very much, the length from 0·021—0·054 ^{mm} and the diameter of the shaft is in relation to the size 0·002—0·007 ^{mm}. Some single developmental stages were seen. The chelæ occur numerously in the dermal membrane, and are also seen singly lower down in the sponge.

Locality: Station 4, 64° 07′ Lat. N., 11° 12′ Long. W., depth 237 fathoms; station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 16, 65° 43′ Lat. N., 26° 58′ Long. W., depth 250 fathoms; station 27, 64° 54′ Lat. N., 55° 10′ Long. W., depth 393 fathoms; station 28, 65° 14′ Lat. N., 55° 42′ Long. W., depth 420 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; further, it has been taken at 63° 05′ Lat. N., 22° 23′ Long. W., depth 115 fathoms and 63° 21′ Lat. N., 16° 22′ Long. W., depth 296 fathoms. The localities lie in the Davis Strait, the Denmark Strait, South of Iceland and between Iceland and the Faröe Islands.

17. **H. clavigera** n. sp.

Pl. III, Fig. 8 b, Pl. VII, Fig. 4.

Incrusting, thin: surface hispid. Spicula: megasclera; the skeletal spicules club-shaped acanthostyli, divided into two groups, both entirely spined, large 0·25—0·298 ^{mm}, small 0·095—0·12 ^{mm}; the dermal spicules tornota 0·16—0·178 ^{mm}: microsclera chelæ arcuatæ 0·041—0·052 ^{mm}.

This species grows incrusting on a stone, which bears several other small sponges, and it grows quite close to a specimen of *H. Bowerbanki* n. sp. to be described hereafter; it has a greatest extent of 12 ^{mm}, and it is exceedingly thin and delicate. It is of a whitish colour (in spirit). The *surface* is very hispid on account of the erect styli being protruding. The *dermal membrane* is imperceptible and not separable, but it appears to be a very delicate membrane, richly provided, however, with chelæ. *Oscula* and *pores* were not seen, but the sponge is perforated by close-standing, vertical canals which shine through the dermal membrane and are seen on the surface as dark, round points; it would seem that the oscula are simple openings in the membrane, and the pores lie several together over the openings of the incurrent canals.

The *skeleton.* The *dermal skeleton* consists of dermal spicules stretching from the skeleton below and out to the dermal membrane; it is very weakly developed and seems only to consist of single spicules, not forming bundles, and the spicules are not numerous. The *main skeleton* is formed in the ordinary way of erect acanthostyli with the head-ends based on the substratum, the longer of them protrude far beyond the surface; a very faint amount of spongin is present at the base.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, and they are rather characteristic; though the basal end is the thickest part of the spicule there is however no head-swelling developed at all; from the basal end the spicule becomes only slightly thinner outwards, and the point is somewhat short; the spicule thus has a somewhat club-like shape; they are generally slightly curved. The styli are divided into two well defined groups, large and small. The large styli have a somewhat slight spinulation, only at the base there are some stronger, but however rather small spines, they are blunt and generally curved somewhat upwards towards the apex of the style; on the other part of the style the spines are small, but they are present to or near to the point, and they are reclined. The small styli have quite the same shape as the large, only they are generally not curved and the spines are relatively larger. The length of the large styli is 0·25—0·298 mm, with a thickness at the base of 0·021 mm, and of the small styli 0·095—0·12 mm with a thickness of about 0·013 mm; as is seen the two groups are fairly distinct in size, and the variation in each group is only slight. 2. The dermal spicules are tornota; they are straight, rather thin and of equal thickness in the whole length; the points are short and sharp; the length is 0·16—0·178 mm, and the diameter 0·002 mm. b. *Microsclera* are chelæ arcuatæ; they have an evenly curved shaft, the alæ are lobe-shaped with the lower edge broad and straightly cut off, and the tooth is elliptical. The length is 0·041—0·052 mm and the thickness of the shaft 0·005—0·007 mm. The chelæ are abundantly present in the dermal membrane.

This species is nearly related to *H. perforata*, but it is distinguished by several characters; the main skeleton is less dense, the acanthostyli not being so densely crowded, the two distinct groups of acanthostyli are not present in *perforata*, and the acanthostyli are in the present species much less spined and in their whole length, while in *perforata* they are more strongly spined, but with the apical part smooth; also in the shape of the tornota and the chelæ there are small differences, and finally the sizes of the spicules are different.

Locality: The Denmark Strait, 65° 50' Lat. N., 26° 53' Long. W., depth 208 fathoms (The Fishery investigation steamer "Thor").

18. **H. platychela** n. sp.

Pl. VII, Fig. 5.

Incrusting; surface hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a small head, somewhat strongly spined in the whole or nearly the whole length, 0·13—0·45 mm, not divided into *two groups: the dermal spicules tornota* $0{\cdot}327-0{\cdot}53^{mm}$; *microsclera chelæ arcuatæ of a curious, broad and flat shape,* $0{\cdot}032-0{\cdot}035^{mm}$.

Of this species we have one specimen, growing on a shell-fragment of a *Pecten;* the specimen grows on both sides of the shell having grown round the edge from one side to the other; the largest extent of the specimen is 15^{mm}, and the thickness about $0{\cdot}5^{mm}$. The colour (in spirit) is brownish yellow. The *surface* is hispid from projecting dermal spicules. The *dermal membrane* is a thin film, but it is wanting to a great extent on the specimen. *Oscula* and *pores* were not observed.

The *skeleton.* The *dermal skeleton:* the dermal spicules form bundles or fibres which stretch from the main skeleton, often from the lower part of this or quite from the base, in an oblique direction up to the surface, and project beyond this, and it is thus chiefly these spicules which cause the hispidity of the surface; outermost the spicules in the bundles are spread out somewhat fan-like. When the sponge is examined from above with a good lens, therefore, the fan-like bundles of dermal spicules are seen. In the membrane chelæ are found, but they are very scattered. The *main skeleton* is of the typical construction, consisting of vertical acanthostyli with their heads fixed on the substratum; the longest of them project beyond the surface and contribute to the hispidity of the sponge. At the base spongin is found, but only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or somewhat curved; the head-end is a little swollen, and they taper evenly into a long, fine apex. The spinulation is somewhat strong, the spines on the shaft are compressed and reclined downwards; the spines on the head-swelling are considerably longer, they are not compressed, and radiate straight out; these spines are truncate at the end and sometimes somewhat curved and hook-shaped, the small and intermediate styli are spined in their whole length, the longest styli, on the contrary, have a generally rather short part of the apex smooth. The styli vary much in size, but they are not divided into groups. The length is $0{\cdot}13-0{\cdot}45^{mm}$, and the diameter of the head $0{\cdot}018-0{\cdot}035^{mm}$. 2. The dermal spicules are long, straight tornota, they are slightly fusiform; the ends are short pointed, and the points are bounded by straight or concave lines. The fully developed tornota have equal ends, but the developmental stages are monactinal. The length is $0{\cdot}327-0{\cdot}53^{mm}$, and the diameter in the middle about $0{\cdot}005-0{\cdot}008^{mm}$. b. *Microsclera:* these are chelæ arcuatæ; they are of a curious, short and flat shape; the shaft is slightly curved, and is not flattened; the alæ are broad and lobe-shaped, and the tooth is rather broad and a little shorter than the alæ. The angle between the axis and the tooth, and the curvature of the alæ are such, that a transverse section of the chela through alæ and tooth would form a transverse ellipse. For the rest the chelæ are not rarely of a more or less irregular shape, and some monstrosities are also found. The length of the chelæ is $0{\cdot}032-0{\cdot}035^{mm}$, and the diameter of the shaft about $0{\cdot}004^{mm}$. The chelæ occur only in the dermis, but also here only in small numbers.

Locality: Station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; the station lies in the Denmark Strait.

19. **H. basispinosa** n. sp.

Pl. III, Fig. 5, Pl. VII, Fig. 6.

Incrusting; surface smooth, bearing some small, conical oscular cones with a dense skeleton of dermal spicules in the wall. Spicula: megasclera: the skeletal spicules acanthostyli with a small head, *divided into two groups, large, only spined at the base, 0·42—0·50^{mm}, small, entirely spined, 0·09—0·23; the dermal spicules large tornota, 0·32—0·50^{mm}; microsclera small chelæ arcuatæ, resembling palmate chelæ, 0·025—0·030^{mm}.*

The only specimen of this species forms an incrustation on a shell of a Brachiopod; it has a greatest extent of about 15^{mm}; the thickness is 0·5^{mm} or a little more. The colour (in spirit) is dark brownish. The *surface* is smooth or nearly so, without projecting spicules; it bears some conical papillæ of a length of about 1^{mm}; in the present state of the sponge the papillæ are lying down towards the surface. The *dermal membrane* is thin, resting on the skeleton beneath and provided with some spicules, more or less scattered or bundle-like collected. *Oscula* and *pores:* the mentioned papillæ are oscular papillæ with the oscular opening at their apex; the fibres of dermal spicules continue into the wall of the papillæ and form here a dense skeleton of spicules lying parallel to the longitudinal axis of the papilla; pores were not observed with certainty; some few, small openings in the dermal membrane may perhaps be pores.

The *skeleton.* The *dermal skeleton.* The skeleton formed of the dermal spicules consists of bundles or short fibres, which stretch from the lower part of the sponge up to the dermal membrane; the fibres are for the greatest part more or less horizontal; some single spicules or bundles lie in the membrane or just below it. The *main skeleton* is in the ordinary way constructed of perpendicular acanthostyli with the heads against the substratum; they are not close-standing but somewhat scattered. A very slight amount of spongin is present at the heads of the acanthostyli.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or slightly curved near the base, and long pointed; the head is more or less pronounced, but generally only to a slight degree. The longer styli are only spined at the base, on the head and a little way out; the small styli are entirely spined, but the spines become scattered towards the point; the spines are small, only at the base some few spines a little larger may be found. The styli are divided into two distinctly separated groups, large and small; the large has a length of 0·12—0·50^{mm} and a diameter of the head of 0·021—0·025^{mm}; the small styli are 0·09—0·23^{mm} long, and the diameter of the head is 0·014—0·021^{mm}. 2. The dermal spicules are rather large tornota, they are straight or nearly so, slightly tapering towards the ends and sometimes slightly polytylote; the points are short and sharp, sometimes the ends are a little swollen; the length is 0·32—0·50^{mm} and the diameter is 0·004—0·007^{mm}. b. *Microsclera:* these are chelæ arcuatæ; they are small and slender, the shaft is only slightly curved, the tooth is elliptical; the alæ are connected with the shaft for about their whole length and the chela thus greatly resembles a palmate chela, or might perhaps even be termed so; the length of the chela is 0·025—0·030^{mm} and the thickness of the shaft 0·002^{mm}. The chelæ are seen singly in the tissue, and they occur in rather great numbers in the dermal membrane, but they form no layer.

This species is nearly related to *H. platychela* and has similar large dermal tornota, but it differs by the much less spined styli and the small chelæ, which are quite different in shape, and finally also by the oscular papillæ.

Locality: Station 28, the Davis Strait 65° 14' Lat. N., 55° 42' Long. W., depth 420 fathoms. One specimen.

20. **H. longistylus** n. sp.

Pl. VII, Fig. 7.

Incrusting: surface somewhat hispid. Spicula: megasclera: the skeletal spicules acanthostyli with the base thickened, but not forming a real head, the longer only spined at the base, the smaller in the whole length, 0·10—0·92^mm^, not divided into two groups: the dermal spicules subtornota to tornostrongyla 0·238—0·28^mm^; microsclera chelæ arcuatæ 0·025—0·045^mm^.

Of this species one specimen grows incrusting on a *Retepora:* it grows in several places on both sides of the *Retepora* and through the holes of this, so that by looking through the holes the projecting spicules of the sponge are seen bordering the holes; another specimen grows on a stone. Its greatest extent is 14^{mm}, and the thickness does not go beyond 0·5^{mm}. The colour (in spirit) is greyish white or white. The *surface* is in the present state of the sponge strongly hispid from the long projecting spicules, but the *dermal membrane* is in most places damaged; only in some single places it is seen; it is a thin film, which seems to be in a somewhat loose connection with the other body; the membrane is provided with scattered dermal spicules. In the places where the membrane is present, the sponge seems to be somewhat hispid, the longest skeletal spicules being somewhat projecting.

The *skeleton.* The *dermal skeleton* consists of loose fibres and scattered spicules which are placed between the longest of the skeletal spicules; in the membrane itself there are found horizontal, scattered spicules. The fibres or bundles may in places be somewhat thick. The *main skeleton* is formed in the ordinary way of vertical acanthostyli; the longest of them project beyond the surface, thus making the sponge strongly, but somewhat dispersedly hispid; the styli are not placed densely. There seems to be some spongin at the base, but I could not observe it with certainty.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; the longest are slightly curved, the small are straight. In the large styli the head end is thickened, but a real head is not marked off, in the small styli the head is more distinctly marked; the styli taper into a long, fine apex; the largest ones are only spined at the base, the small in the whole length, and the spines are relatively largest in the small styli. The length varies exceedingly, but all intermediate sizes are found, the smallest are present in greatest numbers. The length is 0·10—0·92^{mm} and the diameter of the head 0·014—0·028^{mm}. 2. The dermal spicules may best be termed tornota, the ends may be slightly swollen, most frequently this is only the case with one end which then has a distinct, short point, while the other end sometimes is somewhat rounded, so that the spicule might be termed a tornostrongyle; the spicules are straight and not thickened in the middle. The length is 0·238—0·28^{mm} and the diameter 0·0028—0·005^{mm}. b. *Microsclera:* these are chelæ arcuatæ, they are of common shape with an elliptical tooth and lobe-shaped alæ; the shaft is evenly curved and somewhat flattened. The length is 0·025—0·045^{mm} and the diameter of the shaft 0·0028—0·007^{mm} in relation to the size and to whether the chela is seen in side or in front view. The chelæ are found scattered in the tissue, but not, or only singly, in the dermal membrane.

This species shows some resemblance to *H. perforata* and *curvichela,* but *perforata* has shorter styli and pure tornota, and also the main skeleton is much more dense; *curvichela* has similar styli, but the dermal spicules are polytylote strongyla and the chelæ are very strongly curved; it is also related to *H. similis*, but it is, as mentioned under this species, distinguished by the small styli being straight, and by differences in the dermal spicules and the chelæ; also the styli in *similis* are distinctly divided into two groups.

Locality: Station 7, 63° 13' Lat. N., 15° 41' Long. W., depth 600 fathoms, and at 61° 09' Lat. N., 7° 54' Long. W., depth 180 fathoms, (Ad. Jensen, the cruise of "M. Sars" 1902). Two specimens in all. The localities lie South of Iceland and West of the Faröe Islands.

21. **H. occulta** Bow.

Pl. III, Fig. 6, Pl. VII, Fig. 8.

1874. *Hymedesmia occulta* Bowerbank, Mon. Brit. Spong. II, 250, III, Pl. LXXIX, figs. 9–11.

1894. *Desmacidon occultum*, Hanitsch, Trans. Liverp. Biol. Soc. VIII, 180.

1894. *Hymeraphia occulta*. Topsent, Rev. Biol. du Nord de la Fr. VII, 12 et 21.

1904. *Leptosia occulta*, Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 186, Pl. XV, fig. 1.

Incrusting; surface smooth, generally with a number of papillæ, bearing oscula and pores, and with a dense skeleton of dermal spicules in the wall. Spicula: megasclera: the skeletal spicules acanthostyli with a small, but distinct head, divided into two groups, larger, only spined below, 0·47—1·10^{mm}, *smaller, entirely spined, 0·110—0·20*^{mm}*; the dermal spicules tornota to oxea 0·34—0·50*^{mm}*; microsclera chelæ arcuatæ with relatively small end parts, 0·034—0·040*^{mm}.

Of this species we have some specimens growing on stones, pebbles, small shells and one on a tube of *Placostegus tridentatus*. Most specimens are rather small, only reaching to an extent of 12^{mm}; only two specimens, growing on larger stones, have a greatest extent of 18 and of 20^{mm}; the thickness reaches at most 1^{mm}. The colour (in spirit) is whitish grey or brownish. The *surface* is nearly smooth, but seen with a lens it shows small, punctiform projections, caused by the skeletal spicules reaching the dermal membrane, but not piercing it. The surface may otherwise have a different aspect; in some specimens, especially the small ones, it shows no or only few and imperceptible papillæ, but in the larger and best developed specimens the surface bears a number of papillæ, often rather close-standing; the papillæ are conical or nearly cylindrical, and may reach to a height of about 1·5^{mm}, but the exact length cannot be given, as one side of the wall is generally shorter than the other, the papillæ lying somewhat down towards the surface. The *dermal membrane* is a transparent, somewhat solid and easily separable membrane; it has an irregular skeleton of horizontal spicules and is more or less densely filled with chelæ, which form, however, no layer. *Oscula* and *pores:* the papillæ mentioned are both oscular and pore-papillæ. The oscular papillæ are more conical and tapering than the others and have a simple oscular opening at the summit; the pore-papillæ are broader at the tip and have here a membrane with pores. Bowerbank, who had only one small specimen, does not mention papillæ; Topsent, on the other hand, has perhaps seen something of the kind, as he says (l. c. 186) that the sponge somewhat resembles a small *Hamacantha*.

The *skeleton.* The *dermal skeleton:* the dermal spicules form bundles which stretch almost from the base of the sponge and upwards, thus occupying the whole space between the base and the dermal membrane, lying in different directions between the erect styli of the skeleton. In the dermal membrane the spicules lie horizontally, more or less densely, but quite irregularly, they lie singly or here and there a couple together; the membrane is thus provided with a proper skeleton. The skeleton in the wall of the papillæ is formed of spicules lying parallel to the longitudinal axis of the papillæ and very densely, and it is formed both of the spicules lying in the membrane, and of those stretching from the underlying skeleton up in the wall. Besides the mentioned skeleton the membrane is somewhat densely charged with chelæ which are specially numerous in the pore-membrane in the papillæ. The *main skeleton* consists of erect acanthostyli with the heads placed on the substratum; the longest of them reach through the whole thickness of the sponge up to the dermal membrane. At the base there is a not very conspicuous amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are divided into two well defined groups; the large ones are long and evenly tapering; they are slightly curved, the curvature as a rule placed more or less near the base; the head is only slightly swollen, but, however, somewhat distinct, it is densely beset with spines which are blunt; from the head and a little way out there are spines, decreasing in size outwards, the remainder of the shaft is smooth, or has only scarcely perceptible and scattered grains. The small acanthostyli are straight or nearly so; they have a small head which, however, seems larger on account of its somewhat long, radiating spines; they are spined in their whole length, the spines on the shaft are reclined. The length of the long acanthostyli is 0·47—1·19^{mm}, and the diameter of the head 0·025—0·037^{mm}, the small styli are 0·119—0·26^{mm} long, with a diameter of the head of 0·020—0·025^{mm}. Small individual variations in size may occur. Developmental stages of both sizes of the styli were seen in small numbers, showing that the two sizes are essentially different from the beginning. 2. The dermal spicules are tornota with intermediates to oxea; they are straight and long tapering; they vary a good deal in thickness, when they are thin they may be termed tornota, but often they are more fusiform and are then oxea; their length is 0·34—0·44^{mm} with a thickness of 0·008—0·013^{mm}. Besides these spicules there are some stronger, especially thicker, and fusiform oxea of a length of 0·38—0·50^{mm} and with a thickness in the middle of 0·017—0·028^{mm}. — With regard to these latter spicules the facts are somewhat curious; they are mentioned both by Bowerbank and by Topsent, and both authors say, that they are present only in small numbers. But they seem to be subjected to great variations with regard to the number in which they are present; generally they are only found in very small numbers, and such is the case in most of my specimens; but in one specimen they are very numerous; whether they are few or many they are always only present in the dermal membrane, and lying horizontally, but they are not found in the bundles which stretch down into the sponge; in the specimen mentioned, with numerous thick oxea, the horizontal spicules in the dermal membrane are almost all of this kind; as the skeleton in the wall of the papillæ is formed both of the spicules lying in the membrane itself, and of those belonging to the fibres stretching up into the wall, the skeleton of this latter consists consequently outwards of thick oxea, but inwards of thin ones. In the specimen with numerous thick oxea these are at the same time thicker and upon the whole larger than in the other specimens. — Developmental stages of the dermal spicules were seen in small numbers, they show that these spicules are diactinal from the first beginning. b. *Microsclera:* these are chelæ arcuatæ; they have an evenly curved shaft, the terminal parts are relatively small, and the alæ are somewhat triangular; the length is 0·034—0·040^{mm}; the shaft is not cylindrical but a little flattened, the thickness is in relation to this 0·003—0·005^{mm}. The chelæ occur through the whole sponge and outermost in the dermal membrane; they are especially numerous in the pore-membranes.

Locality: Station 18, 61° 44′ Lat. N., 30° 29′ Long. W., depth 1135 fathoms; station 46, 61° 32′ Lat. N., 11° 36′ Long. W., depth 720 fathoms; station 64, 62° 06′ Lat. N., 19° 00′ Long. W., depth 1041 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms. The localities are situated in the southern part of the Denmark Strait, South of Iceland and between Iceland and Faröe Islands.

Geogr. distr. The species was described by Bowerbank from Scotland, depth 96 fathoms; Topsent l. c. records it from the Azores in depths of 448, 620, 756 and 1200 fathoms. It seems thus to have a very wide bathymetrical range, from 96 to 1200 fathoms.

22. **H. simillima** n. sp.

Pl. III, Fig. 7, Pl. VII, Fig. 9.

Incrusting; surface smooth, bearing small oscular papillæ and very low, poriferous warts, both with a dense skeleton of dermal spicules in the wall. Spicula: megasclera: the skeletal spicules acanthostyli with a small or no marked head, divided into two groups, large, only spined at the base, 0·41—0·65^{mm}, small, nearly spined in the whole length, 0·16—0·19^{mm}; the dermal spicules oxea with intermediates to tornota, 0·32—0·47^{mm}; microsclera strongly curved chelæ arcuatæ 0·028—0·037^{mm}.

Of this species we have several specimens of various sizes, growing on larger and smaller pebbles, shells, Brachiopods and tubes of *Placostegus tridentatus*. They are present in the material in all sizes from quite small up to an extent of 30^{mm}; the thickness is at most 0·7^{mm}. The colour (in spirit) is white to greyish white. The *surface* is smooth, without projecting spicules; otherwise it may have a somewhat wrinkled appearance on account of the papillæ and impressed areas to be mentioned hereafter. The *dermal membrane* is a thin, but distinct and separable membrane; it rests on the skeleton below and is densely filled with chelæ, but has no proper skeleton of horizontal dermal spicules. *Oscula* and *pores:* in the somewhat large and well developed specimens oscula are always found, they are conical papillæ with a simple opening at the summit. The pores are also limited to certain areas, which may be described as very low, broad warts, somewhat recalling the structures in *Inflatella viridis*. They are bounded by a low wall, being generally lower on one side than on the other, the wart lying down towards the surface; the pore-membrane closes the opening and forms a sieve, it is densely filled with chelæ. The pore-areas may be of various, generally relatively large diameters, up to 3^{mm}. When the sponge is examined with a lens, the pore-areas are only seen with difficulty; as they are so very low the pore-membrane is always sunk down on the tissue below and the pores not to be seen, and therefore the only thing seen is a circular, depressed area, surrounded by a sharp edge.

The *skeleton*. The *dermal skeleton:* the dermal spicules form bundles and short fibres stretching from the main skeleton, often almost from the base, upwards to the dermal membrane which rests on them; above they are more or less penicillately spread; they are somewhat perpendicular or more oblique and often somewhat decumbent. The skeleton in the wall of the oscular and pore-papillæ is formed by fibres stretching up in the wall and here forming a skeleton of close-lying, parallel spicules. There is no skeleton of horizontal spicules in the membrane, but this is provided with dense-lying chelæ. The *main skeleton* is of the typical construction formed by vertical acanthostyli with their heads placed on the substratum; the longest of the styli may reach to or near to the surface. Spongin is present at the base, but only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two rather well defined groups of sizes. The large styli are straight or generally slightly curved near the head, this latter is small or not at all pronounced; the spines are only present on the head and a little way out, being here smaller and soon quite disappearing. The small styli are straight, the head is very small and for the greatest part due to the somewhat longish, radiating spines; the style is spined nearly in the whole length, only a small apical part being smooth; the spines are often reclined; they are of moderate size or small, and in this respect there may be some difference in different specimens. The length of the large styli is 0·41—0·65^{mm} with a diameter of the head of 0·020—0·028^{mm}, and of the small styli 0·16—0·19^{mm} and the thickness of the head about 0·021^{mm}. 2. The dermal spicules are oxea with transitions to tornota; they are straight and generally more or less fusiform and somewhat long tapering and in this case they are oxea, the thinner ones are more cylindrical with shorter points and must be termed tornota. The length, which may vary a little in various specimens, is on the whole 0·32—0·47^{mm} with a diameter in the middle of 0·006—0·014^{mm}. The spicules have generally not quite equal ends, but one end is slightly thinner than the other; the thinner the spicule is the more pronounced is this difference, and some few very fine developmental stages were quite monactinal, thus showing that the spicule begins as monactinal. Besides the mentioned dermal spicules there are also in this species, as in the preceding one, some thicker, fusiform oxea, they have a length of 0·29—0·35^{mm} with a thickness in the middle of 0·015—0·017^{mm}; they are very scarce, and as the measurements show, they seem to be connected in size with the ordinary spicules, only being specially short and thick, and in contrast to the case in the preceding species they are here shorter than the ordinary dermal spicules. So far as I have seen, these thicker spicules are found in the outer part of the fibres, just at the dermal membrane. b. *Microsclera:* these are chelæ arcuatæ; they have a strongly, sometimes semicircularly curved shaft, the alæ are lobe-shaped, and short and round; the length is 0·028—0·037^{mm}, the most strongly curved may sometimes be a little shorter; the shaft is somewhat flattened, its thickness is in accordance herewith 0·004—0·007^{mm}; developmental stages were seen in small numbers. The chelæ are seen through the whole sponge, but only in small numbers, in the dermal membrane they form on the other hand a more or less dense layer, and they are numerous in the pore-membrane.

This species is rather similar to and seems also nearly related to *H. occulta*, but it is characteristically distinct; as to the skeleton it is distinguished by the absence of a proper dermal skeleton, and with regard to the spicules the chelæ have a different shape and are much more curved; also the difference in the development of the dermal spicules with diactinal beginning in one and monactinal beginning in the other species is to be noticed. I think it very probable, that the specimens mentioned by Topsent (l. c.) from stations 600 and 899, and which the author refers with some doubt to *H. occulta*, belong to the present species, as he declares the spicules to be somewhat smaller, and especially as he observes, that the chelæ are more curved than in the typical *occulta*; his figures belong on the contrary certainly to *occulta*.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; further it has been taken East of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902), at 66° 20′ Lat. N., 25° 12′ Long. W., depth 96 fathoms (Wandel), and at Angmagsalik in East Greenland, depth 140 fathoms (The Amdrup Expedition 1900). The localities are situated at East Greenland, West and South of Iceland and East of the Faröe Islands; the bathymetrical range goes from 96 to 691 fathoms.

If the species mentioned by Topsent with more curved chelæ and smaller spicules should prove to be the present species, it has also been taken at the Azores in depths of 185 and 100 fathoms.

Remarks: The two species *H. occulta* and *simillima* show great resemblance, and they might be thought nearly related if it were not for the difference in the manner of development of the dermal spicules. The existence of this difference is very interesting, but it is not, however, possible to decide for the present its real importance. The occurrence of special dermal spicules besides the ordinary ones is also an interesting fact; these spicules seem to be only extreme variations of the ordinary form, and we have then here again a fact, showing that the spicules placed outermost in the sponge may be liable to special variations, such as I have pointed out more particularly in Part II of this work (p. 32—33); also the difference in the abundance of these spicules in different specimens of the same species, as shown by *occulta*, has its parallel, as mentioned at the place cited.

23. **H. baculifera** Tops.

Pl. VIII, Fig. 1.

1901. *Leptosia baculifera* Topsent, Arch. de zool. exp. et gén. 3, IX, 354.
1904. — — Topsent, Résultats des camp. sc. du Prince de Monaco, Fasc. XXV, 101, Pl. XV, fig. 2.

Incrusting; surface without projecting spicules. Spicula: megasclera: the skeletal spicules acantho-styli with a distinct head-swelling, spined in the whole or nearly the whole length, 0·077—0·21 mm, not divided into two groups; the dermal spicules strongyla varying to subtylota 0·15—0·238 mm; microsclera small chelæ arcuatæ 0·021—0·025 mm.

This species forms very thin incrustations on stones and on tubes of *Placostegus tridentatus* and other serpulid tubes. The greatest extent to which any of the specimens reach is 38 mm, and the thickness is about 0·3 mm. The colour (in spirit) is whitish to brown. The *surface* has no projecting spicules, but seen with a lens it is finely gritty, caused by the skeletal styli. The *dermal membrane* is a thin film, it is filled with microscleres and supported by dermal spicules. *Oscula* and *pores* I was not able to detect.

The *skeleton*. The *dermal skeleton*. Besides the chelæ filling the dermal membrane, this is supported by bundles of dermal spicules, which stretch upwards from the main skeleton; further some scattered spicules are present in the membrane. The *main skeleton* consists as usual of vertical acanthostyli with their head-ends fixed on the substratum. The longest of the styli reach to the dermal membrane, but without projecting through it. A slight amount of spongin seems to be found just at the substratum, but it is at all events difficult to observe.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli; they are straight or slightly and evenly curved; they have generally a somewhat distinct head-swelling, and they taper from the head into a long apex, which may be more shortly pointed outermost. The spinulation is dense in the lower part of the style, but it is more dispersed outwards; in the longer spicules an apical part is smooth, while the shorter ones are spined to the point. The spines on the shaft are reclined, on the head they are placed more densely and are longer, radiating straight out and generally truncate. The acanthostyli vary much in size, but they are not divided into two groups. The length is 0·077—0·214^{mm}, and the diameter at the base is 0·011—0·028^{mm}. In some specimens the styli did not reach beyond 0·178^{mm}. 2. The dermal spicules are strongyla varying to subtylota; they are straight, sometimes a little polytylote but only to a slight degree. The ends may be simply rounded but they are most frequently slightly swollen; they are not equal, one being a little thinner than the other, and this thinner end shows the most distinct swelling. The length varies in all between 0·15 and 0·238^{mm}; in the single specimens the variation is only slight. The thickness is about 0·002—0·004^{mm}. b. *Microsclera:* these are chelæ arcuatæ; they are rather small, they have an evenly, generally somewhat strongly curved shaft, but with regard to this curvature there may be some little variation; the tooth is lancet-like, and the alæ of the same length as the tooth. The teeth have such a direction, that they lie in a straight line drawn from one end of the chela to the other. The length of the chelæ is 0·021—0·025^{mm}, and the diameter of the shaft 0·002—0·028^{mm}. The chelæ occur in great numbers in the dermal membrane, sometimes somewhat scattered and sometimes quite close-lying; this difference is probably due to the greater or less contraction of the membrane.

As I find no characters separating this species from *H. baculifera* Tops., I have referred it to the latter; especially the figures cited appear to me very like the spicules in the present species.

Locality: Station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 86, 65° 03′ Lat. N., 23° 47′ Long. W., depth 76 fathoms; station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 204 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; further it has been taken at 63° 12′ Lat. N., 20° 06′ Long. W., depth 270 fathoms (The fishery investigation steamer "Thor"), and East of the Faröe Islands, depths 220 and 250 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902); in all about 14 specimens. The station on which most specimens were collected was station 85, the sponge here growing on tubes of *Placostegus*. The enumerated localities are situated in the Denmark Strait, South of Iceland and East of the Faröe Islands.

Geogr. distr. Topsent records the species from the Mediterranean North of Algiers, and at 38° 35′ 30″ Lat. N., 28° 05′ 45″ Long. W., depth about 660 fathoms.

24. H. levis n. sp.

Pl. VIII, Fig. 2.

Incrusting and very thin: surface finely hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a somewhat swollen head and small spines, 0·08—0·25 mm, not divided into two groups; the dermal spicules polytylote tylota or subtylota 0·16—0·21 mm; microsclera small chelæ arcuatæ 0·021—0·024 mm.

The specimens of this species grow on Brachiopods, shells of *Astarte* and other mussels and on *Placostegus tridentatus*. The greatest extent, to which the species reaches, is 19 mm; the sponge forms an exceedingly thin incrustation, the thickness is scarcely above 0·10 mm. The colour (in spirit) is light brownish yellow. The *surface* is finely and densely hispid from projecting skeletal spicules. The *dermal membrane* is a thin film. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton:* the dermal spicules form bundles which go to the surface in an oblique, often very decumbent direction; these bundles are rather scattered. In the membrane the chelæ are found sometimes rather numerously, at other times more scattered. The *main skeleton* consists in the ordinary way of acanthostyli with the head-ends on the substratum; the larger of them project beyond the surface, making this hispid. A small amount of spongin is found at the base.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which have a somewhat characteristic shape; they are straight or generally somewhat curved; the head-end is somewhat swollen, and they taper into a long apex; as they are rather thick at the head-end and are not especially long, they become slightly club-shaped. The head-end has strong spines, in the small styli the other spines are also rather pronounced, but in the larger ones the spines on the shaft are small, the shaft thus almost being merely gritty; in the longer styli the spines are scattered towards the point, but there is generally no long, smooth apical part. The size varies much, but the styli are not divided into two groups. The length is 0·08—0·25 mm, the styli thus being rather short; the diameter of the head is about 0·014—0·03 mm. 2. The dermal spicules are slender, straight tylota or subtylota which are distinctly polytylote; they have a generally rather distinct, longish swelling at each end, the shaft is a little thinner in one end, and the swelling in this end is therefore more marked than in the other. The length is 0·16—0·21 mm, and the diameter about 0·0028—0·004 mm. b. *Microsclera:* these are chelæ arcuatæ; they are rather small, the shaft is somewhat strongly curved, the alæ are nearly triangular and the tooth elliptical and of the same length as the alæ. The length of the chela is 0·021—0·024 mm, and the diameter of the shaft about 0·0028 mm. The chelæ seem to be confined to the dermal membrane.

This species stands very near to *baculifera*, but I consider it as distinct; it is especially the slightly spined acanthostyli which distingush it, and the dermal spicules are also more distinctly polytylote.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 25, 63° 30′ Lat. N., 54° 25′ Long. W., depth 582 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; further it has been taken at 62° 20′ Lat. N., 5° 17′ Long. W., depth 160 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). In all seven specimens. The localities are situated in the Davis Strait, the Denmark Strait and East of the Faröe Islands.

25. H. bractea n. sp.

Pl. VIII, Fig. 3.

Incrusting; surface hispid. Spicula: megasclera: the skeletal spicules acanthostyli, divided into two groups, large, with a small head, only spined in the lower part, 0·28—0·36 mm, small, without head, entirely spined, 0·12—0·15 mm; the dermal spicules tylota 0·27—0·50 mm; microsclera chelæ arcuatæ 0·028—0·034 mm.

Of this species we have only a very small specimen, and the description will therefore in some respects not be quite satisfactory. The specimen grows on a Brachiopod-shell together with a specimen of *Hymenancora duplicata* n. g. et sp. (to be described hereafter), and a small specimen of *Melonanchora emphysema*. It forms a very small, almost circular incrustation, scarcely two millimeters in diameter and very thin; it bears about in the middle a low, cylindrical papilla. The colour (in spirit) is greyish, and the sponge is somewhat transparent. The *surface* is in the present state hispid from projecting skeletal styli. About the *dermal membrane* I can say nothing, and also nothing about *pores* and *oscula*; probably the papilla mentioned is an osculum, but I could not observe it.

The *skeleton*. The *dermal skeleton* seems to consist of scattered bundles of dermal spicules, and it is, so far as I could observe, relatively weakly developed. The *main skeleton* is constructed in the ordinary way and consists of vertical acanthostyli with their heads on the substratum, and it is somewhat dense; the longest of the acanthostyli project beyond the surface, and it seems to be so also in the undamaged sponge.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two groups, large and small. The large acanthostyli are straight, they have a small head-swelling and taper evenly into a long apex which is a little more abruptly pointed outermost; they are spined only on the basal part, at most on the half part; the spines are of medium size, largest below; they are placed most densely on the head-swelling, but more dispersed outwards. The small styli have no head-swelling; the base is the thickest part and from here they taper evenly to the point, thus assuming a club-like shape; these styli are spined in their whole length, the spines at the base radiate straight out, those on the shaft are reclined. The length of the large styli is 0·28—0·36 mm, and the diameter of the head is about 0·02 mm; the length of the small styli is 0·12—0·15 mm with a diameter at the base of 0·014 mm. 2. The dermal spicules are straight and somewhat slender tylota, the end-swellings are distinct but not large; the length varies rather considerably, from 0·27—0·50 mm, and the diameter of the shaft is 0·004—0·007 mm. b. *Microsclera;* these are chelæ arcuatæ, they have a curved shaft, elliptical teeth and lobe-shaped but somewhat narrow alæ. The length of the chela is 0·028—0·034 mm, and the diameter of the shaft 0·004—0·005 mm. The chelæ seem to occur through the whole tissue, but are seen especially at the surface.

Locality: Station 89, The Denmark Strait, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms.

26. H. lævistylus n. sp.

Pl. VIII, Fig. 4.

Incrusting. Spicula: megasclera: the skeletal spicules acanthostyli with a very small head, only spined on and just at the head, for the rest smooth, very uniform in size, 0·44—0·48 mm; the dermal spicules tylota varying to strongyla, 0·27—0·34 mm; microsclera chelæ arcuatæ 0·045—0·052 mm.

Of this species only one very small specimen is present, growing as an incrustation on the inside of a *Pecten*-shell; it is longish and has a greatest extent of only 3·5 mm. The colour (in spirit) is whitish. The *dermal membrane* is thin and densely filled with chelæ. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton* consists of bundles and spicules, which are scattered in different ways from near the base to the dermal membrane; it seems to be rather diffuse; there is no skeleton of dermal spicules lying horizontally in the dermal membrane, but this latter is densely filled with chelæ. The *main skeleton* seems to be somewhat slightly developed, it consists of acanthostyli which are all of the same size, and have the heads based on the substratum. I could detect no spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are very slightly spined, almost smooth acanthostyli; they are straight or slightly curved and have a slightly inflated head; this latter bears more or fewer, but generally only few small spines; near the head the style may be very finely gritty, but for the rest it is quite smooth. The styli are only of one form and very slightly varying in size, so that small forms do not occur. The length is about 0·44—0·48 mm, and the thickness of the head is about 0·017 mm. 2. The dermal spicules are tylota, which are straight, slightly thickened in the middle and with small end-swellings; these latter may be very small or absent, the spicules thus becoming strongyla; the length is 0·27—0·34 mm and the thickness in the middle 0·005—0·007 mm. b. *Microsclera:* these are chelæ arcuatæ; they have a rather curved shaft which is a little recurved at the outermost extremities, the alæ are lobe-shaped and the tooth narrowly elliptical; the length of the chelæ is 0·045—0·052 mm, and the thickness of the somewhat flattened shaft is 0·005—0·008 mm. The chelæ occur in specially large numbers in the dermal membrane.

This species is easily distinguished and stands somewhat apart on account of its almost smooth styli, which are all of nearly the same length.

Remarks: It might be thought, that this species represented only a young stage of some other sponge (a *Lissodendoryx*), but I do not think this possible. To be sure we have no investigations on the skeleton of the youngest fixed stages of the sponges which may come into consideration here, and it is therefore not known, what the first beginning of the skeleton is in species with a reticulate or dendritical skeleton, and it is not impossible, that the styli may at first be placed vertically. The structure of the present species seems so fully to conform with that of *Hymedesmia*, however, that I think it must be in reality a *Hymedesmia;* the styli with a somewhat distinct head, and especially the chelæ being crowded in the dermal membrane are good characters of *Hymedesmia*.

Locality: Station 89, the Denmark Strait, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms.

27. H. Bowerbanki n. sp.

Pl. III, Fig. 8 a, Pl. VIII, Fig. 5.

Incrusting, thin; surface smooth. Spicula: megasclera: the skeletal spicules short, club-shaped, strongly and entirely spined acanthostyli of one size 0·09—0·13 mm; the dermal spicules tylota 0·10—0·23 mm; microsclera chelæ arcuatæ 0·020—0·034 mm.

Of this species one specimen grows on a stone together with *H. clavigera;* on the stone besides grow a *Polymastia* and a *Mesapos;* another specimen is growing on a worm-tube. The sponge has a greatest extent of 12 mm; it is exceedingly thin, not over 0·2 mm, and its thickness is not or only slightly greater than the length of the skeletal styli. The colour (in spirit) is whitish, somewhat milky. The *surface* is smooth, without projecting spicules. The *dermal membrane* is very thin, transparent and not separable; it has no proper skeleton. *Oscula* and *pores* were not observed.

The *skeleton.* The *dermal skeleton;* the skeleton formed by the dermal spicules consists of bundles lying irregularly between the erect acanthostyli; they are more or less horizontal, but stretch up to the membrane; also some single scattered spicules are seen, but there is no dermal reticulation. The *main skeleton* is of the ordinary structure, consisting of erect acanthostyli with the heads based on the substratum; as they are of about the same length, they all reach just to the dermal membrane but none of them project beyond it. I could detect no spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are of a very characteristic shape and to a high degree recall the styli figured by Bowerbank for *H. zetlandica;* they are short and robust, conically tapering and without any head-swelling; they are strongly spined in their whole length; the spines at the base are radiating straight out, while the other spines are directed somewhat downwards; the styli are only of one size and not much varying in length; this is 0·09—0·013 mm and the thickness at the base (the spines, as always, included) 0·021 mm. 2. The dermal spicules are tylota; they are straight, somewhat thickened in the middle, and the end-swellings are small; they have a length of 0·19—0·238 mm, and a diameter in the middle of 0·007—0·009 mm. b. *Microsclera:* these are chelæ arcuatæ which have a somewhat curved shaft and small end-parts, the alæ are somewhat lobe-shaped, rounded downwards, the tooth is elliptical. The chelæ have a length of 0·020—0·034 mm and a thickness of the shaft of 0·0028—0·005 mm respectively; the larger sizes are by far the most numerous. The chelæ are present in the dermal membrane in somewhat considerable numbers, but not at all forming a layer.

This species is evidently nearly allied to *H. zetlandica;* it has the same outer appearance and skeletal structure, and the shape and dimensions of both megasclera and chelæ are in close agreement as also the fact that the styli are of only one form; but *H. zetlandica* has sigmates, while the present species has only chelæ for microsclera.

Locality: Station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; further at 65° 50′ Lat. N., 26° 53′ Long. W., depth 208 fathoms (The Fishery investigation steamer "Thor"). The localities lie in the Denmark Strait. — As said above, one of the specimens grows on a stone together with several other sponges and among these a specimen of *H. clavigera* (Pl. III, Fig. 8 a and b.). These two *Hymedesmia* species grow side by side and quite uniting, but they are easily distinguished from one another by their characteristically different aspects, *clavigera* is whitish, but appears somewhat darkened on account of the black stone shining through it; it is hispid and shows the canals as darker points; *Bowerbanki* on the contrary is of a milky colour, it has a smooth surface of a quite uniform aspect, not showing canals.

28. **H. truncata** n. sp.

Pl. III, Fig. 9, Pl. VIII, Fig. 6.

Incrusting, thin; surface smooth, bearing some small cylindrical or conical oscular papillæ, with a dense skeleton of dermal spicules in the wall. Spicula: megasclera; the skeletal spicules short, somewhat club-shaped, strongly and entirely spined acanthostyli, truncate at the apex and with a neck-shaped constriction above the base; they are of one size 0·065—0·077^{mm}; the dermal spicules tylota 0·28—0·369^{mm}; microsclera chelæ arcuatæ 0·021—0·023^{mm}.

Most specimens of this species grow incrusting on stones, one specimen on a Brachiopod-shell and one on a fragment of a mussel-shell; the specimens are of different sizes, the largest reaches an extent of 40^{mm}; the thickness is very small, generally scarcely exceeding 0·2^{mm}. The colour (in spirit) is light bluish white, somewhat milky. The *surface* is entirely smooth without projecting spicules. The *dermal membrane* is thin and transparent, it is generally easily separable, and seems to be without spicules, resting on the skeleton beneath, but the facts with regard to the dermal membrane are not easily understood; the membrane has a curious, skin-like appearance and consistency, and it is generally filled with cells containing somewhat refringent granules ("cellules sphéruleuses"?), and I think the mentioned state of the membrane is due to the influence of alcohol; in most of the specimens there is moreover outermost a thin, brownish film, more or less easily separable, which is, I think, formed by influence of the alcohol on some sort of mucus. *Oscula* and *pores:* In most of the specimens there are some cylindrical or slightly conical papillæ on the surface; they may reach to a length of 3^{mm}; these papillæ are oscular tubes with the oscular opening at the summit, though in the present state they are generally closed. The number of papillæ present in the various specimens varies from two to eleven. The two smallest specimens showed no papillæ. Pores were not observed.

The *skeleton.* The *dermal skeleton* consists of bundles of dermal spicules, which stretch from the main skeleton, or almost from the base, and up towards the dermal membrane; they are thus lying obliquely or more or less horizontally. In some places the bundles are more numerous than in others, but most frequently they are scattered and not at all numerous; the bundles are rather thick, consisting of numerous spicules. Near the oscular tubes the bundles form fibres which run from various sides into the oscular papilla and form in the wall of the papilla a dense layer of spicules lying parallel to the longitudinal axis of the papilla. The *main skeleton:* In most places the main skeleton is constructed in the ordinary way, the acanthostyli are erect, with their heads based on the substratum; they reach from the base to the dermal membrane, but do not project beyond it; they are, at all events in most places, rather close-standing. I could not detect any spongin. Such is, as said, the structure of the skeleton in most places, and I think these are the places where the sponge is quite undisturbed; but in many other places this is not so, the acanthostyli may here be lying down and crossing each other in all directions, and, what is the most remarkable fact, they may be lying more or less horizontally in or near the dermal membrane; in most places they are then crowded together, in others they are much more scattered. Whether this condition is normal or not, I am not able to say with certainty, but I think it is due to contraction, especially as the normal *Hymedesmia*-arrangement of the skeleton is seen in many places. It was stated above, that the dermal membrane appeared to be somewhat transformed by the preservation in alcohol, but the whole sponge is also evidently highly influenced by the alcohol, the surface being wrinkled to a high degree. I am inclined to think that the exceedingly thin sponge is somewhat mucous in the fresh state, and then is highly contracted by the influence of the alcohol, and this would fully explain the remarkable condition seen in the skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli of a very characteristic shape; they are short and straight, slightly tapering towards the point, this latter is broadly truncate, so that the spicule is nearly cylindrical; they are strongly spined in the whole length, only a little above the base there is an unspined part, and this part is also a little thinner than the rest of the spicule, thus forming a characteristic, neck-shaped constriction; though there is no real head-swelling, the shape mentioned gives the base of the spicule the appearance of a head. Only very rarely the neck-formed constriction is less obvious. The length of the acanthostyli is very uniform, 0·065—0·077 mm, and the diameter at the base is 0·017—0·024 mm. 2. The dermal spicules are tylota; they are straight and rather robust, and they are of the same or nearly the same thickness in the whole length, but just before the ends they are somewhat narrowed, and this narrowing gives rise to the rather slight end-swellings. The shaft is often slightly polytylote. The length is 0·28—0·369 mm, and the diameter 0·009—0·012 mm. b. *Microsclera;* these are chelæ arcuatæ; they have a curved shaft, the teeth are so directed that they are lying in a straight line drawn between the ends of the chela; the alæ are somewhat narrow and rather incised in the lower margin when seen in front view; the tooth is narrowly elliptical. The chelæ are small, the length is 0·021—0·023 mm and the thickness of the shaft about 0·0028 mm. Not rarely chelæ occur which are thicker and more robust in all parts, but these give the impression of not being quite normal. The chelæ are seen in the dermal membrane and in the other parts of the sponge, but generally not in great numbers, on the other hand they are very numerous on the oscular papillæ.

This species is nearly related to *H. Bowerbanki*, but it is easily distinguished by the characteristic acanthostyli as also by several other more minute characters.

Locality: Station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; further it has been taken in Forsblads Fjord in East Greenland, depth 50—90 fathoms (The East Greenland Expedition 1900), at 66° 54′ Lat. N., 15° 38′ Long. W., depth 58 fathoms ("Beskytteren"), South-west of Sudero, depth 180 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities are situated on the East coast of Greenland, in the Denmark Strait, North of Iceland and at the Faröe Islands.

29. **H. latrunculioides** n. sp.

Pl. III, Fig. 10, Pl. VIII, Fig. 7.

Incrusting; surface smooth, bearing some oscular papillæ with a dense skeleton of dermal spicules in the wall. Spicula: megasclera; the skeletal spicules short, conical, very strongly spined acanthostyli with a neck-shaped constriction above the base; they are of one size 0·065—0·071 mm; the dermal spicules tylota, but often with such small swellings, that they approach nearly to strongyla, 0·30—0·40 mm; microsclera chelæ arcuatæ 0·023—0·028 mm.

This species greatly resembles the preceding one in external appearance. One specimen is growing on a stone, which it has nearly quite overgrown, its greatest extent may be estimated to 22^{mm}; three other specimens grow on a stone together with specimens of *Histoderma physa*, *Hymedesmia nummulus*, *H. filifera* and *Plocamia* sp.; the largest of these specimens is 12^{m} in greatest extent. The thickness of the sponge is about 0·5^{mm}. The colour (in spirit) is whitish with a slightly bluish, somewhat milky tint, but in places it may be shaded brownish on account of a film-like covering, such as mentioned in the preceding species. The *surface* is smooth. The *dermal membrane* is thin and has no proper skeleton; it is of the same curious, skin-like consistency and appearance as in *truncata*, and it has very probably been mucous in the living state of the sponge. *Oscula* and *pores:* with regard to the oscula the facts are quite as in *truncata;* on the largest specimen there is a cylindrical, rather large oscular papilla about in the middle, it has a length of 6^{mm}. Pores were not observed.

The *skeleton* is constructed quite as in *truncata*. The *dermal skeleton* consists of somewhat scattered bundles of spicules, the bundles generally consisting of rather many spicules; at the base of the oscular papilla the bundles form fibres which stretch up in the wall of the papilla, here forming a dense spiculation of close-lying, parallel spicules. The *main skeleton* consists in the ordinary way of erect acanthostyli placed with the heads on the substratum; the spicules are rather close-standing. So far as I could observe there is no spongin present. For the rest the skeleton in most places shows all the same conditions and alterations as described above under *truncata*, and I think these conditions are due to the same factors as suggested for this species. Thus the present species also gives the impression of being strongly contracted, and the dermal membrane is obviously wrinkled and folded, and moreover it also shows numerous cells with refringent granules.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli of a very characteristic shape; they may to some slight degree remind one of the discasters in *Latrunculia*. They are short, thick and regularly conical; they are strongly spined, and the spines are large, radiating horizontally, not reclined; there is no head-swelling, but there is a slightly thinner and unspined part above the base, forming, as in *truncata*, a neck-shaped constriction, and this constriction makes it seem as if a head-swelling were present; the constriction mentioned and the outermost point are the only smooth parts. The length is very uniform, 0·065—0·071^{mm} and the diameter at the base is 0·022—0·027^{mm}. 2. The dermal spicules are tylota, but the swellings are often so small that they are nearly strongyla; they are straight with a cylindrical shaft of equal thickness in the whole length; sometimes they are very slightly polytylote. The length is 0·30—0·40^{mm}, and the diameter is 0·008—0·013^{mm}. b. *Microsclera:* these are chelæ arcuatæ; they have a slightly curved shaft, the alæ are lobe-shaped and the tooth elliptical; the lower edge of the alæ is somewhat incised when the chelæ are seen in front view. The length is 0·023—0·028^{mm} and the diameter of the shaft 0·003—0·005^{mm}. The chelæ may vary somewhat, being more slender or more robust, and some of them are found showing a very robust shape, giving the impression of being not normal but influenced by abnormal deposition of silica. The chelæ occur especially in the dermal membrane, and on the oscular papilla they are present in great numbers.

This species is related to the two preceding, but it is characteristically distinguished, especially by its acanthostyli, but also by several other characters.

Locality: Station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; both localities lie in the Denmark Strait.

Remarks: The three species *Bowerbanki*, *truncata* and *latrunculioides* form together with *zetlandica* Bow. a group of related species; *zetlandica* is however distinguished from the three others by possessing sigmata; *truncata* and *latrunculioides* are the two most nearly related species. A fifth species which seems also to belong here on account of its uniform acanthostyli and dermal tylota is the *H. tenuissima* Dendy (established by the author under the generic name of *Myxilla*), and perhaps also a sixth species must be referred to this group, viz. *H. obtusata* Tops., but this latter species has no microsclera; its curious, obtuse acanthostyli with a little knob at the apex vary a little more than the acanthostyli in the other species, from 0·13 to 0·23 ^{mm}.

If the views about the relationship of these species are correct, and they are certainly so at all events with regard to the first four species, we have an interesting example which shows, that in a group of nearly related species we may have forms with chelæ and sigmata, with chelæ alone, and with no microsclera at all. This confirms the view advanced in the introduction to the genus, that it is not possible to create genera here according to the presence or non-presence of the mentioned forms of microsclera.

30. **H. irregularis** n. sp.

Pl. VIII, Fig. 8.

Incrusting; surface partly smooth partly hispid. Spicula: megasclera; the skeletal spicules acanthostyli with a distinct head, the smaller spined in the whole length, the larger with a smooth apical part, 0·12—0·50 ^{mm}, not divided into two groups; the dermal spicules polytylote styli 0·298—0·39 ^{mm}; microsclera chelæ arcuatæ 0·040—0·050 ^{mm}.

This species generally forms incrustations on small stones, a couple of specimens grow on shells of *Astarte sulcata*; the greatest extent to which the sponge reaches is about 20 ^{mm}, but most specimens are smaller; three of them, which grow together on a pebble are quite small, the smallest only 4 ^{mm}. The thickness is scarcely more than 0·5 ^{mm}. The species is of a somewhat irregular appearance, because it, at all events generally, does not grow flat on the substratum but has imbedded in its base some small particles and gravel. The colour (in spirit) is yellowish grey to whitish. The *surface* is in some places smooth, in other places densely hispid from projecting dermal spicules. The *dermal membrane* is a somewhat solid membrane, densely charged with chelæ. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton:* in the dermal membrane the chelæ are close-lying, forming a layer; the skeleton formed by the dermal spicules is strongly developed; it consists of spicula-bundles or fibres which stretch from the main skeleton or quite from the base up towards the surface, outermost the bundles are penicillately spread and support the membrane; the spicules sometimes terminate just in the membrane, sometimes they pierce it more or less. When the sponge is examined from above under the microscope, fan-shaped, more or less decumbent bundles of dermal spicules are therefore seen. The dermal spicules all have the pointed end turned outwards. The *main skeleton* consists in the ordinary way of acanthostyli with the head-ends based on the substratum; on account of the irregularity of the substratum on which the sponge grows, the styli may show some irregularity with regard to direction. On the same account there may be great difference with regard to the relation of the main and the dermal skeleton to one another; when the sponge grows directly on the shell or the stone the construction is the common one, and the larger styli reach to the surface; but when the substratum is irregular, and the sponge therefore grows thicker in places, the skeleton formed of the dermal spicules increases in extent and forms fibres going up to the surface; this skeleton forms in such places the greatest part of the whole skeleton of the sponge, the main skeleton always remaining formed of the vertical styli attached to the substratum. A small amount of spongin seems to be found at the base, but at all events only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or generally somewhat curved near the base; the curvature is present especially in the longer styli. The styli have a distinctly marked, globular head, and they taper into a long, fine apex. As commonly the small styli are entirely spined, the longer the styli are the more dispersed are the spines, and the longer a part of the apex is smooth. The spines on the head are densely placed, and they are the largest; on the shaft they are compressed and reclined. The styli vary much in size; even if the intermediate forms are rare, there are however not two separate groups of size. The length is 0·12–0·50^{mm}, and the diameter of the head is 0·021–0·030^{mm}. 2. The dermal spicules are of a very characteristic shape and must be termed styli; they are straight, one end is rounded, the other tapers evenly into a long apex which is more abruptly pointed outermost; the spicules are thickest in the middle, and they are polytylote, showing on the middle part a series of swellings; near the rounded end there is a somewhat sudden narrowing which forms a handle-like part. The length of the dermal spicules is 0·298–0·39^{mm} and the diameter in the middle 0·006–0·010^{mm}. b. *Microsclera:* these are chelæ arcuatæ; they are of ordinary shape with an evenly curved shaft, an elliptical tooth and alæ of the same length as the tooth. The length of the chelæ is 0·040–0·050^{mm}; the shaft is somewhat flattened, its diameter is in front and side view about 0·004–0·008^{mm} respectively. The chelæ are found, as mentioned, in the dermal membrane forming a dense layer.

Locality: Station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms; station 10, 65° 13' Lat. N., 26° 58' Long. W., depth 250 fathoms; station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; further it has been taken in the Denmark Strait at about 65° Lat. N., depth unknown, at 62° 20' Lat. N., 5° 17' Long. W., depth 160 fathoms and South-west of Sudero, depth 180 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). About ten specimens in all. The localities lie in the Denmark Strait and at the Faröe Islands.

31. H. proxima n. sp.

Tab. VIII, Fig. 9.

Incrusting; surface hispid. Spicula: megasclera: the skeletal spicules acanthostyli with [illegible] head, divided into two groups, large, only spined below, 0·43–0·62^{mm}, small, entirely spined, [illegible]–0·18^{mm}; the dermal spicules styli 0·28–0·33^{mm}; microsclera chelæ arcuatæ, 0·023–0·035^{mm}.

Of this species we have two specimens growing as thin, but rather extended incrustations on tubes of *Placostegus tridentatus*. The greatest extent of the sponge, which, of course, follows the longitudinal direction of the worm-tube, is about 30^{mm}; the incrustation is very thin and reaches where it is thickest scarcely $0{\cdot}5^{mm}$. The colour (in spirit) is light greyish brown. The *surface* is somewhat strongly hispid from projecting skeletal spicules. The *dermal membrane* is a thin, transparent film. *Pores* and *oscula:* some circular openings are found in the membrane, scattered on the surface, they were measured to a diameter of $0{\cdot}023-0{\cdot}15^{mm}$; probably the smaller openings are incurrent and the larger excurrent, but no separation into two divided sizes could be observed. When the sponge is examined with a lens a multitude of canals and cavities are seen in the tissue; they are especially visible, when the sponge is somewhat dry.

The *skeleton.* The *dermal skeleton;* in the dermal membrane the chelæ occur numerously, in some places lying rather densely, in others more scattered. The skeleton formed of the dermal spicules is somewhat strongly developed; it consists of bundles or fibres stretching from the main skeleton, often quite from the base upwards and supporting the dermal membrane; the spicules in the bundles are outermost spread penicillately, and they may project a little through the membrane. The fibres have often a very oblique or decumbent direction, thereby being longer, and thus, when the membrane is viewed from above, one may get the impression, that the dermal membrane has a reticulation. All the dermal spicules have the pointed end turned outwards. The *main skeleton* is formed of acanthostyli with their head-ends based on the substratum, the longest of them project considerably beyond the surface. There is an amount of spongin at the base, in which the head-ends of the styli are imbedded, but it is, however, only slightly pronounced.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or generally somewhat curved; the basal end is the thickest part of the spicule, but there is no head developed; they taper evenly into a long apex. The small styli are spined in the whole length, and the spines are more or less reclined. In the large styli the spines are relatively smaller, they are present only on the lower part of the spicule and upwards they become small and gritty. The spines on the lowermost part are both in the small and the large styli not specially larger than those a little more upwards. The size of the styli varies greatly, and they are divided into two groups, which show however no other principal differences than the size. The length of the large styli is $0{\cdot}43-0{\cdot}62^{mm}$ and of the small $0{\cdot}14-0{\cdot}18^{mm}$, the diameter at the base is $0{\cdot}017$ and $0{\cdot}011^{mm}$ respectively. 2. The dermal spicules are of a characteristic shape; they are styli and have a shape like those in *irregularis* with the rounded end narrowed and handle-like, but they are not polytylote; they are straight or slightly curved and they have an even, middle-long apex. The length is $0{\cdot}28-0{\cdot}33^{mm}$ and the diameter in the middle $0{\cdot}008-0{\cdot}012^{mm}$. b. *Microsclera:* these are chelæ arcuatæ; they have an evenly, rather strongly curved shaft, the end-parts are relatively small, the tooth is lanceolate with a long tuberculum; the alæ are of the same length as the tooth, strongly incised in the lower edge and somewhat tooth-shaped; the shaft is not flattened. The length is $0{\cdot}023-0{\cdot}035^{mm}$, and the diameter of the shaft about $0{\cdot}0038-0{\cdot}005^{mm}$. The chelæ occur, as mentioned, in the dermal membrane, but they are also otherwise seen in the body of the sponge.

This species is nearly related to the preceding one, *H. irregularis*, it is however distinguished from this by characteristic differences; thus in contrast to *irregularis* it is hispid from projecting skeletal spicules, and the chelæ do not form a dense layer in the dermal membrane. But the most characteristic differences lie in the spicules, the acanthostyli have no pronounced head, they are more slender and are divided into two groups; the dermal spicules are not polytylote, and the chelæ have a diffreent shape and are smaller.

Locality: Station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; the station lies in the Denmark Strait.

32. H. crux O. Schmidt.

Pl. III, Fig. 11, Pl. VIII, Fig. 10.

1875. *Desmacidon crux* O. Schmidt, Jahresber. der Comm. zur wissensch. Unters. der deutsche Meere in Kiel für 1872—73, 1875, 118, Taf. I, Fig. 10—11.

1903. *Hymedesmia crux.* Thiele, Arch. für Naturgesch. Jahrg. 1903, I, 392, Taf. XXI, Fig. 26 a—d.

Incrusting; surface smooth, generally with low, oscula-bearing, conical warts with a skeleton of dermal spicules in the wall. Spicula: megasclera; the skeletal spicules acanthostyli with a well-marked head, spined in the whole length, 0·12—0·38^{mm}, not divided into two groups; the dermal spicules subtornota varying through tornostrongyla to strongyla, they are polytylote, 0·27—0·38^{mm}; microsclera chelæ arcuatæ with a spined shaft, 0·031—0·043^{mm}.

Of this remarkable and very interesting species we have about ten specimens; they form small or more extended incrustations on stones and worm-tubes, one grows on a *Pecten*-shell; the greatest extent it reaches is about 35^{mm}, and the thickness lies between 0·5 and 1^{mm}. The colour (in spirit) is yellowish red, brownish red or reddish, the sponge may thus vary somewhat in colour, but it always tends towards reddish. Schmidt l. c. says about the colour "braungelb", and one of the Ingolf specimens is stated to have been yellow in the fresh state. The *surface* is smooth in so far as there are no projecting spicules, but it is often wrinkled and folded to a higher or lower degree; this latter fact is probably only due to contraction. The *dermal membrane* is rather thick and solid, and it is easily separable; it is very densely charged with chelæ, more densely than in any other species of *Hymedesmia;* the chelæ form a dense and solid layer. *Oscula* and *pores:* oscula are found as low, conical warts scattered on the surface; they have an opening or a depression in the summit, and around this the surface may be a little stellately rugose. In my specimens the warts are, as said, quite low, sometimes scarcely elevated above the surface; Schmidt says on the other hand "Oscula auf unregelmässigen Papillen"; according to this it would seem, that the oscular cones may sometimes be higher, if it is not irregular folds of the surface, that Schmidt has mistaken for cones. In some specimens the warts are easily discernible, in others they are more or less indistinct, and they may be quite absent. Pores I have not seen and cannot say whether they are scattered or perhaps collected in definite areas; sometimes some larger, dendritically branched canals may be seen through the dermal membrane.

The *skeleton.* The *dermal skeleton:* the most protective skeleton of the dermal membrane is formed by the mentioned dense layer of chelæ; the dermal spicules form bundles stretching from the main skeleton, often almost from the base, up to the dermal membrane; in the membrane itself no dermal spicules are found. Around the oscula the dermal spicules form a special oscular skeleton, the spicules here forming fibres which run stellately to the top or the middle of the cone, but also here the fibres run below the dermal membrane and not in it, and the dense layer of chelæ continues just to the centre of the cone. The *main skeleton* consists in the ordinary way of perpendicular acanthostyli with their heads on the substratum; the longest styli reach up to the dermal membrane. At the base a small amount of spongin is present.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are slightly curved, generally nearest the base, and they are somewhat densely spined in their whole length; the head is round and generally well marked; the spines on the head are straightly radiating, on the shaft they are reclined. The spicules vary much in length, but as all intermediate sizes are present they are not divided into two groups; the length is 0·12—0·38^{mm} and the diameter of the head 0·02—0·03^{mm}. 2. The dermal spicules are straight and very slightly fusiform; they may be termed subtornota, but generally one end is rounded so that they are tornostrongyla and also both ends may be rounded, the spicules thus being strongyla; they are distinctly polytylote. The length is 0·27—0·38^{mm} and the diameter 0·006—0·008^{mm}. b. *Microsclera* are chelæ arcuatæ of a very characteristic and remarkable shape; the shaft is very strongly curved, sometimes to so high a degree that its end-parts form two nearly parallel arms; on the middle of the hinder side of the shaft there are a number of strong spines. Also the shape of the end-parts of the chela affords great interest; the tooth is protruding greatly forwards, but it is formed almost entirely of the strongly developed falx, while there is nearly no plate, the falx only being somewhat thickened at the front edge; the alæ are also very interesting, they quite resemble the falx in shape and they are of the same size, further they are directed straight out to each side, so that they form right angles with the falx, on the other hand they are not or almost not bent forwards. The whole construction of the end-parts recalls the construction characteristic for the ancoræ, but I shall otherwise draw no conclusion from this fact at present. The chelæ are nearly always somewhat contorted. Same few developmental stages were seen, they show spines on the shaft already when rather thin. The length of the chela, which is somewhat dependent on the degree of the curvature, is 0·031—0·043^{mm}, and the diameter of the shaft, the spines not included, is 0·005—0·007^{mm}. As mentioned the chelæ form a dense layer in the dermal membrane, but they are also seen in the other parts of the sponge.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; further it has been taken at 65° 50′ Lat. N., 26° 53′ Long. W., depth 208 fathoms (The Fishery investigation steamer "Thor"), and West of the Faröe Islands in depths of 160 and 180 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). In all about ten specimens. The localities lie in the Denmark Strait and West of the Faröe Islands.

Geogr. distr. Schmidt had the species from South-west of Bukenfjord, Norway, depth 106 fathoms.

33. **H. aenigma** n. sp.

Pl. IX, Fig. 1.

Incrusting; surface for the most part hispid, with some conical projections, bearing oscula. Spicula: megasclera: the skeletal spicules acanthostyli with no real head-swelling, they are entirely *spined*, *0·13—0·34^{mm}, not distinctly divided into two groups; the dermal spicules somewhat fusiform, polytylote tornota, 0·32—0·43^{mm}; microsclera curious asteroid chelæ 0·028—0·035^{mm}.*

This species grows incrusting on a Brachiopod-shell together with some other incrusting sponges; it has a greatest extent of 20^{mm} and a thickness of about 0·5^{mm}. The colour (in spirit) is greyish brown. The *surface* is for the greatest part densely hispid from projecting dermal spicules, but in one end it is smooth, and here there are a couple of conical projections, forming oscular cones. As I have only one specimen, I cannot say, whether it is characteristic for the species that the oscular cones are thus restricted to a special part of the surface. The *dermal membrane* is thin and not separable; it is densely charged with the curious chelæ.

The *skeleton*. The *dermal skeleton*; as said the microscleres form a dense layer in the dermal membrane; the dermal spicules form fibres and bundles stretching in various ways from the main skeleton or quite from the base up to the dermal membrane; the direction of the fibres is generally almost horizontal, and they reach therefore some length; they are also rather strong, of an average thickness of 0·042^{mm}; they terminate in the dermal membrane. The membrane is pierced by spicules which seem to be more or less scattered or forming penicillately spread bundles. As far as I could observe these projecting spicules rise from the underlying fibres, probably from the ends of these; they seem to be wanting or are at all events few in number on the smooth part of the surface, where the oscular cones are found. The fibres formed of the dermal spicules run into the oscular cones, forming in the wall of the cone a dense skeleton of parallel spicules with the ends towards the summit of the cone; above this skeleton the layer of microscleres lies. Quite down at the base of the sponge there is found a number of dermal spicules lying singly and horizontally and thus not taking part in the formation of the fibres. The *main skeleton* is constructed in the ordinary way and consists of vertical acanthostyli with their heads based on the substratum; the skeleton is not dense, the styli being somewhat scattered. At the base a scarcely perceptible amount of spongin is found.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli; they are straight or slightly curved, the basal end is the thickest part, but there is no real head-swelling or only a slight one. The styli are spined in the whole length, the spines are of small or medium size and reclined; on the head-end they are larger and straightly radiating. The length is 0·13—0·34^{mm}, and the diameter at the base is 0·014—0·021^{mm}. The styli cannot be said to be divided into two groups but the middle sizes are however rare. 2. The dermal spicules are tornota, they are straight or slightly curved and somewhat fusiform, and they are more or less polytylote. The length is 0·32—0·43^{mm} and the diameter in the middle 0·006—0·007^{mm}. b. *Microsclera*; these are bodies of a very curious shape. I may term them asteroid chelæ. Roughly speaking they present a cylindrical shaft which at each end divides into three branches, each bearing at the end four compressed, two-pointed teeth, placed in a square; the shaft is more or less curved. On closer examination it becomes evident that this curious body is a chela. It is as a rule possible to trace the shaft or main axis (Pl. IX. Fig. 9 c), and one of the three branches at each end is the direct continuation of the axis; this axis answers to the shaft and the teeth in an ordinary chela; the two other branches at each end, which are generally a little thinner than the axis, answer to the alæ; they issue from the hinder side of the shaft; but the ends of the shaft itself and of the alar branches are all developed in the same way, splitting into four compressed, two-pointed teeth, the exact shape of which may be seen in the figures. Such are the facts generally, but it is however not always possible to decide, which of the branches belong to the axis, the branches often being so uniformly developed that they all seem alike. The chela is somewhat contorted, so that when seen from the end all six branches become visible, and we get a figure almost like a six-rayed aster. (Pl. IX, fig. 1f). The length of the chela from one end of the shaft to the other is 0·028—0·035 ^{mm} and the thickness of the shaft is 0·004—0·005 ^{mm}. That these bodies are transformed chelæ is seen also from the developmental stages, of which some were found (Pl. IX, fig. 1g); these consist of a curved axis with two lateral dilatations near each end, and they resemble to some degree developmental stages of other chelæ, only that the tooth is here not curved forwards. — These chelæ remind one somewhat of the chelæ in *H. Schmidti* Tops., but are different in many respects; they are very interesting and take an intermediate position between the previously described, more or less transformed chelæ; *H. crux* has normally shaped, but spined chelæ, *H. Schmidti* has likewise spined chelæ, but much more transformed, in *H. aenigma* they are still more transformed, and finally we find in *H. vidua* the chelæ transformed almost to spined staves. — The chelæ occur in the dermal membrane forming a dense layer, and they are also found scattered in the tissue lower down in the sponge.

Locality: Station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms. The station lies in the Denmark Strait.

Remarks: While at present only few species are known with spined chelæ — I think only the above mentioned and *Pseudohalichondria clavilobata* Cart. (Ann. Mag. Nat. Hist. 5, XVIII, 1886, 454, Pl. X, fig. 8) — there are on the other hand some fossil forms, described by Hinde and Holmes (Journ. of the Linn. Soc. XIV, 1894, 214, Pl. XI, figs. 8—14); the authors figure seven chelæ, which they think belong to four species, two of which are named as *Pseudohalichondria deformis* and *oamaruensis*. The forms are all referred to the genus *Pseudohalichondria* Cart. evidently only on account of the spined chelæ. As already mentioned by Topsent in his work from 1904, there may be some reason to think, that the described chelæ belong to species of *Hymedesmia*. The chelæ were found in lower Tertiary strata in New Zealand. It is somewhat curious, that such chelæ are known as fossil, since the spination and higher or lower transformation of the chelæ must certainly be considered as a feature of recent origin. Probably therefore the genus *Hymedesmia*, containing only incrusting forms of a simple structure, is an old genus.

34. **H. filifera** O. Schmidt.

Pl. III, Fig. 12, Pl. IX, Fig. 2.

1875. *Desmacidon filiferum* O. Schmidt, Jahresber. der Comm. zur wissensch. Unters. der deutsche Meere in Kiel für 1872—73, 1875, 117, Taf. I, Fig. 6.

1903. *Hymedesmia filifera*. Thiele, Arch. für Naturgesch., Jahrg. 1903, I, 391, Taf. XXI, Fig. 25 a—c.

Incrusting, but not thin; surface smooth, bearing a number of thin, cylindrical oscular and pore-papillæ. The dermal membrane solid, with horizontal spicules. The skeleton formed of dermal spicules strongly developed, the main skeleton rather weak. Spicula: megasclera: the skeletal spicules entirely spined acanthostyli with the basal end not or slightly thickened, 0·13—0·27 ^{mm}, not divided into two *groups; the dermal spicules strongyla with a slight, double curvature, 0·27—0·45^{mm}; microsclera chelæ arcuatæ 0·030—0·035^{mm}.*

This species forms thinner or a little thicker incrustations on stones; the surface bears a number (in the specimens to hand some few to about a dozen) of long papillæ, which generally reach a length of 6^{mm} or a little more; they are cylindrical, generally a little thickened towards the apex, and they may vary in thickness from quite thin and thread-like to a diameter of about 0·5^{mm}. The largest of our specimens has a greatest extent of 25^{mm}; the specimen figured by Schmidt l. c. is 35^{mm} long. The colour (in spirit) is greyish or dirty yellowish. The *surface* is smooth without projecting spicules. The *dermal membrane* is a tough and solid, easily separable membrane which is provided with horizontal spicules. *Oscula* and *pores:* the mentioned appendages are by Thiele (l. c.) declared to be oscular papillæ, and this is also the case with some of them, but the greater part are pore-papillæ; the oscular papillæ have a simple opening in the summit, while the pore-papillæ have here a pore-sieve stretched over the opening. So far as I could see on my somewhat damaged material there is also some difference in the shape of the papillæ, the oscular papillæ being more conical and the pore-papillæ cylindrical and somewhat widened towards the apex.

The *skeleton.* The *dermal skeleton;* the skeleton formed by the dermal spicules is by far the largest part of the whole skeleton. The spicules form fibres which run in different directions quite from the base up to the dermal membrane; these fibres consist of many spicules and are generally rather thick, they may f. inst. reach to a diameter of 0·36^{mm}. In the skin the spicules lie horizontally and in more than one layer, thus forming a close skeleton; they lie in all directions, but however somewhat bundle-like; the bundles in the different layers generally cross each other. Finally the dermal spicules form the skeleton in the wall of the papillæ; they lie here in the longitudinal direction, but the spicules in the different layers crossing each other under acute angles and rather regularly. The *main skeleton* is formed mainly in the ordinary way of acanthostyli with their heads on the substratum; they do not reach to the dermal membrane. Where the fibres of dermal spicules rise from the base, they are seen to have just their basal end formed by acanthostyli. Spongin is found at the base.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or very slightly curved; the basal end is not or only slightly thickened; they taper evenly into the apex, but the outermost point is not long. They are spined in the whole length, on the base the spines are large and radiating, giving thus to some degree the impression of a head-swelling; the spines on the shaft are reclined. The styles vary much in length, but there are no groups. The length is 0·13—0·27^{mm} and the diameter at the base 0·017—0·028^{mm}. 2. The dermal spicules are strongyla; they are slightly fusiform and have nearly always a curious and characteristic double curvature, more rarely they are somewhat irregularly curved or nearly straight; the length is 0·27—0·45^{mm}, varying a little in different individuals, and the diameter in the middle is 0·007—0·012^{mm}. b. *Microsclera* are chelæ arcuatæ; they have a regularly curved shaft, the end-parts are not large, the tooth is elliptical, the alæ have generally the lower edge but slightly incised and are more or less triangularly lobe-shaped in side view. The length is 0·030—0·035^{mm} and the thickness of the shaft about 0·003 . The chelæ are found rather richly in the tissue quite down to the base, they are often abundantly present along the fibres; in the dermal membrane they are much less frequent, but in the papillæ they are more frequent on the inside, and they are very numerous in the pore-sieves.

The identification of this species leaves no doubt according to the description and figures by Thiele; e. g. his figure of the strongyle with the characteristic curvature is quite in agreement. Schmidt mentions "Spangen", and Thiele has also found some single sigmates, but he thinks, that they do not belong to the species; now it is curious enough that I also found sigmates, but quite singly, and I think too, that they do not belong to this species; they are very scarce, and as the species always envelops some incrusted material, it is easily understood, that foreign sigmates may occur in it.

Locality: Station 2, 63° 04' Lat. N., 9° 22' Long. W., depth 262 fathoms; station 15, 66° 18' Lat. N., 25 59' Long. W., depth 330 fathoms, (bottom temperature ÷ 0° 75 C.); station 25, 63° 30' Lat. N., 54° 25' Long. W., depth 582 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; further it has been taken at 62° 26' Lat. N., 4° 49' Long. W., depth 220 fathoms, and 62° 29' Lat. N., 4° 12' Long. W., depth 283 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities lie in the Davis Strait, the Denmark Strait and at the Faröe Islands. The species is certainly an inhabitant of the warm area; to be sure station 15 has a negative bottom temperature, but this station is situated at the very border between the cold and the warm areas.

Geogr. distr. The species was hitherto only known from Norway, South-west of Bukenfjord, depth 106 fathoms (Schmidt l. c.).

35. **H. grandis** n. sp.

Pl. III, Figs. 13—14, Pl. IX, Fig. 3.

Incrusting, but of massive appearance; surface smooth, bearing a number of thin, cylindrical oscular and pore-papillæ. The dermal membrane solid, with horizontal spicules. The skeleton formed of dermal spicules strongly developed, the main skeleton weak, chiefly consisting of bundles of spicules, forming the lowermost part of the fibres of dermal spicules. Spicula: megasclera; the skeletal spicules acanthostyli with a very slight or no head, spined almost in the whole length, 0·41—0·75 mm (not divided into two groups?); the dermal spicules long strongyla 0·48—0·80 mm; microsclera two forms, chelæ arcuatæ 0·042—0·048 mm, sigmata 0·031—0·096 mm.

The specimens to hand of this species all grow on aggregated, large sponge-spicules; these spicules are then overgrown, enveloped or more or less imbedded by the sponge; although the species must thus in reality certainly be considered as incrusting, it has however an outer appearance of being more or less massive; the upper part of the sponge has at the same time a somewhat bladder-like consistency which also contributes to its massive outer appearance. The surface bears a generally great number of long, thin papillæ or appendages which may reach to a length of 12 mm with a diameter of 0·5—1·5 mm. The appendages may be more or less erect or decumbent, and they are generally more or less curved. The whole sponge is generally folded and wrinkled in different ways. The species may reach a considerable size, the largest specimen is about 50 mm long and has an apparent height of 15 mm. The colour (in spirit) is dirty yellowish or greyish white. The *surface* is smooth without projecting spicules. The *dermal membrane* is solid and easily separable, and it is provided with horizontal spicules. *Oscula* and *pores:* the mentioned papillæ are oscular and pore-papillæ; in outer appearance there is almost no difference between the two kinds, only the oscular papillæ are generally more conically pointed at the apex, while the pore-papillæ are more broad here; the latter are closed by a pore-sieve, while the oscular papillæ have a simple opening in the summit. The pore-papillæ are more numerous than the oscular papillæ.

The *skeleton.* The *dermal skeleton;* the skeleton consisting of the dermal spicules forms the greatest part of the whole skeleton; it consists of fibres and bundles which stretch in an irregular way from or nearly from the substratum up to the dermal membrane; the course of the fibres is, as said, irregular, and they are often more or less curved, and may thus be seen running somewhat parallel with the surface; the fibres may be of very different strength, but often rather thick, up to 0·3^{mm}, and consisting of many spicules. In the dermal membrane the spicules lie horizontally, but irregularly, crossing each other in all directions; they lie somewhat scattered, and the membrane is to be seen everywhere between them; they lie thus much more scattered than in *filifera*, and not bundle-like collected. The skeleton of the papillæ is constructed quite as in *filifera*, and also here the spicules cross each other regularly and under acute angles. The *main skeleton* is quite irregular and scattered on account of the way in which the sponge grows on the substratum; it forms thick bundles scattered everywhere between the foreign sponge-spicules and other particles of the substratum, and always forming the lowermost part of a fibre of dermal spicules; the acanthostyli are thus not at all evenly distributed at the base of the sponge, but very scattered and only present as bundles, from which fibres of dermal spicules proceed. The bundles are generally large and consist of many spicules, they may have a thickness of 0·5^{mm}. At the base of the bundles there is a distinct mass of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are long and slender acanthostyli; they are straight or nearly so and evenly tapering, but the outermost point is short; they have no or only a very slight head-swelling and are somewhat densely spined at the base and some way out, but on the largest part of the shaft the spines are somewhat scattered; at the base and especially a little above it the spines are somewhat large, but for the rest they are small. The styli do not generally vary much in length, from 0·41—0·75^{mm} with a diameter at the base of 0·021—0·026^{mm}; it will be seen that there is thus no very great difference in size between the styli; some smaller ones may however be found, reaching only 0·18^{mm} in length, but these are very scarce and perhaps not always present. 2. The dermal spicules are long strongyla; they are straight, sometimes slightly, irregularly curved, and they may be slightly polytylote; the ends may be very slightly swollen. The length is 0·48—0·80^{mm}, and the diameter in the middle 0·007—0·013^{mm}. *Microsclera;* these are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have a curved shaft, the free middle part of which is about one third of the length of the chela, the alæ are lobe-shaped, the tooth elliptical, pointed. The length is 0·042—0·048^{mm}, and the diameter of the shaft 0·005—0·007^{mm}. 2. The sigmata are of common shape, more or less contorted up to a quarter of a turn; they vary considerably in size, the length is 0·031—0·096^{mm} and the thickness relatively 0·002—0·006^{mm}; the larger forms are the most common. The two forms of microsclera occur at definite places in the sponge; in the dermal membrane both chelæ and sigmata are present in equal numbers; the chelæ occur moreover in the wall of the papillæ.

especially outwards, and in rather great numbers in the membrane forming the pore-sieves, and in these places no sigmata occur; on the other hand, the chelæ do not occur in the inner body, while the sigmata are present here in enormous numbers, filling the tissue and also occurring everywhere in the basal parts among the particles of the substratum. The consequence of this distribution of the microscleres is that the sigmata are far more numerous than the chelæ.

Embryos. In one of the specimens, which was cut through, some embryos were found; they reached to a diameter of $0{\cdot}65^{mm}$; they smallest of them had no spicules, but the larger were richly provided with microsclera, both chelæ and sigmata; both forms were smaller than in the grown sponge, the chelæ $0{\cdot}031^{mm}$ and the sigmata not surpassing $0{\cdot}040^{mm}$; also in the embryo the sigmata were far more numerous than the chelæ. No megascleres were present.

Locality: Station 78, 60° 37' Lat. N., 27° 52' Long. W., depth 799 fathoms; station 84, 62° 58' Lat. N., 25 24' Long. W., depth 633 fathoms; station 90, 64° 45' Lat. N., 29° 06' Long. W., depth 568 fathoms. In all five specimens. The localities lie in the Denmark Strait and on the eastern slope of the Reykjanæs Ridge.

36. **H. digitata** n. sp.

Pl. III, Fig. 15, Pl. IX, Fig. 4.

Incrusting or of somewhat massive appearance; surface smooth, bearing some thin oscular and pore-papillæ; the dermal membrane with horizontal spicules. Spicula: megasclera: the skeletal spicules acanthostyli, divided into two groups, large, without a distinct head and not entirely spined, $0{\cdot}25$—$0{\cdot}31^{mm}$, small, with a distinct head and entirely spined, $0{\cdot}11$—$0{\cdot}14^{mm}$: the dermal spicules tylota $0{\cdot}26$—$0{\cdot}417^{mm}$; microsclera two forms, chelæ arcuatæ $0{\cdot}034$—$0{\cdot}038^{mm}$, sigmata $0{\cdot}028$—$0{\cdot}050^{mm}$.

This species resembles the preceding in outer appearance, but the specimens present are small; we have only two specimens, growing on stones together with other species of *Hymedesmia* and some other incrusting sponges. The sponge forms a basal, incrusting or more massive part, from which a number of long, thin papillæ issue; in the present specimens the number of papillæ does not exceed three; they are of the common shape and reach to a length of 7^{mm}. As said the specimens are small, the basal part has a greatest extent of about 5^{mm}. The colour (in spirit) is yellowish or whitish. The *surface* is smooth, and the *dermal membrane* constructed as in the preceding species. *Oscula* and *pores* are connected with the papillæ quite as in the preceding species.

The *skeleton.* The *dermal skeleton;* the skeleton formed of the dermal spicules consists of more or less distinct fibres going from the basal skeleton towards the dermal membrane; in the membrane the spicules lie horizontally, and they are as usual lying close in the wall of the papillæ in the longitudinal direction, intercrossing at acute angles. The *main skeleton* consists of basal acanthostyli with their heads on the substratum. Spongin is present, but only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are divided into two rather distinct groups, large and small; the large styli are slightly curved, they are thickest at the base but without any real head-swelling; they taper evenly but the outermost point is short, and they are spined in somewhat more than the basal half; the spines are small, only at the base a little larger. The small styli are straight and have a distinct head, the shaft is beset with relatively large spines in the whole length, the spines are directed downwards; on the head there are rather long, radiating spines. The length of the large styli is 0·25—0·31^{mm}, and the diameter at the base 0·021 ; the small styli are 0·11—0·14^{mm} long with a diameter of the head of 0·021^{mm}. 2. The dermal spicules are tylota which are cylindrical and straight or slightly, irregularly curved; the end-swellings are not large but distinct; the length is 0·26—0·417^{mm} and the diameter in the middle 0·005—0·008 . b. *Microsclera* are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have an evenly curved shaft, the free middle part of which is a little more than the third part of the length; the alæ are lobe-shaped and the tooth elliptical, rounded at the end. The length is 0·034—0·038^{mm} and the diameter of the shaft 0·005^{mm}. 2. The sigmata are of ordinary shape, more or less contorted up to a quarter of a turn. The length is 0·028—0·050^{mm} and the thickness between 0·002 and 0·003^{m}. The chelæ and sigmata seem to be present in about equal numbers; the chelæ occur in the wall of the papillæ, and for the rest both forms of microscleres seem to occur, so far as I could ascertain, through the whole body.

This species is distinguished from the preceding in regard to the spicules by the smaller acanthostyli, the tylote dermal spicules and the much smaller sigmata; also the chelæ are slightly different.

Locality: Station 89, the Denmark Strait, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms. Two specimens.

37. **H. trichoma** n. sp.

Pl. III, Fig. 16, Pl. IX, Fig. 5.

Incrusting; surface smooth, bearing thin papillæ. The dermal membrane with horizontal spicules. Spicula: megasclera; the skeletal spicules acanthostyli with a small head, spined in the whole length, they are divided into two groups, large, 0·20—0·24^{mm}, small, 0·11—0·13^{mm}; the dermal spicules tylota 0·29—0·38^{mm}; microsclera two forms, chelæ arcuatæ 0·034—0·042^{mm}, plane sigmata 0·058—0·075^{mm}.

Of this species we have only one specimen growing on a shell of an *Astarte*; it forms a thin incrustation of a greatest extent of only 6^{mm}, and it bears one long and thin papilla. The colour (in spirit) is light brownish. The *surface* is smooth. The *dermal membrane* is thin and not easily separated. About *oscula* and *pores* I can say nothing, as said, only one papilla is present.

The *skeleton.* The *dermal skeleton:* the skeleton formed of the dermal spicules consists of bundles stretching from near the base to the dermal membrane; in the membrane there are horizontal spicules, but they are scattered and not at all dense-lying. The *main skeleton* is arranged quite in the ordinary way, consisting of erect acanthostyli with their head on the substratum and evenly distributed over it; the largest of them reach to the surface. A small amount of spongin seems to be present.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are straight or nearly so, the head-swelling is small, and they taper slightly towards the point, which is short; they are rather densely spined in the whole length, but the spines are small, only longer at the base; though they do not vary much in length they are yet divided into two distinct groups; the length of the large styli is 0·20—0·24^{mm}, and of the small 0·11—0·13^{mm}; the diameter of the head is about 0·021 , and it is nearly the same in the large and the small styli on account of the basal spines being larger in the small than in the large styli. 2. The dermal spicules are tylota, they are straight or generally slightly and somewhat irregularly curved, often with a curvature recalling to some degree that found in the dermal spicules of *H. filifera;* the end-swellings are small, sometimes almost disappearing; the length is 0·29—0·38 mm and the diameter 0·004—0·007 mm. b. *Microsclera* are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have a curved shaft the free middle part of which is more than one third of the length, the alæ are lobe-shaped, their lower margin not much incised; the tooth is narrowly elliptical; the length is 0·034—0·042 mm and the diameter of the shaft about 0·003 mm. 2. The sigmata are of common shape, but they are quite or nearly quite plane; the length is not very variable 0·58—0·75 mm, generally nearest the latter size; they are relatively thin, the thickness being 0.0028 mm. As far as I have been able to ascertain, both chelæ and sigmata occur through the tissue, while in the dermal membrane only the chelæ occur, but here in great numbers, and in places lying densely. Of the microsclera the chelæ are the most numerous.

This species is distinguished from *grandis* and *digitata* by its plane, thin sigmata and besides by characters in the other spicules.

Locality: Station 85, the Denmark Strait, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms. One specimen.

38. **H. macrosigma** n. sp.

Pl. IX, Fig. 6.

Incrusting; surface smooth. Spicula: megasclera: the skeletal spicules acanthostyli with a small head-swelling, spined in the whole length, but the spines much dispersed outwards, 0·13—0·28 mm, not divided into two groups: the dermal spicules strongyla or subtylota 0·23—0·28 mm; microsclera three forms, chelæ arcuatæ 0·020—0·032 mm, sigmata of two forms, large 0·18—0·208, small 0·06—0·089 mm.

We have three specimens of this species, one of them grows on aggregated sponge-spicules; it incrusts these all round, so that they are chiefly situated in the interior of the sponge, but stretching out here and there. Of the other two specimens one grows on a Brachiopod-shell, the other on a basalt block. The specimens are rather small, one only about 8 mm, the others 12 mm in greatest extent. The colour (in spirit) is yellowish white or yellow. The *surface* is smooth without projecting spicules. The *dermal membrane* is thin, it is densely charged with chelæ and sigmata; some small, circular openings could be observed in it.

The *skeleton* is highly irregular and confused in the first examined specimen, viz. that imbedding sponge-spicules, on account of the manner in which the sponge envelops the substratum. The *dermal skeleton* is represented by dermal spicules which are found scattered through the whole sponge; in single places they may form a bundle stretching towards the surface; in the dermal membrane they are not seen, or at all events only some few, while, as said, the membrane is filled with microscleres. In one place the dermal spicules were lying parallel and forming something like a conical projection — perhaps an oscular cone — but the state of the specimen did not allow this to be decided. The *main skeleton* is still less developed, and the acanthostyli are only present in small numbers; they are seen here and there with the head based on the substratum but otherwise quite confused and pointing in all directions. While the skeleton is thus on the whole little developed, the sponge is on the other hand densely filled with microscleres. When a vertical section is examined, the view is therefore somewhat curious; in the interior foreign sponge-spicules are seen, and for the rest the microscleres are predominant, filling the other space, the dermal spicules being only seen scattered between the other elements, and it is only by close examination that an acanthostyle can be observed here and there. The condition of the skeleton is, as seen below, due to the way in which the sponge grows, and the principle of the construction is evidently the same as in the other species of *Hymedesmia*. There seems to be a little spongin at the base of the acanthostyli. — On examining the other specimens, which only came into my hands later, it proved, that the skeleton was here of the ordinary construction and the styli were as usually placed on the substratum; otherwise it agreed with the above description, the other space being occupied by dermal spicules and densely charged with microscleres. Here also the styli of the skeleton were somewhat scarce and arranged very dispersedly.

It is of some importance to notice the facts with regard to these different specimens, as we see it clearly proved here, that specimens of *Hymedesmia* may, when growing on loose material, assume a shape and a manner of growth which may give rise to mistakes by influencing the arrangement of the skeleton, though the construction of this latter is principally the same as in species of *Hymedesmia* growing on a flat and firm substratum.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight and the head-swelling is small or wanting; the spines on the basal part are somewhat large and close-standing, on the rest they are small, reclined and few in number; the smallest styli are somewhat more spined. The length is 0·13—0·28^{mm} and the diameter at the head about 0·020^{mm}. 2. The dermal spicules are straight, cylindrical strongyla or subtylota; the ends are generally swollen, but only to a very slight degree. The length is 0·23—0·38^{mm} and the diameter is 0·0057—0·007^{mm}. b. *Microsclera* are three forms, chelæ arcuatæ and sigmata of two sizes. 1. The chelæ are of the common shape, the shaft is curved, the tooth elliptical and the alæ lobe-shaped; they vary somewhat in size, the length is 0·020—0·032^{mm} and the diameter of the shaft 0·0015—0·0028^{mm}. 2. The large sigmata are of ordinary form, but somewhat elongated and generally only slightly contorted; they are of a considerable and very uniform size, the length is 0·18—0·208^{mm} and the thickness 0·010—0·011^{mm}. 3. The small sigmata are of a less regular shape and they are contorted, generally a quarter of a turn or nearly so; their length is 0·06—0·089^{mm} and the thickness 0·003^{mm}. As said the microscleres occur in great numbers all through the tissue; in the dermal membrane all three forms occur, but the chelæ are here present in greatest number and very close-lying.

This species shows, in one specimen, a manner of growth quite as is found in *grandis*, and it also shows resemblances to this species otherwise, but it is easily distinguished from it and from the related species by the presence of two forms of sigmata. As seen from the description I have not been able to decide whether the species in a more perfect state may be provided with papillæ.

Locality: Station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 89, 61° 15′ Lat. N., 27° 20′ Long. W., depth 310 fathoms. The localities lie in the Denmark Strait and South of Iceland.

39. **H. pugio** n. sp.

Pl. IX, Fig. 7.

Incrusting: surface somewhat hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a distinct head, only spined on the lower part, they are divided into two groups, large 0·38—0·54 mm, small 0·12—0·20 mm; the dermal spicules thin styli 0·27—0·31 mm; microsclera two forms, chelæ arcuatæ 0·021—0·040 mm, sigmata, small and curved in a somewhat circular way, plane or nearly plane, 0·014—0·017 mm.

Of this species we have one specimen, growing on a stone; it forms a thin incrustation of a greatest extent of about 20 mm, and the thickness does not exceed 0·5 mm. The colour (in spirit) is white. The *surface* is somewhat hispid from the projecting acanthostyli. The *dermal membrane* is thin and not separable, sparingly provided with dermal spicules, but somewhat more richly with chelæ. A number of circular openings of canals are seen shining through the membrane.

The *skeleton.* The *dermal skeleton* is not much developed; it consists of dermal spicules which are, so far as I could ascertain, lying partly more or less horizontal in the membrane, but for the greatest part projecting. The *main skeleton* consists of acanthostyli with the heads placed on the substratum; it is rather dense with the spicules close-standing; the longest of the styli project through the dermal membrane. The heads of the styli are at the base inserted in a somewhat slight mass of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are straight or only very slightly curved and taper evenly into a long apex; the head is round and not large but distinct. They are spined at the base and some way out, but the larger apical part is smooth; the spines are small. With regard to size the styli are divided into two groups, but otherwise they are quite similar. The large styli have a length of 0·38—0·54 mm with a diameter at the head of 0·021—0·028 mm; the small styli are 0·12—0·20 mm long and the head 0·015—0·021 mm thick. The small styli are the most numerous. 2. The dermal spicules are rather thin styli which are cylindrical, straight or slightly curved and taper into a long and fine point. The length is 0·27—0·31 mm with a diameter of about 0·003 mm. b. *Microsclera* are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have a sometimes rather strongly curved shaft and relatively small end-parts; the alæ are lobe-shaped but somewhat narrow, the tooth is elliptical. The size of the chelæ is somewhat variable, the length being 0·021—0·040 mm and the thickness of the shaft 0·004—0·006 mm. 2. The sigmata are very small and fine and they are somewhat circularly curved, so that the length is not much greater than the breadth; they are plane or almost plane; the length is 0·014—0·017 mm and the thickness 0·001 mm or still finer. Both forms of microsclera are seen especially in or near the dermal membrane.

Embryos. The specimen contained a great number of embryos; they are globular or lentiform and they were easily seen in the thin sponge on account of their white colour. They have an average diameter of 0·35 mm. They contained either no spicules or also developmental forms of the chelæ but no megascleres.

Locality: Station 15, the Denmark Strait, 66° 18′ Lat. N., 25° 59′ Long. W., depth 330 fathoms (bottom temperature ÷ 0°·75 C.). Only one specimen.

40. H. consanguinea n. sp.

Pl. IX, Fig. 8.

Incrusting; surface finely hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a small or no head-swelling, they are divided into two groups, large, with a smooth apical part, 0·21—0·29 mm, small, entirely spined, 0·10—0·13 mm; the dermal spicules tornota, 0·15—0·19 mm; microsclera two forms, chelæ arcuatæ 0·028—0·057 mm, contorted sigmata 0·014—0·017 mm.

This species grows as thin incrustations on living Brachiopods and one on a *Retepora*; the sponge covers generally the whole shell and may thus reach a greatest extent of 16 mm; it is exceedingly thin, not reaching 0·5 mm in thickness. The colour (in spirit) is whitish. The *surface* is short and finely hispid. The *dermal membrane* is very thin and hardly observable.

The *skeleton*. The *dermal skeleton* is not much developed and somewhat diffuse; it consists of small bundles formed by a few spicules; the bundles stretch from the skeleton below up to the dermal membrane. The *main skeleton* is constructed in the ordinary way and consists of acanthostyli with the heads based on the substratum; the styli are not densely placed. The longer styli stretch beyond the dermal membrane, thus giving rise to the hispidity of the surface. So far as I could observe there is a very small amount of spongin at the base of the skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two well separated groups, large and small. The large styli are straight or generally slightly curved near the base; they are thickest at the base but have no or only a small head-swelling; they taper evenly from the base, but the apex itself is not long-pointed; the styli are somewhat densely spined in almost the lower two thirds, the spines being less dense outwards; at the base the spines are somewhat large and blunt, for the rest they are small. The small styli have a similar shape as the large, but they are spined in the whole length. The large styli have a length of 0·21—0·29 mm and a diameter at the base of 0·018—0·025 mm. The small styli are 0·10—0·13 mm long with a diameter at the base of about 0·014 mm. 2. The dermal spicules are tornota which are somewhat thin, straight and cylindrical; the ends have short points; they are not of a simple tornote shape in so far as one end has a generally slight swelling; sometimes also the other end may show an indication of a swelling. The length of the tornota is 0·15—0·19 mm and the diameter about 0·0025 mm. b. *Microsclera* are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have a slightly curved shaft and relatively small end-parts, the alæ are lobe-shaped and the tooth elliptical. The length of the chela is 0·028—0·057 mm and the diameter of the shaft 0·003—0·006 mm. 2. The sigmata are thin and contorted, generally a quarter of a turn; their length is 0·014—0·017 and the thickness 0·0008 mm. The microscleres are seen through the whole tissue of the sponge.

This species shows some resemblance to *H. (Hymeraphia) mucronata* Tops. with regard to the different categories of spicules, but the size of these is different for all forms and especially for the tornota, and there is only one form of chelæ in the present species. The species is easily distinguished from the preceding by the sigmata and the tornote dermal spicules.

Locality: Station 25, 63° 30' Lat. N., 54° 25' Long. W., depth 582 fathoms, and at 70° 32' Lat. N., 8° 10' Long. W., depth 470 fathoms (The Ryder Expedition 1891—92). In all five specimens. The localities lie in the Davis Strait and the Denmark Strait.

41. **H. planca** n. sp.

Pl. X, Fig. 1.

Incrusting: surface densely hispid. Spicula: megasclera: the skeletal spicules acanthostyli without a distinct head, divided into two groups, large, only spined at the base, 0·35—0·65mm, small, spined about in the lower half, 0·16—0·27mm; the dermal spicules tylotornota 0·21—0·29mm; microsclera three forms, chelæ arcuatæ 0·018—0·057mm, sigmata of two forms, large, contorted, 0·021—0·028mm, small, plane, somewhat circularly curved, 0·014mm.

This species forms incrustations on Brachiopods, shells, Bryozoa and small stones; it reaches a greatest extent of about 15mm, with a thickness of about 0·5mm. The colour (in spirit) is white in all specimens. The *surface* is distinctly and densely hispid. The *dermal membrane* is very thin and transparent; it is perforated by a multitude of close-lying circular openings of different sizes, which are *oscula* and *pores*, but there is no such difference in size between them, that it can be decided therefrom which of them are incurrent and which excurrent openings; the openings are seen only when the sponge is somewhat dried; when lying in spirit close-standing openings of canals are seen to shine through the membrane.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules, which stretch obliquely from the lower part of the main skeleton up to the dermal membrane; the bundles are small, each not consisting of many spicules; the spicules all have the rounded ends inwards and the points outwards; the spicules in the bundles are a little divergent outwards and bear the dermal membrane, but they do not penetrate through it or only very slightly; as the longest skeletal styli reach the dermal membrane and project through it, the bundles of dermal spicules are thus lying between the ends of the long skeletal styli. The *main skeleton* is constructed in the ordinary way of vertical acanthostyli with the heads based on the substratum; it is somewhat dense, and the longer spicules reach as said to the dermal membrane and project beyond it. At the base of the skeleton there is a distinctly visible sponginous substance.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are divided into two distinct groups, large and small; the large styli are more or less curved near the base, this latter is the thickest part of the style but there is no distinct head; they taper evenly into a long apex which is a little more abruptly pointed outermost. They are only spined on a short basal part and the spines are somewhat large. The small acanthostyli are straight and relatively more spined than the large, the spines are continued to or near to the middle; the spines are also relatively more robust than in the large styli. The length of the large styli is 0·35—0·65mm with a diameter at the base of 0·021—0·028mm, and of the small 0·16—0·27mm with a basal diameter of 0·017—0·022mm. 2. The dermal spicules may be termed tylotornota; they are cylindrical and straight, one end is more or less thickened or has an oblong swelling which goes however evenly over into the shaft, the other end has a shorter or longer sharp point. The length is 0·21—0·29mm and the diameter in the middle 0·003mm. b. *Microsclera* are of three forms, chelæ arcuatæ and sigmata of two forms. 1. The chelæ have a somewhat strongly curved shaft, the end-parts are relatively short, the alæ are lobe-shaped and the tooth elliptical. The length is very variable, from 0·018 to 0·057mm, but the shape remains the same.

The shaft is not cylindrical but somewhat flattened and therefore of different thickness in side and front view, the thickness is in relation to this and to the size of the chela 0·003 and 0·006^{mm} to 0·007 and 0·011^{mm}; the larger chelæ are the most numerous. Sometimes the chelæ have the shaft less strongly curved. 2. The sigmata of the larger form are somewhat irregularly curved and they are contorted, always a quarter of a turn or nearly so; their length is rather constant, about 0·021—0·028^{mm} and the thickness about 0·001^{mm}. 3. The small sigmata quite resemble the sigmata in *H. pugio;* they are likewise strongly curved, and they are plane; their length is about 0·014^{mm} and the thickness scarcely goes beyond 0·0008^{mm}. The microsclera occur through the whole tissue and the chelæ are seen in great numbers in the dermal membrane.

Locality: Station 15, 66° 18' Lat. N., 25° 59' Long. W., depth 330 fathoms (bottom temperature ÷ 0° 75 C.); station 25, 63° 30' Lat. N., 54° 25' Long. W., depth 582 fathoms, and East of the Faröe Islands, depth 230 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities are situated in the Davis Strait, the Denmark Strait and East of the Faröe Islands. The species must be an inhabitant of the warm area; it is true that station 15 shows a negative bottom temperature, but this station lies just at the very border between the cold and the warm areas.

The three species just described must be somewhat nearly related, but besides by other characters they may be distinguished by their sigmata alone; *H. pugio* has only small, plane, circularly curved sigmata, *consanguinea* only contorted sigmata and *planca* two forms, contorted and plane.

42. **H. cultrisigma** n. sp.

Pl. X, Fig. 2.

Incrusting; surface hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a very slight or no head, they are divided into two groups, large, only spined below, 0·50—0·80^{mm}, small, spined in the basal half, 0·21—0·30^{mm}; the dermal spicules tylota 0·25—0·32^{mm}: microsclera three forms, chelæ arcuatæ 0·026—0·042^{mm}, sigmata of two forms, large, peculiar, somewhat band-shaped, 0·028—0·035^{mm}, small, plane, 0·014—0·020^{mm}.

This species grows as very thin incrustations on different bottom material as pebbles and shell-fragments and in one case on a Hexactinellid skeleton. The greatest extent it reaches is 10^{mm}; it may vary a little in thickness, but it is however always very thin, not reaching 0·5^{mm}. The colour (in spirit) is whitish. The *surface* is in the present condition of the sponge very hispid with long projecting spicules. The *dermal membrane* is a thin film. *Oscula* and *pores* were not seen, but some circular canals could be seen through the dermal membrane.

The *skeleton.* The *dermal skeleton* is formed by bundles of dermal spicules stretching from or almost from the base to the surface; the bundles have a more or less oblique direction and are often almost horizontal for a distance; they do not project beyond the surface, and there are no spicules lying in the membrane itself. The bundles are generally weak, consisting of only few spicules. The *main skeleton* has quite the ordinary construction and consists of acanthostyli with the heads placed on the substratum; the long styli project beyond the surface. At the base there is a small amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two sizes, large and small; the large styli are slightly curved near the head which is only slightly thickened, while the other end forms a long-pointed apex; the head and a short space above it are spined, while the whole of the rest of the shaft and apex is smooth. The small acanthostyli are generally straight and with the head still less thickened; they are more spined than the large, the spines covering the basal half part or more, and the spines are relatively larger. The length of the large styli is 0·56—0·80^{mm}, and the diameter of the head about 0·028^{mm}, of the small styli 0·21—0·30^{mm} with a diameter of 0·021—0·025^{mm}. 2. The dermal spicules are tylota; they are straight and the shaft is slender, the end-swellings are distinct, but they are not formed abruptly but pass gradually into the shaft. The length is 0·25—0·32^{mm} and the diameter of the shaft is 0·003^{mm}. Some few developmental forms were found, the thinnest of them being monactinal. b. *Microsclera* are of three forms, chelæ arcuatæ and sigmata of two forms and sizes, large, peculiar, and small. 1. The chelæ are of ordinary shape, the shaft is evenly curved and the end-parts are relatively small; the tooth is elliptical and the alæ lobe-shaped; the shaft is flattened, elliptical in section. The chelæ vary somewhat in size, the length is 0·026—0·042^{mm} and the thickness of the shaft 0·004—0·010^{mm}; with regard to the latter measurement it must be remembered, that the shaft is about twice as thick when seen in front as when seen in side view. The intermediate sizes of the chelæ are scarce and hence they could be said to be present in two groups of sizes. 2. The large peculiar sigmata are of a curious shape; they may be described as having the curved end-parts somewhat long and terminating in a hook; they are contorted generally a quarter of a turn, and the hooks are again bent a little out of the plane; but the most interesting feature is that the rod forming the sigma is not cylindrical but compressed and thus somewhat band-shaped. The size of the sigma from one curve to the other is 0·028—0·035^{mm}, and the thickness is 0·001 and 0·003^{mm} for the small and the large diameter respectively. 3. The small sigmata are of ordinary shape and they are plane; the length is 0·014—0·020^{mm} and the thickness about 0·001^{mm}. The chelæ are present especially in the dermal membrane and rather numerous; the two forms of sigmata are seen through the whole body.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms. In all three specimens. The localities are situated on the Reykjanaes Ridge South-west of Iceland.

43. **H. mucronata** Tops.

Pl. X, Fig. 3.

1904. *Hymeraphia mucronata* Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 165, Pl. XIV, fig. 4 a—d.

Incrusting; surface hispid. Spicula: megasclera; the skeletal spicules acanthostyli with no distinct head, the larger spined at the base, the small entirely spined, 0·12—0·65^{mm}, not divided into two groups; the dermal spicules fusiform oxytornota 0·22—0·268^{mm}; microsclera three forms, chelæ of two forms, ordinary 0·021—0·025^{mm}, peculiar, with some processes at each end, 0·021—0·026^{mm}, sigmata, large and fine, 0·028—0·051^{mm}.

Of this interesting species we have one specimen growing as a small incrustation on an *Onychocella;* its greatest extent is 8^{mm}, and it scarcely reaches 0·5^{mm} in thickness. The colour (in spirit) is greyish. The *surface* is hispid on account of the projecting skeletal styli. The *dermal membrane* is a thin film, it shows a multitude of larger and smaller circular openings representing I think both *oscula* and *pores.*

The *skeleton.* The *dermal skeleton* consists of single dermal spicules or of small bundles of these, stretching from the main skeleton to the surface in a more or less oblique direction. In the membrane itself there are no horizontal spicules. The *main skeleton* has the common construction, consisting of vertical acanthostyli with the heads placed on the substratum; the longest of the styli project beyond the surface, thus causing the hispidity of this; the skeleton is somewhat dense. At the base there is an amount of spongin, which is only slight but forms however a continuous basal lamella.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are more or less, generally only slightly, curved; they are thickest at the base but have no distinct head, and they taper into a long apex. The larger styli are spined at the base, but the spines are not large and outwards they become smaller and gritty, and they soon disappear; the small styli are generally straight, they are spined in the whole length, and the spines are relatively larger than in the long styli. The styli vary much in size, but there are no separated groups. The length is 0·12—0·65 and the thickness at the base 0·01—0·024^{mm}. 2. The dermal spicules are of a characteristic shape and may best be termed oxytornota; they are rather thick and much thickened about the middle, so that they are strongly fusiform; they taper towards each end, one end is tornote-shaped, or sometimes more rounded, and terminates in a little mucro, the other end is of an oxeote shape, tapering somewhat evenly, but the outermost point is generally short; in some cases this latter end is so short pointed and has such a shape that the spicule might be termed a tornote. The spicules are often somewhat curved near the short pointed end. The length is 0·22—0·268^{mm}, and the diameter in the middle is 0·008—0·017^{mm}. b. *Microsclera* are of three forms, chelæ of two forms and sigmata; the chelæ are ordinary chelæ arcuatæ and peculiar chelæ. 1. The ordinary chelæ arcuatæ have an evenly curved shaft, the alæ are somewhat claw-shaped triangular, the tooth elliptical; the length is 0·021—0·025^{mm} and the thickness of the shaft about 0·002^{mm}. 2. The peculiar chelæ are spicules, which are somewhat difficult to understand; they consist of a curved shaft the ends of which are a little dilated and from this dilatation a few processes are produced; the processes may be of different number and differently, often quite irregularly arranged, but generally there are two larger processes at the end of the dilated part, and behind these two others, generally smaller processes; it is probable that the two larger processes answer to a cleft tooth, and the other small processes to alæ, but this it is for the present not possible to decide with certainty; on the other hand I consider it as certain, that the spicule is a chela and not a sigma. In spite of the number of processes at each end I think however, that it cannot at all be considered as an ancora; the whole shape of the dilated end-parts seems to me to point towards a chela. The length of this spicule is 0·021—0·026^{mm} and the thickness of the shaft is about 0·0028^{mm}. 3. The sigmata are of a very characteristic shape, they are rather large but exceedingly fine, generally they are strongly curved in the middle and the arms have a hook-formed bend at the end; sometimes they are more evenly curved; they are more or less contorted.

They vary somewhat in size, the length from one hook to the other is 0·028—0·051^{mm} and the thickness about 0·0010^{mm}. The microsclera are especially found in the dermal membrane, the ordinary chelæ and the sigmata are however also seen throughout the tissue.

As I have seen a preparation of the type-specimen, kindly sent to me from Professor Topsent, the determination is certain; as will be seen the shape and measurements of the spicules agree very well, only the dermal spicules are different, but I think that Topsent's figure and measurements are taken from non-typical spicules; the few dermal spicules present in the preparation sent to me quite agreed with my figure (Pl. X, fig. 3 b) and were measured to 0·26^{mm} in length with a diameter of 0·017^{mm}.

Locality: Station 25, the Davis Strait 63° 30′ Lat. N., 54° 25′ Long. W., depth 582 fathoms. One specimen.

Geogr. distr. Topsent (l. c.) has the species from 37° 55′ Lat. N., 25° 24′ Long. W., depth 465 fathoms.

44. **H. tenuisigma** n. sp.

Pl. X, Fig. 4.

Incrusting; surface smooth. Spicula: megasclera; the skeletal spicules acanthostyli with a round head, divided into two groups, large, only spined below, 0·30—0·83^{mm}, small, entirely spined, 0·119—0·16^{mm}; the dermal spicules long strongyla 0·32—0·42^{mm}; microsclera only sigmata which are large, but thin, 0·084—0·12^{mm}.

Of this interesting species we have two specimens, one growing on an *Astarte*-shell together with *H. levis*, the other growing on a small *Saxicava* together with *H. Koehleri* and *H. procumbens*. The greatest extent to which the species reaches is about 10^{mm}, and the thickness is at most 0·6^{mm}. The colour (in spirit) is brownish red. The *surface* seems, when the sponge is undamaged, to be smooth. The *dermal membrane* is a thin film. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules which stretch from the skeleton below to the surface, they thus lie between the apical parts of the long skeletal spicules; the spicules in the bundles are more or less penicillately spread outwards; the bundles are sometimes rather large, consisting of many spicules. The *main skeleton* is arranged as usual and consists of vertical acanthostyli, the longest of which stretch to the surface; at the base there is a small amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two groups, large and small; the large styli are straight or, generally, slightly curved near the base; they have a round, more or less swollen head and taper into a long and fine apex which generally is a little more abruptly pointed outermost; the head-swelling is beset with medium sized, blunt spines, and a short basal part has small spines, the rest of the style is smooth. The small styli are generally straight, they have a round head-swelling which is however less distinct than in the large styli, it is likewise beset with blunt spines, and the styli are spined in the whole or nearly the whole length, but the spines are dispersed outwards. The length of the large acanthostyli is about 0·30—0·83^{mm}; they vary considerably in thickness from 0·020—0·029^{mm} and this has no relation to their length, the longest being often thin; the small styli have a length of 0·119—0·16mm and a diameter at the head of 0·021mm. The large styli are generally in size nearest the greatest length, the shorter of them, which are nearly intermediate between the large and the small, being rare. 2. The dermal spicules are long and straight strongyla, sometimes one end, and sometimes both may be slightly swollen, in the latter case the spicule approaching to a tylote; they are as a rule slightly polytylote. The length is 0·32—0·42mm and the diameter 0·005—0·007mm. Some fine developmental stages were found which were monactinal. b. *Microsclera* are of one form, sigmata, which are rather curious; they are large but exceedingly thin, and they are more or less contorted up to a quarter of a turn, otherwise they are of the common shape. The length is 0·084—0·12mm and the thickness 0·0014mm. The sigmata occur through the whole tissue but are especially numerous at the surface.

Locality: Station 9, 64° 18' Lat. N., 27° 00' Long. W., depth 295 fathoms; station 98, 65° 38' Lat. N., 26° 27' Long. W., depth 138 fathoms. Both localities lie in the Denmark Strait.

45. **H. Dujardinii** Bow.

Pl. X, Fig. 5.

1866. *Hymeniacidon Dujardinii* Bowerbank, Mon. Brit. Spong. II, 224, 38.
1867. *Halisarca Dujardinii.* Gray, Proc. Zool. Soc. 1867, 520.
1874. *Hymeniacidon Dujardinii* Bowerbank, l. c. III, 95. Pl. XXXVIII, figs. 1—4.
1882. — — Bowerbank, Norman, ibid. IV, 92, 48.
1888. *Dendoryx Dujardini,* Topsent, Arch. de Zool. exp. et gén. 2, V bis, 115, Pl. VI, fig. 3, 12, 13 c.
1890. — — , Topsent, Mém. de la Soc. Zool. de Fr. III, 201.
1891. — — . Topsent, Arch. de Zool. exp. et gén. 2, IX, 528.
1892. — — , Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. II, 99.
1892. *Myxilla radiata* Bow. Topsent, (partim, the last passage), ibid. 109.
1894. *Leptosia Dujardini,* Topsent, Mém. de la Soc. Zool. de Fr., VII, 37.
1896. — — . Topsent, ibid. IX, 123.
1896. — — , Topsent, Résultats scient. de la camp. du "Caudan", 275.
1901. — — . Topsent, Arch. de Zool. exp. et gén. 3, IX, 353.
1904. — — , Topsent, Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 185, Pl. I, fig. 5.
1909. *Hymedesmia Dujardinii,* Lundbeck. Meddel. om Grönl. XXIX, 444.

Incrusting; surface smooth; pore-sieves scattered on the surface. Spicula: megasclera: the skeletal spicules acanthostyli with a globular, more or less marked head, spined in the whole length, 0·083—0·22mm, not divided into two groups; the dermal spicules subtylota to strongyla 0·140—0·28mm. No microsclera.

Nearly all the specimens in my material of this species, and they are rather numerous, grow as thin incrustations on the shells of a species of *Valdheimia*, and the specimens of the *Valdheimia* were all living; one specimen grows on a mussel-shell, one on a Bryozoa, one on a stone with a specimen of *Petrosia crassa* and finally one on a *Voeringia.* Otherwise it is recorded as growing on stones, shells of Bivalves, Hydroids, and once it is recorded (Topsent 1892) as on an *Inachus*. The greatest extent to which the sponges in my material ordinarily reach is determined by the size of the *Valdheimia*, and is thus about 20^{mm}, and the incrustations are as a rule very thin, scarcely reaching 0.5^{mm}. The specimen on the stone has an extent of 25^{mm}. The colour (in spirit) is generally pale yellow, sometimes deeper yellow or brownish. Topsent records (l. c. 1888) that it may sometimes be violet. The *surface* is smooth. The *dermal membrane* is delicate and transparent and without spicules; it is thin, but when it remains on the sponge in its normal position it is not at all fragile, and is easily separable; but in most cases the membrane is more or less destroyed, either quite wanting or remaining only as patches or rags; probably the membrane is in the living sponge soft and hence easily torn, but on hardening in alcohol it becomes much tougher. Topsent (l. c. 1888) speaks of "La peau épaisse" but he is here evidently thinking of the whole tissue occupied by the dermal spicules; in 1892, on the other hand, in the description of the specimens of *Myxilla radiata* which in 1904 he declares belong in reality to *H. Dujardinii*, he describes a thin dermal membrane. *Oscula* and *pores:* Bowerbank says: "Oscula and pores inconspicuous", and Topsent (l. c. 1888) says: "Les orifices aquifères sont petits". Oscula I have not observed, but pores I observed on the other hand in those specimens in which the dermal membrane was in good condition; the pores are somewhat interesting; they are gathered in beautiful sieves which may be present in rather great numbers; the sieves are generally oval and are seen as slight, somewhat sharp-bordered impressions inclosing a sieve-like membrane; they are not very conspicuous and require a close examination to be detected, and they are best rendered visible when the sponge is a little dried. The sieves have generally a largest diameter of 0.8—2^{mm}; the pores are dense-lying, more or less oval and of a diameter of 0.028—0.08^{mm}.

The *skeleton*. The *dermal skeleton* consists of fibres, bundles or more loosely scattered spicules which stretch from near the base and up to the dermal membrane; it may be somewhat differently developed in different places, in some places it consists only of scattered spicules together with some few bundles, while in other places the spicules and bundles are much more crowded; sometimes also the spicules may form rather long fibres running horizontally below the dermal membrane; finally, as already pointed out by Topsent, the dermal skeleton is naturally most developed in the thickest specimens, as it alone occupies the space between the basal skeleton and the surface. The *main skeleton* consists of vertical acanthostyli with their heads placed on the substratum; they are somewhat distantly arranged; at the base there is a distinct amount of spongin forming a more or less distinct basal lamella, and the spongin also stretches somewhat up along each acanthostyle, thus imbedding the lower part of it and forming a distinct coat.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli; they are straight, only rarely slightly curved; the head is globular, sometimes distinctly marked off, at other times less so on account of the shaft being rather thick below, but also in this latter case of a globular appearance; the shaft tapers evenly from the head to the point. The styli are spined in their whole length, only the spines are sometimes few and dispersed towards the point, and a short outermost part may then be smooth. The spinulation may vary much in different specimens being more or less dense; the spines are medium sized and reclined on the shaft, but radiating straight out or curved somewhat upwards on the head, and they may here vary somewhat in length. The size of the styli varies somewhat, but there are no groups; the length is 0·083—0·22^{mm} and the diameter of the head is 0·012—0·02^{mm}. The size may be somewhat different in various individuals, the styli sometimes not reaching over 0·15^{mm} in length. 2. The dermal spicules are subtylota varying to strongyla; they are straight and slender; when they are of tylote shape one end of the shaft is thinner than the other, and this thinner end has a distinct end-swelling, while the other end is more evenly and but slightly thickened; the shaft is generally of the same thickness in the whole length, but sometimes somewhat thickened in the middle. The length of the dermal spicules varies in all from 0·149—0·28^{mm}, and the diameter from 0·002—0·005^{mm}, but the difference is not so great in the single specimens, as these spicules may vary to a rather considerable degree in different specimens; thus the following measurements were taken from different specimens: 0·149—0·19^{mm}, 0·16—0·20^{mm}, 0·19—0·24^{mm}, 0·18—0·28^{mm} and 0·20—0·28^{mm}. Very often the larger spicules are strongyla or slightly tylote, while the smaller are more distinct tylota. *Microsclera* are not present.

Embryos. In many of the specimens embryos were found. They are globular and of an average diameter of 0·23^{mm}; they are often present in great numbers. Nearly all the specimens examined had spicules, only a single one without spicules was seen. The spicules are styli considerably smaller than those of the grown sponge; they were measured from 0·028—0·078^{mm} in length and from exceedingly fine to 0·008^{mm} in diameter at the head; otherwise they are acanthostyli chiefly of the same shape as in the grown sponge, only the spines are less developed, in such a way, that the spicules may be termed coarsely and rather densely gritty.

It will thus be seen, that the spicules first appearing in the embryo are the skeletal spicules; this was also to be expected, the same being the case in the *Myxilleae*, as I have shown in the second part of this work in several instances, in the genera *Myxilla*, *Iophon* and *Forcepia*, in the embryos of which the skeletal spicules are also the megasclera first appearing. Topsent declares on the contrary (l. c. 1888, 110), just with regard to the present species, that the first developed spicules are the dermal, and he says further that this also holds good with regard to *Myxilla incrustans*. It is somewhat strange to me how he has got to this result; I can only imagine that he has examined embryos with very young and fine spicules, in which case these may perhaps be mistaken for dermal spicules.

Locality: This species has been collected in rather great numbers; station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 25, 63° 30′ Lat. N., 54° 25′ Long. W., depth 582 fathoms; station 27, 64° 54′ Lat. N., 55° 10′ Long. W., depth 393 fathoms; station 28, 65° 14′ Lat. N., 55° 42′ Long. W., depth 420 fathoms; station 35, 65° 16′ Lat. N., 55° 05′ Long. W., depth 362 fathoms; further it has been taken at East Greenland, Forsblads Fjord, depth 50—90 fathoms (The Amdrup-Expedition 1900), and at the Faröe Islands, depth 30 fathoms (Th. Mortensen). The localities are situated in the Davis Strait, at East Greenland, the Eastern coast of Iceland and the Faröe Islands.

Geogr. distr. H. Dujardinii was hitherto recorded from the Eastern coasts of Britain and Ireland (Bowerbank); from the French coast of the Channel (Luc, Roscoff, Calvados) (Topsent), the Bay of Gascogne, depth 95 fathoms (Topsent), the coast of Provence at Ciotat (Topsent), at the Azores in depths of 69 and 28 fathoms, at 46° 17′ Lat. N., 60° 12′ Long. W., depth 72 fathoms (Topsent), finally at the coasts of North Africa, in the Bay of Gabes and at la Calle (Topsent). The species is thus hitherto known from 65° to 34° Lat. N., and between 60° Long. W. and 10° Long. E. As to the depth some of the specimens of the Ingolf Expedition are taken in considerably greater depths than those from which it was known hitherto; the greatest depth recorded was 95 fathoms, while it was taken by the Ingolf Expedition in depths down to 582 fathoms. Its bathymetrical range as known now is in all from the very coast even above low-water mark (Bowerbank) down to 582 fathoms.

Remarks: If the rules of nomenclature were adhered to strictly, the present species should have a new name, as it is not identical with the well known *Halisarca Dujardinii* Johnst. Bowerbank thought, when he examined the present species, that Johnston had overlooked the spicules, and he identified it therefore with *Dujardinii.* Already Schmidt has noted (Zweites Suppl. zu den Spongien des adriat. Meer. 1866, 16) that this must be erroneous. Gray however in 1867 followed (l. c.) Bowerbank. Topsent in 1888 (l. c.) placed the species in the genus *Dendoryx,* and referred it later correctly to his genus *Leptosia,* but he did not alter its name, which should properly have been done, since Bowerbank's determination was erroneous. As the species is well known now under the name *Dujardinii* I shall however make no change.

46. **H. primitiva** n. sp.

Pl. X, Fig. 6.

Incrusting; surface smooth. Spicula: megasclera: the skeletal spicules acanthostyli with a slight head-swelling, entirely spined or the larger with a smooth apical part. 0·119—0·35^{mm}, not divided into two groups; the dermal spicules strongyla, slightly polytylote, 0·196—0·28^{mm}. No microsclera.

This species grows incrusting on shells of Brachiopods, mussels and barnacles; it has a greatest extent of about 20^{mm}, the thickness is about 0·5^{mm}. The colour (in spirit) varies between dark yellowish and brown. The *surface* is smooth. The *dermal membrane* is a distinct but thin film; it was on my specimens often destroyed to a high degree. Some canals are seen shining through the membrane, and some *oscula* are present as circular openings not elevated over the level of the surface.

The *skeleton.* The *dermal skeleton* consists of bundles or quite short fibres stretching from the main skeleton, often almost from the base, to the dermal membrane; the spicules in the bundles are penicillately spread towards the membrane and support it, but they do not pierce it. The membrane itself is not provided with spicules or at all events only with some few, lying singly and scattered; only around the oscula the structure is different; short fibres appear here in the membrane, stellately arranged all round the opening, towards which they unite in such a way, that the opening is surrounded by radiately arranged, but not dense-lying single spicules. The *main skeleton* is of the ordinary arrangement, the vertical acanthostyli are somewhat densely placed; the longest of them reach just to the dermal membrane. There is a considerable amount of spongin at the base, forming a more or less continuous basal layer.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, which have only a slight head-swelling; they are straight or, when longer, slightly curved near the base; they are somewhat densely spined with spines of medium size; in the longer spicules the spines are small and scattered towards the apex, and a shorter or longer part may be smooth. The styli vary much in size but they are not divided into two groups. The length is 0·119—0·35^{mm} and the diameter at the base is 0·014—0·027^{mm}. The styli may vary somewhat in different individuals, in some they are more robust and more coarsely spined than in others, and at the same time the smooth part towards the point is wanting or small. Also with regard to the size there is some variation, the greatest length being in some individuals 0·27^{mm}. 2. The dermal spicules are straight or slightly curved, cylindrical strongyla; they are slightly but distinctly polytylote and the ends are generally very slightly swollen, the swellings being as a rule scarcely perceptible. The length is in all 0·196—0·28^{mm}, but there may be some variation between the individuals; the diameter is 0·0028—0·005^{mm}. b. *Microsclera* are not present.

This species is characterised towards *H. Dujardinii* by the size and shape of the acanthostyli and by the polytylote dermal strongyla.

Locality: Station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 28, 65° 14′ Lat. N., 55° 42′ Long. W., depth 420 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; further it has been taken at Iceland, depth 54 fathoms; East of the Faröe Islands, depth 160 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). The localities lie in the Davis Strait, the Denmark Strait, between Iceland and the Faröe Islands and East of the latter.

47. H. longurius n. sp.

Pl. X, Fig. 7.

Incrusting; surface smooth or nearly so, with scattered pore-sieves. Spicula: megasclera; the skeletal spicules acanthostyli with a small or no head, entirely spined or with a smooth apical part, 0·10—0·50^{mm}, not divided into two groups: the dermal spicules strongyla 0·22—0·298^{mm}. No microsclera.

This species grows as thin but very extended incrustations on large Balani, on Brachiopods and one specimen on a *Pecten;* both the Balani, the Brachiopods and the *Pecten* were living specimens. As the species grows along and round the Balani, it may reach to a greatest extent of not less than 75^{mm}; the thickness does not reach 0·5^{mm}. The colour (in spirit) is yellowish or greyish yellow, in some specimens dark brown or even blackish brown, but probably this latter colour is due to a change produced later. The *surface* is smooth or at all events only with a few projecting spicules. The *dermal membrane* is a thin film resting on the skeleton below. *Oscula* I have not seen, but the *pores* are arranged in a somewhat interesting way; they are lying in pore-sieves which are generally circular; the sieves are surrounded by a very low wall and they are thus seen as slight, circular, sharply bordered impressions, the borders of which are only a little elevated over the surface; the whole formation is only little conspicuous, and is generally only to be seen when the sponge is half dried; in some specimens I could not detect pore-sieves. The pores are close-lying in the sieve and of an average diameter of 0·04^{mm}.

The *skeleton.* The *dermal skeleton* is well developed; it consists of bundles and fibres of dermal spicules stretching from the main skeleton to the dermal membrane, the outermost spicules in the fibres are more or less penicillately spread; sometimes the fibres may stretch horizontally below the membrane for some distance. Around the pore-areas the spicules are radiately arranged and they stretch into the wall bordering the areas and are here arranged densely and parallel, forming thus a dense skeleton in the wall. In the membrane itself there are otherwise no spicules, or at all events only some single, scattered ones. The *main skeleton* is of the common construction consisting of vertical acanthostyli with the heads based on the substratum; the longest of them reach to the dermal membrane or even pierce it. At the base there is a slight amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are straight or slightly curved near the base; the head is small but however generally somewhat distinctly swollen; in the small spicules it is as a rule not swollen; the styli taper into a long and fine apex. The spinulation is dense but the spines are somewhat small; in the longer spicules the spinulation is less dense, the spines become very small and scattered outwards, and in the longest a larger or smaller apical part, sometimes almost the half part, is smooth. The styli vary very much in size, but are not divided into groups. The length is 0·10—0·50^{mm} and the diameter of the head 0·014–0·025^{mm}. 2. The dermal spicules are straight or only slightly and somewhat irregularly curved strongyla; they are often more or less polytylote, but they may also be quite smooth; one end is a little thicker than the other, the thinner end has sometimes an elongate, more or less pronounced swelling, which is the more distinct the thinner the spicules are. The strongyla may vary somewhat in the different individuals, being in some considerably thicker and less slender than in others; in these thicker strongyla there is no end-swelling. Some very fine developmental stages were seen which were monactinal. The length is 0·22—0·298^{mm} and the diameter 0·003—0·007^{mm}. *Microsclera* are not present.

Locality: Station 32, the Davis Strait, 66° 35′ Lat. N., 56° 38′ Long. W., depth 318 fathoms; Iceland in Ofjord on the Northern coast, depth 18 fathoms (Ditlewsen) and at Hornsvig on the Southeast coast, depth 84 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902).

48. **H. aequata** n. sp.

Pl. X, Fig. 8.

Incrusting: surface smooth. Spicula: megasclera: the skeletal spicules acanthostyli with a small or no head, entirely spined, 0·10—0·30^{mm}, not divided into two groups: the dermal spicules strongyla 0·21—0·298^{mm}. No microsclera.

This species grows as a thin but extended incrustation on the lower side of a *Lithothamnion.* Its greatest extent may be estimated to about 40^{mm} but is in reality more, as the sponge follows the irregularities on the underside of the *Lithothamnion;* the thickness is about 0·25^{mm}. The colour (in spirit) is whitish brown. The *surface* is smooth without projecting spicules. The *dermal membrane* is thin and not separable. *Oscula* and *pores* were not observed.

The *skeleton.* The *dermal skeleton* consists of bundles or fibres stretching from the main skeleton, generally quite from the base up to the dermal membrane, at which the bundles are spread in a penicillate way. The fibres have a more or less oblique direction, and when they are of some length they stretch horizontally below the dermal membrane. The *main skeleton* is of the ordinary arrangement consisting of erect acanthostyli with their heads on the substratum; the styli are somewhat distantly placed. At the base there is a distinct though not copious amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are somewhat slender acanthostyli; they are straight or, the longer of them, slightly curved and these latter have a small head-swelling; the small styli have a very slight head-swelling or often no swelling at all. The styli are somewhat densely spined with small spines, and they are all, both the large and the small, spined in the whole length; the spines are relatively largest in the small styli. The length is 0·10—0·30^{mm} and the diameter at the base 0·012—0·017^{mm}. The styles are not divided into two groups. 2. The dermal spicules are strongyla which have one end a little thicker than the other, and they are slightly fusiform, being a little thicker in the middle than towards the ends; they may sometimes be slightly polytylote, which is especially the case with the thinner (not fully developed) forms. The length is 0·21—0·298^{mm} and the diameter in the middle 0·004—0·007^{mm}. *Microsclera* are not present.

This species is very difficult to characterise towards the three preceding ones, but it is no doubt distinct. From *Dujardinii* it is distinguished already by the dermal strongyla, as in *Dujardinii* there are always at all events some tylota among the dermal spicules; *primitiva* has longer, somewhat more robust styli with somewhat stronger spines, and distinctly polytylote dermal spicules; *longurius* finally is easily distinguished by the long styli which are smooth in a shorter or longer apical part. Also the small styli without heads are characteristic for the present species.

Locality: At Ikamiut in North Greenland. One specimen.

49. **H. dermata** n. sp

Pl. III, Fig. 17, Pl. XI, Fig. 1.

Incrusting; surface smooth, bearing a number of conical, compressed oscular and pore-papillæ. The dermal skeleton much developed, the main skeleton rather weak. Spicula: megasclera: the skeletal spicules acanthostyli with a small or no head, divided into two groups, large, only spined below, 0·30—0·417^{mm}, small, spined in the whole length 0·107—0·13^{mm}; the dermal spicules long strongyla 0·33—0·45^{mm}. No microsclera.

Of this species we have a couple of specimens growing on a branching Bryozoon, and one growing on a stone; the latter specimen is incrusting in the common way, but the specimens growing on the Bryozoon quite envelop the branches of this, and they also extend between the branches, filling the interspaces with their body, which however in these places is thin and plate-shaped. The greatest extent of the species is about 35^{mm}, and the thickness of the incrustation may reach 1·5^{mm}. The colour (in spirit) is whitish or yellowish white. The *surface* is smooth, without projecting spicules, it bears a number, smaller or greater, of conical papillæ; these papillæ are highly compressed and are generally lying quite down towards the surface with a flat side turned upwards, and the arrangement is then such, that the opening, which lies in reality in the summit, comes to lie at the summit of the side of the papilla, which is turned upwards. The *dermal membrane* is a thin and separable film; it has no skeleton proper, but the tissue lying below it, and which has horizontal fibres, is liable to be separated off together with the membrane, the whole thus giving the impression of a thick and solid membrane. *Oscula* and *pores* are certainly situated on the papillæ mentioned; most of these show a rather large opening at the summit, while some others are more pointed and conical with a small opening; I have not seen pore-sieves but the papillæ with the large opening are in all probability pore-papillæ, the others being oscular papillæ, the facts being thus as in *H. verrucosa.*

The *skeleton.* The *dermal skeleton:* the skeleton formed by the dermal spicules is by far the most developed and it occupies nearly the whole body of the sponge; it consists of fibres which stretch from the main skeleton or quite from the base and obliquely towards the surface, but they run generally so obliquely, that they are for long distances more or less parallel with the surface, and the skeleton is on the whole rather irregular on account of the manner in which the sponge grows; the fibres are somewhat numerous and they are also rather strong, of a thickness up to 0·12 mm. The fibres stretch horizontally just below the dermal membrane and terminate in it, but there are no spicules proper to the membrane. The fibres lying below the membrane run together at the base of the oscular and pore-cones and continue up in the wall of these, forming thus a skeleton which consists of densely placed parallel spicules with the ends towards the opening of the cone. The *main skeleton* is somewhat weakly developed and consists as usual of acanthostyli with the heads based on the substratum, but the styli are much scattered and not numerous. At the heads of the acanthostyli there is a very small amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two well separated groups, large and small. The large styli are straight or slightly curved, the head is small or not at all developed; they taper evenly outwards but at the end they are abruptly pointed with a short point; they are spined only on the basal part at most in the lower half part; most of the spines, especially those on the head, are somewhat strong. The length is 0·30—0·417 mm and the diameter of the head 0·018—0·022 mm. The small styli are straight and spined in the whole length, but the spines are small and scattered in the outer part, otherwise they are relatively robust; these styli are somewhat uniform in size, the length being 0·107—0·13 mm and the diameter of the head 0·014—0·019 mm. 2. The dermal spicules are long and straight strongyla with one end thicker than the other; they may be slightly polytylote; the ends may sometimes be very slightly swollen, especially in the thinner strongyla. The length is 0·33—0·45 mm and the diameter 0·006—0·010 mm. *Microsclera* are not present.

This species is interesting in a certain respect; it resembles to a very high degree one of the species with chelæ, viz. *H. stylata:* the only differences, besides the want of the chelæ, are that both the styli and the dermal spicules are slightly smaller in the present species than in *stylata,* but this is of no specific value; otherwise the growth, the surface with its papillæ, the structure of the dermal membrane, the arrangement of the skeleton and the shape of both kinds of spicules agree very well in the two species, and if it were not for the difference in the possession and non-possession of chelæ, and the difference in the structure of the dermal membrane, to which the want of the chelæ seems to give rise, I should not hesitate in uniting them. As however I have otherwise never found, that the same species may be with or without chelæ, I think it necessary to consider the present species as specifically distinct from *H. stylata.*[1]) It is to be remarked, that the specimens of both species are

[1]) To be sure Topsent has described (Résultats du Voy. du S. Y. Belgica, Spongiaires, 1901, 18.) a species without sigmata as *Lissodendoryx spongiosa* R. and D. var. *asigmata,* and in the same place the author strongly advocates the view that sponge-species are capable of varying in such a way, that they may want a form of microsclera otherwise present in the species; I cannot at all agree with Topsent in this view, and with regard to the examples he mentions *(Hamacantha Johnsoni, Desmacella Peachii)* I have proved (The Ingolf Exp. VI, 1. 1902) that the supposed varieties are distinct species, and with regard to *H. Johnsoni* Topsent has himself in his work from 1904 admitted the specific validity of his former varieties.

in a good state, and they have especially the dermal membrane undamaged, and further it must be noted, that the chelæ in *stylata* are numerous and form a layer in the dermal membrane. Should the two species be considered as identical, it must be from the point of view, that the specimens of *dermata* were abnormal, but there is otherwise nothing to indicate such a state. Now one fact is very interesting, and it is that *H. stylata* is from the cold area (station 113, bottom temperature ÷ 1° 0 C.), while the present species is from bottom with positive temperature. It is not for the first time that very nearly related, but distinct species are found one on negative the other on positive bottom (e. g. *Gelliodes plexa* and *consimilis*, The Danish Ingolf Exp. VI, 1; *Asbestopluma pennatula* and *bihamatifera*, *Cladorhiza abyssicola* and *gelida*, *Lissodendoryx complicata* and *vicina*; ibid. VI, 2.).

Locality: Station 2, 63° 04' Lat. N., 9° 22' Long. W., depth 262 fathoms; Forsblads Fjord in East Greenland, depth 50—90 fathoms (The Amdrup Expedition 1900). The localities lie at East Greenland and West of the Faröe Islands.

50. **H. tornotata** n. sp.

Pl. III, Fig. 18, Pl. XI, Fig. 2.

Incrusting; surface hispid. Spicula: megasclera: the skeletal spicules acanthostyli with a more or less pronounced head, entirely spined but in the longer the spines very small outwards, 0·107—0·31 ^mm^, not distinctly divided into two groups; the dermal spicules long tornota, generally with microspined end-parts, 0·32—0·47 ^mm^. No microsclera.

This species is represented by four specimens, three growing on shell-fragments, the fourth on a Brachiopod; the former are rather small crusts while the latter covers the greatest part of the Brachiopod shell and has thus an extent of 20 ^mm^. The small specimens are about 0·7 ^mm^ thick while the larger one reaches to a thickness of about 1 ^mm^; this comparatively great thickness is reached on account of a special development of the dermal skeleton as mentioned below. The colour (in spirit) is light brown to brown. The *surface* is densely hispid from projecting dermal spicules; the small specimens are much more hispid than the large. The *dermal membrane* is inconspicuous and not separable. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton* consists of large bundles of dermal spicules which stretch from the main skeleton to the surface, the spicules in the bundles are penicillately spread outwards and project beyond the surface for a rather long distance; seen from above the projecting spicules are almost stellately arranged. Such is the construction of the dermal skeleton in the small specimens, but in the large specimen the facts are somewhat otherwise; the dermal spicules are here more numerous and they are somewhat strongly interwoven, forming a dense and thick layer, and apparently lying without any order; only outermost they are arranged somewhat parallel, with the points projecting outwards; this layer may reach to a thickness of 0·8 ^mm^. The difference in the development of the dermal skeleton in this species is, as will be seen, about the same as may also occur in *H. Peachii*. The *main skeleton* is of typical construction, consisting of vertical acanthostyli with the heads on the substratum; they are placed rather densely. At the base there is an amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are not divided into two groups, in so far as intermediate forms occur, but as these are somewhat rare, the styli give the impression of falling into two groups; the large styli are straight or very slightly curved, they have a roundish head with moderately sized spines, the shaft has small spines which become quite gritty outwards; the small styli are generally straight, the head is less pronounced than in the large, the spines are larger and often distinctly reclined. The length of the styli is in all 0·107—0·31 mm and the diameter at the head 0·014—0·021 mm. 2. The dermal spicules are long, straight, or somewhat, often irregularly, curved tornota; they are thickest in the middle and thus more or less fusiform; they show a curious feature, the end-parts being generally, but not always, somewhat roughened or microspined. The length is 0·32—0·47 mm and the diameter in the middle 0·004—0·007 mm. *Microsclera* are not present.

Locality: Station 81, 61° 44' Lat. N., 27° 00' Long. W., depth 485 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; East of the Faröe Islands, depth 160 fathoms. The localities lie in the Denmark Strait, South-west of Iceland and at the Faröe Islands.

51. H. mucronella n. sp.

Pl. III, Fig. 19, Pl. XI, Fig. 3.

Incrusting, but of somewhat massive appearance; surface hispid. The dermal skeleton strongly developed, the main skeleton weak. Spicula: megasclera; the skeletal spicules acanthostyli divided into two groups, large with a very small head, only spined below, 0·40—0·65 mm, small, with a more distinct head, and entirely spined, 0·14—0·178 mm; the dermal spicules tornota with one end with a mucro, 0·38—0·596 mm. No microsclera.

Of this species we have only one specimen which grows on a fragment of a *Sipho:* the sponge is of a somewhat massive shape as it does not incrust the shell-fragment but is only fixed on it and is for the rest somewhat filled with bottom material; it thus shows a growth similar to that in *H. grandis,* though it is much less filled with foreign particles. On account of large cavities in the sponge the consistency is somewhat bladder-like. The specimen has an extent of 17 mm and a height of about 9 mm. The colour (in spirit) is dark greyish brown. The *surface* is strongly and densely hispid from projecting dermal spicules. *Oscula* and *pores* were not observed.

The *skeleton.* The *dermal skeleton:* the skeleton formed of the dermal spicules is strongly developed and occupies the greatest part of the sponge; it consists of fibres running everywhere but chiefly in the direction from the base, or else from some part of the main skeleton, towards the surface, the fibres may thus attain a relatively great length; in the dermal membrane the spicules form penicillately spread bundles, the spicules of which pierce the membrane; seen from above the spicules in the bundles appear almost stellately arranged; in places where the membrane stretches over the large cavities, fibres pass horizontally just below it, and the bundles seem here to originate from these fibres. The sponge-body has, as said, many large cavities and the fibres are found therefore in the parts of the tissue separating these cavities. The *main skeleton* is not much developed; it consists of acanthostyli based with their heads partly on the shell at the base of the sponge and partly on the imbedded foreign particles, such as large sponge-spicules, gravel and the like, which particles must be considered therefore also as substratum for the sponge; the acanthostyli placed on the imbedded material may point in every direction, and the main skeleton is, according to the manner of growth of the sponge, quite irregular. At the head of each acanthostyle there is a small, but distinctly observable amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, divided into two groups, large and small; the large styli are straight or slightly curved near the base; the head is very small or almost quite absent, the basal part has some small or moderately sized spines, but only for a short distance, the remainder of the shaft being smooth or slightly and imperceptibly gritty. The length is 0·40—0·65^{mm} and the diameter at the base 0·017—0·021^{mm}. The small acanthostyli are generally straight with a slight but distinct head-swelling; they are densely spined in the whole length, the spines on the head being the largest. The length is 0·14—0·178^{mm} and the diameter of the head is 0·017^{mm}. 2. The dermal spicules are tornota but of a characteristic shape; one end is pointed in the way common for tornota and not very short, the other end is shorter and more roundish pointed and has a very distinct mucro; the latter end is somewhat thicker than the former; the tornota are long, straight or nearly so and slightly thicker in the middle than towards the ends. The length is 0·38—0·596^{mm} and the diameter in the middle 0·005—0·011^{mm}; the intermediate sizes are by far the most common. *Microsclera* are not present.

Locality: At East Greenland, 70° 32′ Lat. N., 8° 10′ Long. W., depth 470 fathoms (The Ryder Expedition 1891—92).

Above I have described 51 species of *Hymedesmia* of which only seven are determined as previously described species; these are: *H. Koehleri* Tops., *occulta* Bow., *baculifera* Tops., *crux* O. Schmidt, *filifera* O. Schmidt, *mucronata* Tops., and *Dujardinii* Bow. I have tried to find out the other previously described species, and I think that at all events most of them are enumerated in the following list:

1866. *H. zetlandica* Bow. Mon. Brit. Spong. II, 152, III, Pl. XXI. figs. 1—7.
— *pauperlas* Bow. ibid., II, 223, III, Pl. XXXV, fig. 4—8 (*Hymeniacidon*).
1875. — *vidua* O. Schmidt. Jahresber. der Comm. zur wissensch. Unters. der deutsch. Meere in Kiel für 1872—73, 120. (*Spirastrella*); Thiele, Arch. für Naturgesch. 1903, I, 393, Taf. XXI, Fig. 27.
1882. — *Peachii* Bow. l. c. IV, 64. Pl. XIII, figs. 5—12.
1885. — *mammilaris* Frstdt. Kgl. Sv. Vetensk. Akad. Handl. 21, 6, 32, Tav. III, Fig. 3 a—h. (*Hastatus*); Thiele, Arch. für Naturgesch. 1903, I, 389, Taf. XXI, Fig. 22 a—d.
1887. — *pustula* Frstdt. Öfvers. Kgl. Vet. Akad. Förh. 1887, No. 1, 27. (*Esperia*).
1903. — *prostrata* Thiele, Abhandl. Senckenb. nat. Gesell. XXV, 955, Taf. XXVIII, Fig. 20.
— *norvegica* Thiele, Arch. für Naturgesch. 1903, I, 390, Taf. XXI, Fig. 23 a—e. (perhaps a [illegible]
1904. — *mutabilis* Tops. Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 100, Pl. XIV, fig. 3. (*Hymeraphia*).
— *Schmidti* Tops. ibid., 189, Pl. XV, fig. 9. (*Leptosia*).

1904. *H. raphigena* Tops. Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 192, Pl. XV, fig. 7. (*Leptosia*).

— *obtusata* Tops. ibid., 193, Pl. XV, fig. 6. (*Leptosia*).

— *acerata* Tops. ibid., 193, Pl. XV, fig. 5. (*Leptosia*).

1905. — *tenuissima* Dendy, Rep. on the Pearl Oyster Fishery of the Gulf of Manaar, III, 169, Pl. XI, fig. 5. (*Myxilla*).

— *areolata* Thiele, Zool. Jahrb. 1905, 452, Taf. 31, Fig. 23, 68 a—d.

1906. — *lancifera* Tops. Bull. du Mus. d'hist. nat. 560. (*Leptosia*).

The number of species seems thus at present to be about seventy; this is already a large number and there is reason to believe, that many more species will be described in the future. Earlier Expeditions paid often but little attention to the insignificant crusts, which is the shape of most *Hymedesmia* species; it is first in the work of Topsent from 1904 that a greater number of incrusting species of various genera is recorded, and the author says expressly, that this fact is due to the care with which he examined stones, corals etc. brought home. The Ingolf Expedition laid the greatest stress on procuring all small and incrusting sponges, and hence our material is very rich. Under these circumstances when the number of species must be expected to increase in the future to some degree, it is of the greatest importance, that the new species are described thoroughly, and the spicules ought always to be figured, so that the affinities of the species can be judged. I shall therefore try to give here an analytical table of all the above enumerated species; this table is of course only an attempt, and I do not think that a species can be definitely determined only by its aid, but I think however it may be useful.

Table of the Species of *Hymedesmia*.

1.	Microsclera present	2.
—	No microsclera	59.
2.	Microsclera only chelæ arcuatæ (sometimes transformed to spined rods)	3.
—	Microsclera chelæ arcuatæ together with sigmata, or sigmata alone or rhaphides	45.
3.	The chelæ of common shape	4.
—	The chelæ spined or quite transformed	43.
4.	The dermal spicules genuine strongyla	5.
—	The dermal spicules of other forms, at all events not quite genuine strongyla.	21.
5.	The acanthostyli not divided into two groups	6.
—	The acanthostyli somewhat distinctly divided into two groups	13.
6.	The dermal strongyla more or less distinctly polytylote	7.
—	The dermal strongyla not, or not distinctly, polytylote	10.
7.	The chelæ somewhat strongly curved, 0·028—0·050^{mm}, the acanthostyli with blunt spines on the head	*Koehleri* Tops.
—	The chelæ less strongly curved	8.
8.	The chelæ with somewhat long, free alæ, 0·045—0·054^{mm}	*lacera*
—	The chelæ smaller, somewhat like palmate chelæ	9.
9.	The acanthostyli strongly spined, especially at the head, chelæ 0·033—0·038^{mm}.	*storea*
—	The acanthostyli less strongly spined, chelæ 0·028^{mm}	*lamina*

10.	Surface with low warts or long papillæ	11.
—	Surface simple	12.
11.	Surface with low warts, dermal strongyla long and straight	*verrucosa*
—	Surface with long papillæ, dermal strongyla robust with a double curvature	*filifera* Schmidt.
12.	The acanthostyli only spined on the head	*norvegica* Thiele.
—	The acanthostyli spined in the lower half part	*mollis*
13.	The chelæ strongly, nearly semicircularly curved	*curvichela*
—	The chelæ less strongly curved	14.
14.	The dermal spicules polytylote, chelæ large, 0·052—0·064 mm, the end-parts somewhat recurved	*rugosa*
—	The dermal spicules not polytylote, chelæ smaller	15.
15.	The acanthostyli strongly spined in the whole length	*splenium*
—	The acanthostyli not entirely spined	16.
16.	The large acanthostyli spined towards the apex, chelæ 0·032—0·037 mm, the free part of the shaft about one third of the length	*tenuicula*
—	The large acanthostyli at most spined in the lower half part	17.
17.	The small acanthostyli distinctly curved	18.
—	The small acanthostyli straight	19.
18.	The acanthostyli reaching to 0·65 mm, chelæ somewhat strongly curved, 0·035—0·044 mm	*similis*
—	The acanthostyli reaching to 0·42 mm, chelæ less curved, 0·037 mm	*paupertas* Bow.
19.	The acanthostyli long, reaching to 0·95 mm, the dermal spicules slightly tending towards tornota	*nummulus*
—	The acanthostyli shorter, the dermal spicules pure strongyla	20.
20.	The acanthostyli reaching to 0·63 mm, the dermal strongyla 0·35—0·52 mm, surface with papillæ	*stylata*
—	The acanthostyli reaching to 0·38 mm, the dermal strongyla 0·26—0·32 mm, surface simple	*dubia*
21.	The dermal spicules diactinal (at all events not distinctly monactinal)	22.
—	The dermal spicules monactinal	42.
22.	The dermal spicules tornota	23.
—	The dermal spicules oxea or tylota	32.
23.	The dermal spicules centrotylote tornota	*lancifera* Tops.
—	The dermal spicules not centrotylote	24.
24.	The tornota with unequal ends	25.
—	The tornote with equal ends	26.
25.	The large acanthostyli only spined at the base, 0·24 mm, chelæ 0·018 mm	*prostrata* Thiele.
—	The large acanthostyli a little more spined, 0·45 mm, chelæ 0·03 mm	*Peachii* Bow.
26.	The large acanthostyli spined in about the whole length	27.
—	The large acanthostyli spined only near the base	31.
27.	The chelæ of ordinary shape	28.
—	The chelæ extraordinarily flat	*platychela*
28.	Surface with papillæ, tornota 0·36 mm, chelæ 0·024 mm	*mammillaris* Fistdt.
—	Surface simple	29.
29.	The acanthostyli reaching to 0·53 mm, the tornota 0·17—0·22 mm, chelæ with slightly recurved end-parts 0·021—0·054 mm	*perforata*
	The acanthostyli not reaching over 0·35 mm	30.

30.	The acanthostyli reaching to $0{\cdot}35^{mm}$, tornota $0{\cdot}22$—$0{\cdot}32^{mm}$, chelæ somewhat strongly curved $0{\cdot}024$—$0{\cdot}038^{mm}$	*procumbens*
—	The acanthostyli reaching to $0{\cdot}298^{mm}$, tornota $0{\cdot}16$—$0{\cdot}17^{mm}$, chelæ less strongly curved, $0{\cdot}041$—$0{\cdot}052^{mm}$	*clavigera*
31.	Surface with papillæ, acanthostyli reaching to $0{\cdot}59^{mm}$, tornota $0{\cdot}32$—$0{\cdot}50^{mm}$, chelæ somewhat palmate-like, $0{\cdot}025$—$0{\cdot}030^{mm}$	*basispinosa*
—	Surface simple, acanthostyli reaching to $0{\cdot}92^{mm}$, tornota $0{\cdot}23$—$0{\cdot}28^{mm}$, chelæ of ordinary shape, $0{\cdot}025$—$0{\cdot}045^{mm}$	*longistylus*
32.	Dermal spicules oxea	33.
—	Dermal spicules tylota	35.
33.	The acanthostyli almost entirely spined, chelæ $0{\cdot}025^{mm}$	*areolata* Thiele.
—	The acanthostyli only spined near the base	34.
34.	The acanthostyli reaching to $1{\cdot}19^{mm}$, chelæ $0{\cdot}034$—$0{\cdot}040^{mm}$	*occulta* Bow.
—	The acanthostyli reaching to $0{\cdot}65^{mm}$, chelæ strongly curved, $0{\cdot}028$—$0{\cdot}037^{mm}$	*simillima*
35.	The acanthostyli almost smooth, only slightly spined at the base, chelæ $0{\cdot}045$—$0{\cdot}052^{mm}$	*lævistylus*
—	The acanthostyli more spined, often entirely	36.
36.	The acanthostyli divided into two groups	*bractea.*
—	The acanthostyli not divided into two groups	37.
37.	The acanthostyli varying in size, reaching to $0{\cdot}25^{mm}$	38.
—	The acanthostyli rather uniform in size, not reaching over $0{\cdot}13^{mm}$	39.
38.	The acanthostyli somewhat robustly spined, dermal tylota not or only slightly polytylote	*baculifera* Tops.
—	The acanthostyli more finely spined, dermal tylota polytylote	*levis*
39.	The acanthostyli truncate at the point	*truncata*
—	The acanthostyli not truncate at the point	40.
40.	The tylota distinctly polytylote, $0{\cdot}148^{mm}$	*tenuissima* Dend.
—	The tylota not, or not conspicuously polytylote, length $0{\cdot}19^{mm}$ or more	41.
41.	The acanthostyli without any neck-shaped constriction at the base, the tylota $0{\cdot}19$—$0{\cdot}23^{mm}$	*Bowerbanki*
—	The acanthostyli with a neck-shaped constriction at the base, the tylota $0{\cdot}30$—$0{\cdot}40^{mm}$	*latrunculioides*
42.	The dermal styli polytylote, the acanthostyli not divided into two groups, chelæ $0{\cdot}040$—$0{\cdot}050^{mm}$	*irregularis*
—	The dermal styli not polytylote, the acanthostyli divided into two groups, chelæ $0{\cdot}023$—$0{\cdot}035^{mm}$	*proxima*
43.	The chelæ transformed to spined rods	*vidua* Schmidt.
—	The chelæ less transformed, more chel-shaped, or only spined	44.
44.	The chelæ of normal shape but spined	*crux* Schmidt.
—	The chelæ more transformed, somewhat asteriform	*aenigma*
45.	Microsclera chelæ and sigmata	46.
—	Among the microsclera no chelæ	58.
46.	Sigmata only of one form	47.
—	Sigmata of two forms	56.
47.	The acanthostyli of uniform size, about $0{\cdot}13^{mm}$, strongly spined, sigmata in bundles	*zetlandica* Bow.
—	The acanthostyli longer, sigmata not in bundles	48.

48.	The chelæ spined and transformed	*Schmidti* Tops.
—	The chelæ not spined	49.
49.	The chelæ of two forms, ordinary and peculiar	*mucronata* Tops.
—	The chelæ only of one form	50.
50.	Sigmata rather large, not below 0·028^{mm} and generally much larger, surface with papillæ or warts	51.
—	Sigmata small, not above 0·020^{mm}, surface simple	54.
51.	Surface with warts, sigmata about 0·1^{mm}, chelæ of two forms, large 0·025^{mm}, small 0·012^{mm}	*pustula* Frstdt.
—	Surface with long, cylindrical papillæ, chelæ of one form	52.
52.	Sigmata nearly plane, dermal tylota 0·29—0·38^{mm}, sigmata 0·058—0·075^{mm}	*trichoma*
—	Sigmata not plane	53.
53.	The acanthostyli 0·41—0·75^{mm}, dermal tylota 0·48—0·80^{mm}, sigmata 0·031—0·096^{mm}	*grandis*
—	The acanthostyli 0·11—0·31^{mm}, dermal tylota 0·26—0·41^{mm}, sigmata 0·028—0·050^{mm}	*digitata*
54.	The dermal spicules thin styli, sigmata circularly curved, nearly plane, 0·014—0·017^{mm}	*pugio*
—	The dermal spicules not styli	55.
55.	The dermal spicules tornota 0·15—0·19^{mm}, sigmata 0·014—0·017^{mm}	*consanguinea*
—	The dermal spicules tylota 0·23—0·28^{mm}, sigmata 0·020^{mm}	*mutabilis* Tops.
56.	The large sigmata somewhat band-shaped, peculiarly curved, the small sigmata plane	*cultrisigma*
—	Both the large and small sigmata of ordinary shape	57.
57.	The large sigmata 0·18—0·208^{mm}, the small 0·06—0·089^{mm}	*macrosigma*
—	The large sigmata contorted, 0·021—0·028^{mm}, the small sigmata plane 0·014^{mm}	*planca*
58.	Microsclera only sigmata	*tenuisigma*
—	Microsclera only rhaphides	*rhaphigena* Tops.
59.	Dermal spicules strongyla or tylota	60.
—	Dermal spicules tornota	65.
60.	The acanthostyli truncate at the point	*obtusata* Tops.
—	The acanthostyli not truncate at the point	61.
61.	The acanthostyli generally with a globular head, 0·083—0·22^{mm}, the dermal spicules strongyla to subtylota and there are always subtylota present	*Dujardini* Bow.
—	Dermal spicules strongyla	62.
62.	The acanthostyli not divided into two groups	63.
—	The acanthostyli divided into two groups, the dermal spicules long, 0·33—0·45^{mm}	*dermata*
63.	The acanthostyli entirely spined	*aequata*
—	The acanthostyli with a smooth apical part	64.
64.	The acanthostyli 0·11—0·35^{mm}, dermal strongyla polytylote, 0·149—0·28	*primitiva*
—	The acanthostyli 0·10—0·50^{mm}, dermal strongyla smooth or polytylote, 0·22—0·298	*longurius*
65.	The dermal tornota not polytylote, generally microspined at the end-parts	*formulata*
—	The dermal tornota not with spined ends	66.
66.	The acanthostyli 0·14—0·38^{mm}, the tornota slightly polytylote	*ornata* Tops.
—	The acanthostyli 0·14—0·65^{mm}, divided into two groups, the tornota with a mucro at one end	*mucronella*

Four species in Bowerbank's Monograph could perhaps also be taken into consideration, viz. *Hymeniacidon perarmatus* (III, Pl. XXXI, figs. 11—16) which would in such a case perhaps be related to *H. occulta* and *simillima*; but it is possible that the species is an *Ectyodoryx*. *Hymedesmia pansa*

(IV, Pl. I, figs. 1—4) has long, monactinal dermal spicules; it seems to be a *Hymedesmia* or an *Eurypon*. *Hymedesmia pilata* (IV, 59, Pl. II, figs. 1—4), which seems to have no dermal spicules and only sigmata for microsclera, is I think an *Eurypon*. Finally *Hymedesmia pulchella* (IV, 61, Pl. II, figs. 5—8) seems to be likewise an *Eurypon*.

Hymeniacidon paupertas Bow. (III, Pl. XXXVII, figs. 4—8) I have included in the above table as I take it to be a *Hymedesmia*, and I think the *Myxilla paupertas* recorded by Topsent (1904, Fasc. XXV, 168) is another species. The *Hymedesmia areolata* Thiele mentioned by Kirkpatrick (Nat. Antarc. Exp. Nat. Hist. IV, Pl. 22, figs. 3—3 c) cannot I think be a *Hymedesmia* and must accordingly be another species. Thiele (Abhandl. Senckenb. nat. Gesell. XXV, 1903, 955) thinks that *Myxilla veneta* O. Schmidt is identical with *fasciculata* Lieberk., and is a *Hymedesmia*; I have examined a specimen of *Myxilla fasciculata* send from Professor von Marenzeller; it is correct that the species incrusts the chitinuous tubes of *Stephanoscyphus*, but it has otherwise a reticulate skeleton and is no *Hymedesmia*; *M. veneta* I do not know. *Hymedesmia norvegica* Thiele, which I have included in the above table, is perhaps not a *Hymedesmia* as it has short skeleton columns; it would thus be a *Stylostichon*.

Hymenancora n. g.

Incrusting, thin forms. The external appearance, the skeleton and the megasclera quite as in Hymedesmia; the microsclera are ancoræ which may be either ancoræ spatuliferæ or unguiferæ; sometimes two forms of ancoræ occur; to the ancoræ sigmata are sometimes added.

In the introduction to the second part of this work I have, in accordance with the opinions of Levinsen, advanced the view, that species with ancoræ and species with chelæ should not remain in the same genus, and in accordance herewith I emended the genera *Desmacidon* and *Homocodictya*, *Myxilla* and *Lissodendoryx*, and according to the same view I have created the genera *Ectyodoryx* and *Ectyomyxilla* (Meddel. om Grønland, XXIX, 1909, 444), the first with chelæ, the latter with ancoræ. Also the genus *Hymedesmia* has hitherto included species with chelæ and species with ancoræ, and it is to comprise these latter species that I create the genus *Hymenancora* which is in all other respects similar to *Hymedesmia*.

So far as I am avare the genus comprises at present the following species:

1892. *H. Pecqueryi* Tops. Résultats des camp. scient. du Prince de Monaco, Fasc. II, 110, Pl. XI, fig. 8 (*Myxilla*).
H. minima Tops. ibid., 114, Pl. XI, fig. 2—3. (*Hymeraphia*).
1904. *H. biscutella* Tops. ibid., Fasc. XXV, 191, Pl. XV, fig. 3. (*Leptosia*).
H. umbellifera Tops. ibid. 192, Pl. XV, fig. 4. (*Leptosia*).
1905. *H. laevis* Thiele, Zool. Jahrbücher, 1905, 453, Taf. 31, Fig. 69 a—f. (*Hymedesmia*).
H. tenuissima Thiele, ibid. 454, Taf. 31, Fig. 70 a—f. (*Hymedesmia*).
1907. *H. exigua* Kirkpatr. Ann. Mag. Nat. Hist. 7, XX, 273, and 1909, Nat. Antarct. Exp. IV, Pl. XXII, fig. 4, Pl. XXVI, figs. 2 a—f. (*Hymedesmia*).

1907. *H. rufa* Kirkpatr. Ann. Mag. Nat. Hist. 7, XX, 274, and 1909, Nat. Antarct. Exp. IV, Pl. XXII, fig. 5, Pl. XXVI, figs. 3 a—e. (*Hymeraphia*).

H. interjecta mihi

H. conjungens mihi

H. tenuisclera mihi

H. duplicata mihi.

I do not see the slightest reason why *H. minima* Tops. and *H. rufa* Kirkpatr., both placed by the authors in *Hymeraphia*, should not belong to *Hymenancora*.

1. H. interjecta n. sp.

Pl. XI, Fig. 4.

Incrusting; surface slightly hispid. Spicula: megasclera; the skeletal spicules acanthostyli without a real head-swelling, spined in the whole length, they are divided into two groups, large 0·37—0·47 mm, small 0·14—0·16 mm; the dermal spicules tylota or subtylota 0·30—0·47 mm; microsclera two forms, ancoræ spatulifera with three teeth, 0·025—0·045 mm, sigmata 0·06—0·128 mm.

Of this species we have two specimens; one grows on a dead branch of an *Oculina* together with *H. procumbens* and specimens of *Tedania*, *Eurypon* and *Latrunculia*; the other specimen, which is very small, grows on a pebble. The largest specimen is extended along the *Oculina*-branch and is therefore of a lengthy shape and has a greatest extent of 22 mm; it is exceedingly thin. The colour (in spirit) is greyish or brownish. The *surface* is in the present state of the sponge slightly hispid. About the *dermal membrane*, *pores* and *oscula* I can say nothing.

The *skeleton*. The *dermal skeleton* seems to consist of bundles and scattered spicules. The *main skeleton* is, so far as I could observe, constructed in the ordinary way of vertical acanthostyli placed on the substratum, but the styli are somewhat scattered and the dermal skeleton is therefore the most developed part of the whole skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are somewhat distinctly divided into two groups. The large styli are straight or generally somewhat curved near the base; the base is a little thickened, but there is no head-swelling present, and they taper into a long and fine apex; the styli are spined in their whole length, but the spines are only at the base of larger size, they decrease in size outwards, and the shaft and apex are only gritty; the larger spines at the base are generally curved upwards in a somewhat characteristic way. The small styli are principally of the same shape as the large, but they are often straight, and the spines are relatively larger, the head also is still less developed than in the large. The length of the large styli is 0·37—0·47 mm with a diameter at the base of 0·020—0·023 mm. The small styli have a length of 0·14—0·16 mm and a diameter at the base of 0·020 mm. 2. The dermal spicules may best be termed tylota; they are straight or very slightly curved and somewhat robust, the end-swellings are very small but however always perceptible. The length is 0·30—0·47 mm, and the diameter of the shaft 0·007—0·010 mm. b. *Microsclera* are of two forms, ancoræ spatuliferæ and sigmata. 1. The ancoræ have a curved shaft and three elliptical teeth at each end, but the most remarkable feature is, that they have only very narrow alæ or these may be quite absent; by this fact these ancoræ get some resemblance to arcuate chelæ and it seems that they also in reality must be nearly related to these. The length of the ancoræ varies much, it is 0·025—0·045 mm, and the thickness of the shaft is about 0·002—0·005 mm. 2. The sigmata are of ordinary shape and more or less contorted; they have a length of 0·06—0·128 mm and a thickness of 0·004—0·0065 mm. The microsclera seem to occur through the whole tissue.

Locality: Station 54, South of Iceland, 63° 08' Lat. N., 15° 40' Long. W., depth 691 fathoms; station 98, in the Denmark Strait, 65° 38' Lat. N., 26° 27' Long. W., depth 138 fathoms.

Remarks: As said the ancoræ in this species seem to be nearly related to the chelæ arcuatæ on account of the very narrow and, so far as I could see, sometimes quite wanting alæ, but they are however true ancoræ. In Part II of this work p. 3 I have stated that I consider the ancoræ and chelæ arcuatæ as nearly related spicula and as having been derived from a common original form of spicule. It is well known, that the chelæ arcuatæ may be more or less ancora-like, but being at the same time true chelæ, and many examples of this are given in the preceding descriptions. As one of the most ancora-like chelæ I have examined I may note the chela in *Hymedesmia Bowerbanki*. The alæ do not go here evenly over into the hinder side of the shaft but are somewhat incurved at the shaft, so that in a side view the "tuberculum" is seen quite surrounded by the outer contour of the ala; and so far as I could see the shaft is a little edge-like dilated towards the ends; these spicules are however true chelæ. Should there be found in the genus *Hymedesmia* forms of microsclera which were intermediate between ancoræ and chelæ arcuatæ, and this seems not impossible, it would be of great interest, and it would seem to indicate at the same time, that *Hymedesmia* is a genus of old origin, as already alluded to from other reasons under *H. aenigma*.

2. **H. conjungens** n. sp.

Pl. XI, Fig. 5.

Incrusting; surface somewhat hispid. Spicula: megasclera; the skeletal spicules acanthostyli without head-swelling, they are divided into two groups, large, spined nearly in the whole length or only with a small apical part smooth, 0·29—0·41 mm, small, entirely spined, 0·11—0·13 mm; the dermal spicules tylota with pointed end-swellings, 0·16—0·22 mm; microsclera two forms, ancoræ spatuliferæ with three teeth, 0·022—0·042 mm, sigmata 0·035—0·045 mm.

We have one specimen of this species growing on a living *Pecten* together with specimens of *Melonanchora emphysema*, *Hymedesmia perforata* and *procumbens*, a *Crella*, an *Eurypon* and a *Plocamia*. It forms an incrustation of an extent of about 15 mm, and it is very thin, not reaching 0·5 mm. The colour (in spirit) is light brownish grey. The *surface* is somewhat hispid from projecting spicules. The *dermal membrane* is a thin, transparent film, resting on the skeleton below. *Oscula* and *pores:* larger and smaller, simple circular openings are seen in the dermal membrane representing I think both oscula and pores.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules stretching up to the dermal membrane and supporting it, the spicules in the bundles being somewhat penicillately spread outwards; the bundles are generally not large, consisting only of relatively few spicules. There are no horizontal spicules in the membrane itself. The *main skeleton* is constructed as usual of acanthostyli with their heads placed on the shell, the longest of them reach to the dermal membrane and project beyond it. At the base there is a small amount of spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two groups, large and small; the large styli are generally slightly curved, they are a little thickened at the base, but there is no head-swelling, they taper only slightly outwards and the point is somewhat short; the styli are spined in almost the whole length, only a small part of the apex being smooth or nearly smooth; at the base the spines are of medium size and numerous, outwards they are small, nearly gritty, and more scattered. The small styli are mainly of the same shape as the large, they are straight or slightly curved and have likewise no head-swelling, but they are spined in the whole length. The length of the large styli is 0·29—0·41 ^{mm} with a thickness at the base of 0·016—0·021 ^{mm}, the small styli are 0·11—0·13 ^{mm} long with a diameter at the base of 0·011—0·014 ^{mm}. 2. The dermal spicules are tylota with the swollen ends pointed like tornotes; the shaft is slender and generally straight, sometimes it is very slightly polytylote; the ends are distinctly but not much swollen, and they are pointed in such a way that the spicule might be termed a tornote were it not for the swellings. The length is 0·16—0·22 ^{mm}, and the diameter of the shaft is 0·0028—0·004 ^{mm}. b. *Microsclera* are of two forms, ancoræ spatuliferæ and sigmata. 1. The ancoræ resemble those in *interjecta*, but they are a little less curved or the curve is distinctly localized in the middle of the shaft; they have three elliptical teeth at each end, the alæ are not large but distinct and always present. This ancora is thus evidently related to that in *interjecta*, but it is less chel-like. The length is 0·022—0·042 ^{mm} and the thickness of the shaft is 0·002—0·004 ^{mm}; the large ancoræ are by far the most numerous while the smaller are seen only rarely. 2. The sigmata are of ordinary shape and they are contorted, generally a quarter of a turn. The length is 0·035—0·045 ^{mm} and the thickness about 0·0028 ^{mm}. The sigmata occur in the tissue of the sponge but not in the dermal membrane, the ancoræ occur also in the tissue but especially in the dermal membrane and here rather numerously.

This and the preceding species are nearly related, but they are characteristically different in the shape of the dermal spicules, the size of the sigmata and also in the shape of the ancoræ.

Locality: South of Iceland, 63° 21′ Lat. N., 16° 22′ Long. W., depth 296 fathoms (The Fishery investigation steamer "Thor").

3. **H. duplicata** n. sp.

Pl. XI, Fig. 6.

Incrusting; surface hispid? Spicula: megasclera; the skeletal spicules acanthostyli with a small but distinct head-swelling, the largest only spined at the base, the shorter they are the longer a part is spined, and the shortest are spined in the whole length, 0·12—0·47 ^{mm}, not divided into two groups; the dermal spicules tornota 0·238—0·31 ^{mm}; microsclera ancoræ spatuliferæ of two forms, large, with 5—6 teeth, 0·062—0·071 ^{mm}, small, with 8—11 teeth, 0·032—0·038 ^{mm}.

This interesting species grows as thin incrustations on Brachiopod-shells; its greatest extent is 11 ^{mm} and the thickness is about 0·25 ^{mm}. The colour (in spirit) is whitish or light yellowish. The *surface* is in the present condition of the sponge strongly hispid from projecting acanthostyli, but it is probably not so in the fresh state. The *dermal membrane* seems to be quite wanting in the specimens, so that I can say nothing about it or about pores and oscula.

The *skeleton*. The *dermal skeleton;* as the dermal membrane is quite or nearly quite wanting I can say only little about the dermal skeleton; it seems to be of a construction like that found in the preceding species and thus consists of bundles of spicules stretching from the main skeleton to the dermal membrane. The *main skeleton* is quite of the common construction, the acanthostyli reach to the surface and they project as said beyond it. A small amount of spongin is visible at the substratum around the heads of the acanthostyli.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli of a somewhat characteristic shape; they have a head-swelling which is not large, but generally distinct, they taper evenly into the apex, but the point is a little more abrupt. The largest styli have only spines below; the head is beset with somewhat robust spines, and there are very small spines on the part just above the head; the shorter the styli are the more spined they are and the smallest styli are spined near to the point. The spines on the head are blunt, giving the head in the large styli a characteristic appearance; the spines of the shaft are relatively largest in the small styli. The styli vary much in length, but they are not divided into two distinct groups. The length is 0·12—0·47 ^{mm}, and the diameter of the head 0·017—0·037 ^{mm}. The smallest styli are the most numerous. 2. The dermal spicules are slender and straight, or very slightly curved tornota, they are of the same thickness in the whole length; the ends generally form typical tornotal points, only sometimes the shape is less pronounced. The length is 0·238—0·31 ^{mm} and the diameter is 0·0028—0·004 ^{mm}. b. *Microsclera;* these are ancoræ spatuliferæ of two forms and sizes, large and small; they are both very beautiful spicules. 1. The large ancoræ have a very slightly curved shaft and five to six elliptical teeth at each end; there are somewhat narrow alæ on the shaft, reaching a little longer towards the middle than the teeth. Sometimes the number of teeth at each end is not equal, but may be five at one and six at the other end; also some irregularity may be found, and when there are six teeth, generally one or two are a little smaller than the others. The length is 0·062—0·071 ^{mm}, and the diameter of the shaft is 0·004—0·007 ^{mm}. 2. The small ancoræ have a shape somewhat similar to that of the large, but they have eight to eleven teeth at each end; the number of teeth may also here be different at the two ends; there are small alæ on the shaft, but they are not directed to the sides but backwards, they are thus not or almost not seen when the ancora is viewed from in front, and they are on the whole difficult to see; from the fact that they are directed backwards they get a position similar to the falxes of the teeth, and teeth seem in reality sometimes to be formed here, so that there is a circlet of teeth all round; the construction recalling what is found in the ancoræ of some of the *Iotrochota* species, e. g. *I. rotulancora* (The Danish Ingolf Exp. VI, 2, Porifera, Part. II, 191, Pl. XVIII, fig. 6 c—e). The length is 0·032—0·038 ^{mm}, and the thickness of the shaft 0·003 ^{mm}. Of this ancora some developmental stages were seen; they showed a dilatation with beginning teeth at each end, and they thus resemble the developmental stages of the ancora in the mentioned *Iotrochota* species. The microsclera occur in the tissue of the sponge, and to judge from a single place on one of the specimens they also occur in the dermal membrane in somewhat great numbers; the small ancoræ are by far the most numerous.

This species is related to *H. umbellifera* Tops., but besides other characters this latter species has only one form of ancoræ.

Locality: Station 89, the Denmark Strait, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; two specimens.

4. H. tenuisclera n. sp.

Pl. XI, Fig. 7.

Incrusting; surface smooth. Spicula: megasclera; the skeletal spicules acanthostyli with a small but generally distinct head, somewhat densely spined in the whole length, 0·083—0·19 mm, not divided into two groups; the dermal spicules strongyla 0·15—0·21 mm; microsclera small isancoræ unguiferæ with 5—8 teeth at each end, 0·016—0·020 mm.

This species forms incrustations on Bryozoa (*Retepora* and *Cellepora*), on Brachiopods and on tubes of *Placostegus tridentatus*. Its greatest extent is about 15 mm, and it is very thin, not reaching 0·5 mm. The colour (in spirit) is whitish. The *surface* is smooth or it may be finely hispid from projecting acanthostyli, but this latter condition is certainly due to some damage. The *dermal membrane* is a thin and transparent film. *Oscula* and *pores* were not observed.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules stretching from the skeleton below to the dermal membrane, the spicules are somewhat penicillately spread outwards; besides these bundles some more irregularly scattered spicules are seen; the bundles and spicules are not at all densely placed, and the dermal skeleton is somewhat weakly developed. The *main skeleton* is of typical construction, and it is rather regular, consisting of vertical acanthostyli. At the base there is a very small amount of spongin, only observable with difficulty.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are generally straight, only rarely very slightly curved; the head is not large but as a rule distinct, and the shaft tapers evenly from the head to the point. The styli are somewhat densely spined in their whole length, sometimes the spines may be a little more dispersed towards the point; the spines are medium sized and reclined, on the head they are somewhat long, blunt and radiating straight out. The styli vary somewhat in length, but they are not divided into groups; the length is 0·083—0·19 mm and the diameter of the head 0·011—0·024 mm. 2. The dermal spicules are straight and slender strongyla; they are of the same thickness in the whole length and sometimes they are a little polytylote; the ends may be slightly swollen. The length is 0·15—0·21 mm and the diameter 0·0028—0·004 mm. b. *Microsclera;* these are isancoræ anguiferæ; they are small and have a slender, curved shaft and five to eight narrow teeth at each end; there may be some irregularity present, the teeth sometimes being of different length and breadth and often the number of the teeth is different at the two ends; there are very narrow alæ on the shaft, but they are difficult to observe. The curvature of the shaft is generally very strong, but there is some variation on this point, especially in different individuals. The length of the ancoræ, which is somewhat dependent on the curvature, is 0·016—0·020 mm, and the diameter of the shaft is about 0·001 mm. The ancoræ are present in great numbers in the dermal membrane but occur also otherwise in the tissue.

This species is very nearly related to *H. biscutella* Tops., but it is distinguished by several characters, the acanthostyli are smaller and the ancoræ in *biscutella* are described as having ten or about ten teeth ("une dizaine"), and they are larger, 0·027—0·030^{mm}; finally the present species does not show the "cellules sphéruleuses" mentioned by Topsent for *biscutella*.

Locality: Station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 32, 66° 35′ Lat. N., 56° 38′ Long. W., depth 318 fathoms; further it has been taken at 63° 18′ Lat. N., 21° 30′ Long. W., depth 94 fathoms (The Fishery investigation steamer "Thor"); 61° 40′ Lat. N., 7° 40′ Long. W., depth 135 fathoms (Ditlevsen); 62° 23′ Lat. N., 2° 35′ Long. E., depth 217 fathoms (Ad. Jensen, the cruise of "M. Sars" 1902). In all six specimens. The localities are situated in the Davis Strait, South and East of Iceland, West of the Faröe Islands and between the latter and Norway.

Leptolabis Tops.

Incrusting forms; external appearance, skeleton and megasclera as in Hymedesmia; the dermal spicules tylota: the characteristic microsclera are forcipes of one or two forms, to these are added chelæ arcuatæ and sigmata.

Topsent founded this genus in 1904 (Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 181) and I think he was right, the presence of forcipes being here, as in the genus *Forcepia*, of sufficient importance for the creating of a genus; moreover the dermal tylota seem to be characteristic for the genus.

The genus *Leptolabis* comprises at present the following species:

1888. *L. luciensis* Tops. Arch. de Zool. exp. et gén. 2. VI, XXXVII, (*Dendoryx*).
1892. *L. exilis* Tops. ibid. 2, X, XXII, (*Leptosia*).
1904. *L. forcipula* Tops. Résultats des camp. scient. du Prince de Monaco, Fasc. XXV, 182, Pl. XV, fig. 11.
L. forcipula var. *brunnea* Tops. ibid. 182, Pl. XV, fig. 12.
L. arcuata Tops. ibid. 183, Pl. XV, fig. 18.
1905. *L. irritans* Thiele, Zool. Jahrbücher, 1905, 455, Taf. 31, Fig. 71 a—e (*Hymedesmia*).
L. assimilis mihi.

I have remarked below, that I consider *L. forcipula* var. *brunnea* as a definite and separate species; the same may I think be said with certainty about *L. luciensis* and *exilis;* on reading the description of *luciensis* of 1904 I got the impression that besides *exilis* perhaps still a third species may be hidden here.

1. **L. assimilis** n. sp.

Pl. XI, Fig. 8.

Incrusting; surface smooth. The main skeleton weak. Spicula: megasclera; the skeletal spicules acanthostyli divided into two groups, large and small; the large without head, somewhat densely spined in almost the whole length, 0·42—0·53^{mm}; the small with a slight head, spined in about the lower half, 0·089—0·21^{mm}; the dermal spicules tylota with small swellings, 0·38—0·50^{mm}; microsclera four forms: chelæ arcuatæ 0·014—0·038^{mm}, sigmata 0·077—0·16^{mm}, spinulous forcipes of two forms, large, with legs of equal length, 0·024—0·034^{mm}, small, with unequal legs, 0·014—0·018^{mm}.

This species grows on a large stone together with a *Sarcophyton* and various sponges of the genera *Tedania, Hymedesmia* and *Crella.* It forms an incrustation of a greatest extent of 30 [illegible], the thickness being scarcely 0·5^{mm}. The colour (in spirit) is greyish. The *surface* is smooth without projecting spicules. The *dermal membrane* is not especially thin and it is somewhat solid; it is charged with microsclera, especially sigmata, and there are fibres of dermal spicules in it or just below it. *Oscula* and *pores* were not observed.

The *skeleton.* The *dermal skeleton* consists of bundles and fibres stretching up to the dermal membrane, but in a very horizontal direction, and especially there are fibres running almost or quite horizontally in or just below the membrane; the dermal skeleton is thus chiefly constructed of horizontal fibres, and the fibres may reach some length; otherwise they have a more or less irregular course, and they are often curved; they may be of different thickness but are often rather thick, e. g. 0·10^{mm}. The *main skeleton* consists of acanthostyli placed with the heads on the substratum and directed vertically, or generally more or less obliquely upwards; they are much scattered and present only in somewhat small number; the main skeleton is thus diffuse and irregular and on the whole somewhat weakly developed. The acanthostyli are not evenly scattered over the surface of the substratum, but they are to some degree collected in bundles with a few spicules in each. There seems to be a small amount of spongin at the base of the acanthostyli.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli which are divided into two groups, large and small; the large styli are straight or a little curved; the basal end is rounded, without any head-swelling or with this only very weakly developed, the other end tapers into a middle-long apex. The styli are somewhat densely spined in almost their whole length, only a short apical part being smooth; the spines are of medium size or small, and they are not reclined but radiating straight out; on the basal part there may sometimes be some stronger spines. The length of the large styli is 0·42—0·53^{mm} and the diameter at the base 0·017—0·024^{mm}. The small styli are straight; they have generally a somewhat distinct but small head, and the point is somewhat short; the spinulation is continued somewhat beyond the middle so that the apical part is smooth. The length is 0·089—0·21^{mm} and the diameter at the base 0·010—0·014^{mm}. The small acanthostyli are of rather scarce occurrence. 2. The dermal spicules are tylota; they are straight or sometimes slightly curved, the shaft is cylindrical, not thickened in the middle; the ends have small but somewhat distinct swellings; one end is a little thinner than the other and has the swelling more suddenly marked, but this feature is only slightly pronounced and only noticed by close examination. The length of the tylota is 0·38—0·50^{mm} and the diameter of the shaft 0·0046—0·007^{mm}. b. *Microsclera* are of four forms, chelæ arcuata, sigmata and forcipes of two forms. 1. The chelæ have an evenly curved shaft, the alæ are lobe-shaped, somewhat narrow and deeply incised below, the tooth is elliptical, of the same length as the alæ. The chela varies much in size, the length is 0·014—0·038 and the diameter of the shaft 0·001—0·004^{mm}. The intermediate sizes are not numerous and hence the chelæ give the impression of being divided into two groups. 2. The sigmata are large, of common shape and more or less contorted; they vary somewhat in size, the length is 0·077—0·10 [illegible], and the thickness is 0·0040—0·008^{mm}. 3. The large forceps is of the ordinary hair-pin-like shape with legs of equal or about equal length; they have a round curve above, and the legs are somewhat divergent;

sometimes the legs are curved slightly outwards and then a little more divergent below; these forcipes have thus a shape about as the large forcipes in *Forcepia Topsentii* (The Danish Ingolf Exp. VI, 2, 1905, Pl. XIX, fig. 4 d). The forcipes are grittily or rugosely spinulous, and the legs are irregularly rounded or somewhat pointed at the apex, without any knob; they are smooth on the inside of the upper curve. The length of the forceps is 0·024—0·034 mm, and the thickness of the rod is above in the curve 0·0035—0·0056 mm. In single cases the forceps has the legs extraordinarily divergent, so that the angle is obtuse; this feature is thus parallel to what is likewise the case with the forceps in *Forcepia Topsentii*. (l. c. fig. 4 e). 4. The small forceps has the legs parallel or slightly divergent, and one leg is longer than the other; this longer leg is curved slightly inwards; the legs terminate with a little knob. This forceps recalls thus the forceps in *Forcepia Thielei* and *F. groenlandica* (The Danish Ingolf Exp. VI, 2, Pl. XIX, fig. 5 d, Pl. XX, fig. 3 d.); it is inconspicuously spinulous. This forceps is very small, the total length from the curvature to the end of the long leg is 0·014—0·018 mm, and the thickness above in the curve is about 0·0007 mm. Of the microsclera the chelæ and sigmata are numerous, they are seen especially in the dermal membrane, but occur also through the whole sponge; the forcipes are not numerous but of somewhat rare occurrence, and they are not seen in the dermal membrane; otherwise it must be remarked, that the small forceps is difficult to detect on account of its very small size, and it is therefore very liable to be overlooked.

This species is evidently nearly related to *L. forcipula* var. *brunnea* Tops. which I take to be certainly a distinct species, not specifically identical with *forcipula;* but the present species differs from *brunnea* with regard to the size of both megasclera and microsclera; thus Topsent gives the size of the chela to 0·033 mm, and he does not speak of variation in size; the large forceps in *brunnea* has also a different shape, the legs being more divergent in their outer part; finally the acanthostyli in *assimilis* have no specially strong spines at the base and have not the spines on the shaft reclined, both these features being found in *brunnea*. I may also note, that in *assimilis* I have found no "cellules sphéruleuses" which are mentioned by Topsent for *brunnea*. Topsent mentions, besides the larger forcipes, some small ones of a length of 0·013 mm and very thin, but he does not describe them more particularly; he thinks that they "représentent soit la form jeune soit une état athrophique de cette sort de microsclères". Developmental stages they cannot be, according to what we know about the development of the spicules, the growth taking place only by apposition; there is on the other hand also no reason to believe them to be atrophied forms. It is no doubt a special, small forceps, so that *brunnea*, like *arcuata* and the present species, has also two forms of forcipes, large and small.

Locality: Station 46, West of the Faröe Islands, 61° 32′ Lat. N., 11° 36′ Long. W., depth 730 fathoms. One specimen.

Plate I.

Plate I.

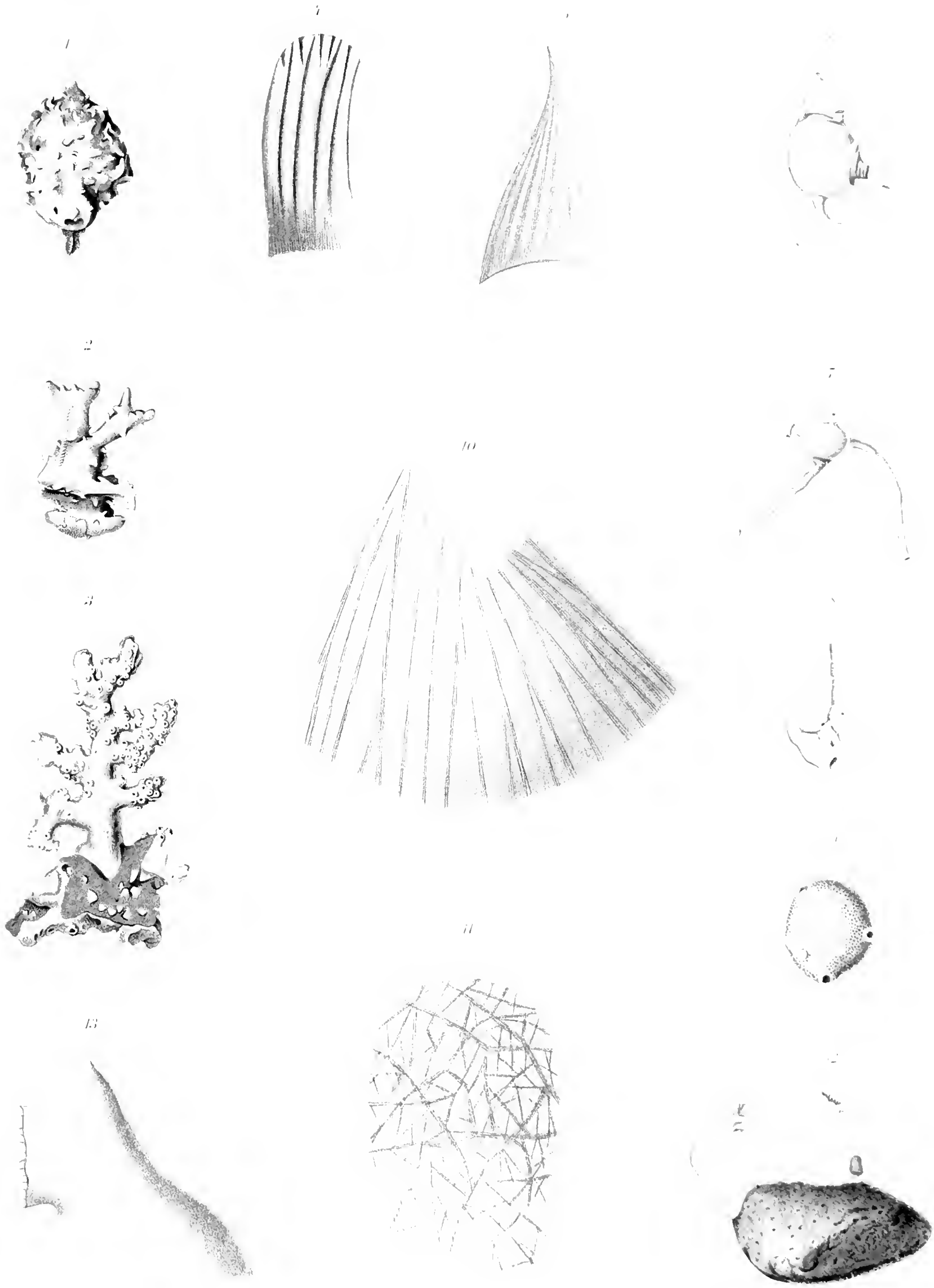


Plate II.

Plate II.

		Page
Fig. 1.	*Histodermella Ingolfi* n. sp. The body somewhat contracted and broken below. $^1/_1$	14
— 2.	*Histodermella Ingolfi* n. sp. Quite irregular specimen. $^1/_1$	—
— 3.	*Histodermella Ingolfi* n. sp. Somewhat tubular specimen. $^1/_1$	—
— 4.	*Histodermella Ingolfi* n. sp. Small specimen. $^1/_1$	—
— 5.	*Histodermella coriacea* n. sp. A typical specimen; above an osculum, most of the other papillæ are pore-papillæ; below the sponge is broken; above there is a *Verruca*. $^1/_1$	16
— 6.	*Histodermella coriacea* n. sp. Tubular, branched specimen, broken below; the pointed papilla is an oscular papilla. $^1/_1$	—
— 7.	*Inflatella pellicula* O. Schmidt. The base of attachment is seen; a tube is shown; remnants of the inner body shine through the dermal layer; the specimen is damaged above $^2/_1$	18
— 8.	*Inflatella pellicula* O. Schmidt. Two tubes present; the dermal layer somewhat contracted and the peduncle broken; the inner body is distinctly seen shining through. $^2/_1$	—
— 9.	*Inflatella pellicula* O. Schmidt. The peduncle with stoles; a tube is seen; below the remaining part of the inner body shines through. $^2/_1$	—
— 10.	*Inflatella viridis* Tops. Somewhat club-shaped specimen; four oscular and one pore-papillæ are seen; bottom material is seen adhering below; remnants of the inner body shine through. $^1/_1$	20
— 11.	*Inflatella viridis* Tops. A somewhat low specimen; five tubes are seen, all contracted; below some adhering bottom material $^1/_1$	—
— 12.	*Inflatella viridis* Tops. Pore-tube, showing the pore-membrane and the skeleton of the wall, $\times$ about 5	—
— 13.	*Cornulum textile* Cart. Somewhat damaged above. $^1/_1$	22
— 14.	*Cornulum textile* Cart., with a Bryozoon. $^1/_1$	—
— 15.	*Grayella pyrula* Cart. A two-branched, compressed specimen; oscula are seen. $^1/_1$	30
— 16.	*Grayella pyrula* Cart. A two-branched specimen with two oscula. $^1/_1$	—
— 17.	*Grayella pyrula* Cart. Somewhat slender, club-shaped specimen with seven oscula. $^1/_1$	—
— 18.	*Grayella pyrula* Cart. An unstalked specimen; several oscula are seen. $^1/_1$	—
— 19.	*Grayella pyrula* Cart. Small specimen with one osculum at the summit. $^1/_1$	—
— 20.	*Grayella gelida* n. sp. An osculum at the summit; the specimen shows wrinkles in the curve, caused by contraction. $^1/_1$	34

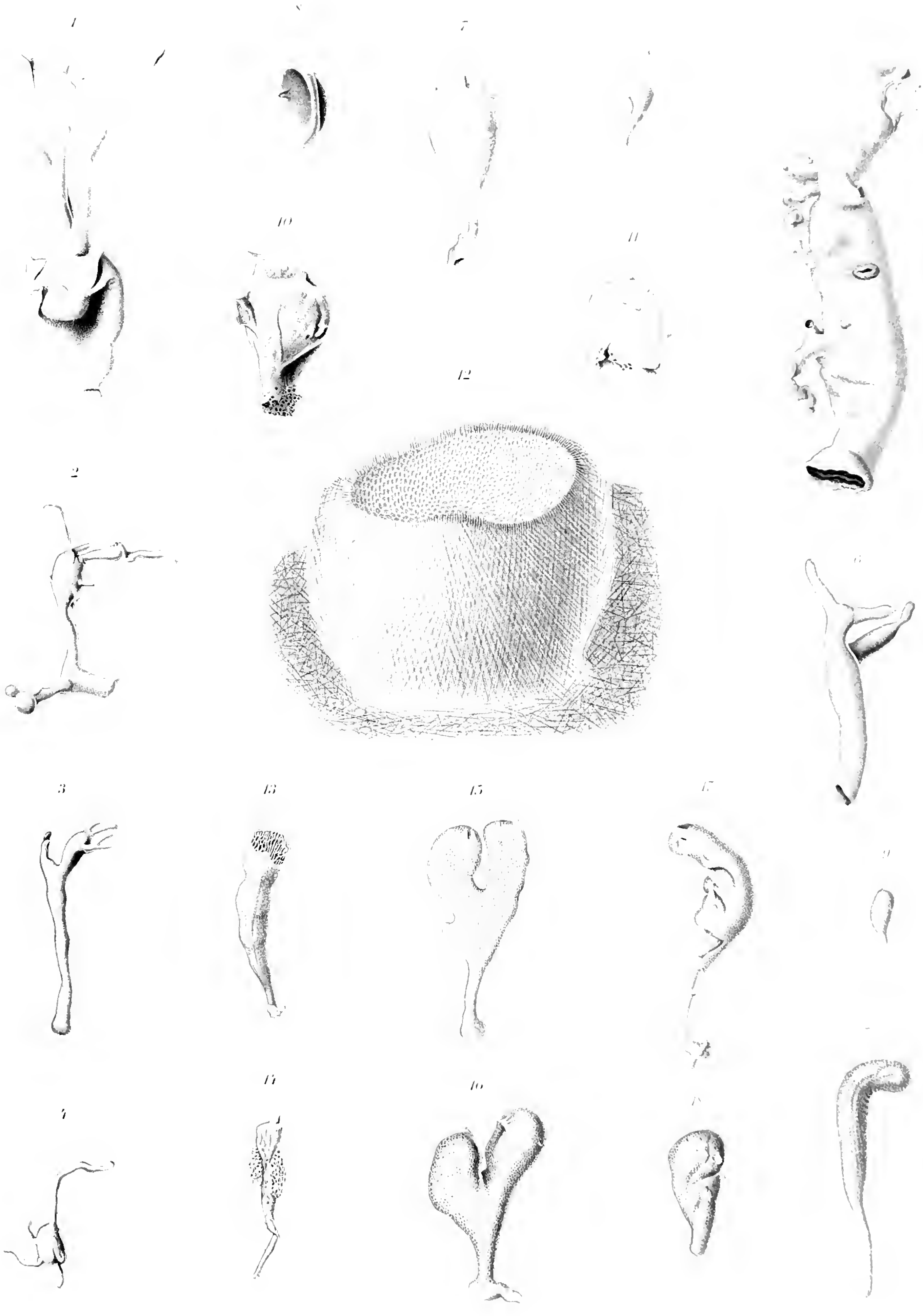

1
7
10
11
12
2
3
13
15
4
16

Plate III.

Plate III.

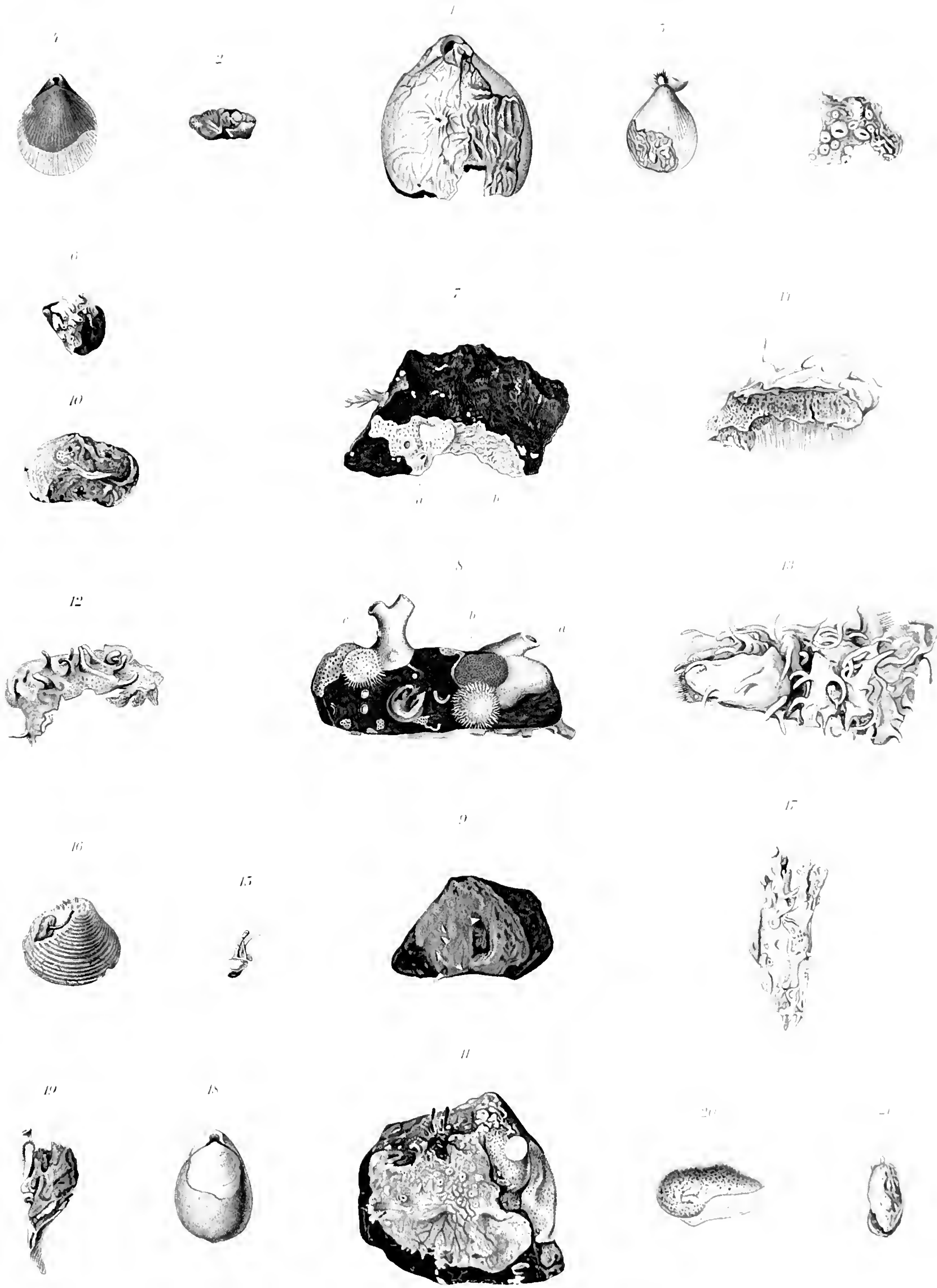


Plate IV.

Plate IV.

Page

Fig. 1. *Tedania suctoria* O. Schmidt, *a* styli of various sizes, *b* tylota × 200, *c* rhaphides of the three different sizes, all from one specimen × 380, *d* the upper end of one of the largest and one of the smallest rhaphides × 1400 1

— 2. *Histoderma appendiculatum* Cart. *a* tylota with intermediates to strongyla from the dermal layer and the inner body × 165, *b* chelæ arcuatæ, side and front view × 1000, *c* sigmata × 460 7

— 3. *Histoderma physa* O. Schmidt, *a* strongyla of various sizes × 165, *b* chelæ arcuatæ, front and side view × 1000, *c* trichodragma × 380 11

— 4. *Histodermella Ingolfi* n. sp. *a* tylota of various sizes, *b* a young and an older developmental stage, *c* acanthoxea, *d* a not quite young developmental stage × 200, *e* chelæ arcuatæ side view, a little from behind, and front view × 1000, *f* sigmata × 460.... 14

— 5. *Histodermella coriacea* n. sp. *a* strongyla of various sizes from the dermal layer and the inner body; with the magnification used the spinulation of the ends is not seen, *b* acanthostrongyla × 165, *c* ends of two strongyla, showing the minute spinulation × 700 ... 16

— 6. *Inflatella pellicula* O. Schmidt, *a* strongyla of various sizes, *b* a developmental stage × 200 18

— 7. *Inflatella viridis* Tops. *a* strongyla of various sizes, *b* a developmental stage × 165...... 20

Plate V.

Plate V.

Plate VI.

Plate VI.

Page

Fig. 1. *Hymedesmia mollis* n. sp. *a* acanthostyli of various sizes, *b* strongylum × 255, *c* chelæ arcuatæ, side view × 1000 47

— 2. *Hymedesmia curvichela* n. sp. *a* acanthostyli of various sizes, *b* strongylum × 165, *c* chela arcuata, side view × 1000 48

— 3. *Hymedesmia rugosa* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chelæ arcuatæ, front and side view × 700 50

— 4. *Hymedesmia splenium* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chela arcuata, side view × 1000 51

— 5. *Hymedesmia tenuicula* n. sp. *a* acanthostyli, large and small, *b* strongyla × 255, *c* chela arcuata, side view × 1000 52

— 6. *Hymedesmia similis* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chela arcuata, side view × 1000 53

— 7. *Hymedesmia nummulus* n. sp. *a* acanthostyli, large and small, *b* strongylum × 165, *c* chela arcuata, side view × 1000 55

— 8. *Hymedesmia dubia* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chela arcuata, side view, a little from the front so that the flat front side of the shaft is seen × 1000 56

— 9. *Hymedesmia stylata* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chela arcuata, side view, a little from the front × 1000; when seen accurately in side view, the alæ would be more claw-shaped 57

Plate VII.

Plate VII.

Plate VIII.

Plate VIII.

		Page
Fig. 1.	*Hymedesmia baculifera* Tops. *a* acanthostyli of various sizes (from a specimen with large styli), *b* tylotum × 255, *c* chela arcuata, side view × 1000	71
— 2.	*Hymedesmia levis* n. sp. *a* acanthostyli of various sizes, *b* polytylote tylotum × 255, *c* chela arcuata, side view × 1000	73
— 3.	*Hymedesmia bractea* n. sp. *a* acanthostyli, large and small, *b* tylotum × 255, *c* chela arcuata, side view, a little from in front × 1000	74
— 4.	*Hymedesmia lævistylus* n. sp. *a* acanthostylus, *b* tylotum × 255, *c* chela arcuata, side view, a little from in front × 1000	74
— 5.	*Hymedesmia Bowerbanki* n. sp. *a* acanthostyli, *b* tylotum × 340, *c* chela arcuata, side view × 1000	75
— 6.	*Hymedesmia truncata* n. sp. *a* acanthostyli, *b* tylotum × 340, *c* chela arcuata, side view × 1000	77
— 7.	*Hymedesmia latrunculioides* n. sp. *a* acanthostyli, *b* tylotum × 340, *c* chela arcuata, side view, a little from in front × 1000	78
— 8.	*Hymedesmia irregularis* n. sp. *a* acanthostyli of varions sizes, *b* polytylote dermal stylus × 255, *c* chelæ arcuatæ, front and side view × 1000	80
— 9.	*Hymedesmia proxima* n. sp. *a* acanthostyli, large and small, *b* dermal stylus × 255, *c* chelæ arcuatæ, front and side view × 1000	81
— 10.	*Hymedesmia crux* O. Schmidt, *a* acanthostyli of varions sizes, *b* subtornotum × 255, *c* chelæ arcuatæ, front view (the spines on the back of the shaft are seen shining through) and side view, *d* seen from the end × 1000	83

Plate IX.

Plate IX.

Page

Fig. 1. *Hymedesmia aenigma* n. sp. *a* acanthostyli of various sizes, *b* tornotum × 255, *c–f* asteroid chelæ in various views, *c* the axis distinct, with the convex side to the right, *d* the axis cannot be pointed out, *e* front view, the axis in the middle, *f* seen from the end, *g* a developmental stage × 1000 84

— 2. *Hymedesmia filifera* O. Schmidt, *a* acanthostyli of various sizes, *b* strongylum × 255, *c* chela arcuata, side view × 1000 86

— 3. *Hymedesmia grandis* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255, *c* chelæ arcuatæ, front and side view × 1000, *d* sigmata of various sizes × 460 88

— 4. *Hymedesmia digitata* n. sp. *a* acanthostyli, large and small, *b* tylotum × 255, *c* chela arcuata, side view × 1000, *d* sigmata × 460 90

— 5. *Hymedesmia trichoma* n. sp. *a* acanthostyli, large and small, *b* tylotum × 255, *c* chela arcuata, side view × 1000, *d* sigmata × 460 91

— 6. *Hymedesmia macrosigma* n. sp. *a* acanthostyli of various sizes, *b* strongylum × 255, *c* chelæ arcuatæ of various sizes, side view × 1000, *d* sigmata, large and small × 340 92

— 7. *Hymedesmia pugio* n. sp. *a* acanthostyli, large and small, *b* dermal stylus × 255, *c* chela arcuata, side view × 1000, *d* sigmata × 585 94

— 8. *Hymedesmia consanguinea* n. sp. *a* acanthostyli, large and small, *b* tornotum × 255, *c* chela arcuata, side view × 1000, *d* sigmata × 585 95

Plate X.

Plate X.

Plate XI.

Plate XI.

Page

Fig. 1. *Hymedesmia dermata* n. sp. *a* acanthostyli, large and small, *b* strongylum × 255 107

— 2. *Hymedesmia tornotata* n. sp. *a* acanthostyli of various sizes, *b* tornota with microspined ends × 255 109

— 3. *Hymedesmia mucronella* n. sp. *a* acanthostyli, large and small, *b* tornotum, the upper end with a mucro × 255 110

— 4. *Hymenancora interjecta* n. sp. *a* acanthostyli, large and small, *b* tylotum × 255, *c* ancoræ, front and side view × 1000, *d* sigmata × 460 117

— 5. *Hymenancora conjungens* n. sp. *a* acanthostyli, large and small, *b* tylotum with somewhat swollen ends × 255, *c* ancoræ, side view and oblique front view, × 1000, *d* sigmata × 460 118

— 6. *Hymenancora duplicata* n. sp. *a* acanthostyli of various sizes, *b* tornotum × 255, *c* ancoræ spatuliferæ of the large form, oblique front view and side view, *d* ancoræ spatuliferæ of the small form, front view and side view, the latter shows two smaller teeth at the upper end × 1000 119

— 7. *Hymenancora tenuisclera* n. sp. *a* acanthostyli of various sizes, *b* strongylum × 255, *c* ancoræ unguiferæ, side view, with more and less curved shaft × 1000 121

— 8. *Leptolabis assimilis* n. sp. *a* acanthostyli, large and small, *b* tylotum × 255, *c* chelæ arcuatæ of various sizes, side view × 1000, *d* large forcipes × 1000, *e* small forcipes × 1400, *f* sigmata × 340 122

INGOLF-EXPEDITIONEN

1895—1896.

STATIONERNES PLADS, DYBDE OG BUNDTEMPERATUR.

Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn	Bund-temperatur	Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn.	Bund-temperatur	Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn.	Bund-temperatur
1	62° 30'	8° 21'	132	7°2	24	63° 06'	56° 00'	1199	2°4	45	61° 32'	9° 43'	643	[illegible]
2	63° 04'	9° 22'	262	5°3	25	63° 30'	54° 25'	582	3°3	46	61° 32'	[illegible]	720	[illegible]
3	63° 35'	10° 24'	272	0°5		63° 51'	53° 03'	136		47	61° 32'	[illegible]	950	[illegible]
4	64° 07'	11° 12'	237	2°5	26	63° 57'	52° 41'	34	0°6	48	61° 32'	[illegible]	500	[illegible]
5	64° 40'	12° 09'	155			64° 37'	54° 24'	100		49	62° 07'	[illegible]	420	[illegible]
6	63° 43'	14° 34'	90	7°0	27	64° 54'	55° 10'	393	3°8	50	62° 43'	[illegible]	[illegible]	[illegible]
7	63° 13'	15° 41'	600	4°5	28	65° 14'	55° 42'	420	3°5	51	64° 15'	[illegible] 22'	68	7° 32
8	63° 56'	24° 40'	136	6°0	29	65° 34'	54° 31'	68	0°2	52	63° 57'	13° 32'	420	7° 57
9	64° 18'	27° 00'	295	5°8	30	66° 50'	54° 28'	22	1°05	53	63° 15'	[illegible]	[illegible]	[illegible]
10	64° 24'	28° 50'	788	3°5	31	66° 35'	55° 54'	88	1°6	54	63° 08'	[illegible]	[illegible]	[illegible]
11	64° 34'	31° 12'	1300	1°6	32	66° 35'	56° 38'	318	3°9	55	[illegible] 33'	15° 02'	[illegible]	[illegible]
12	64° 38'	32° 37'	1040	0°3	33	67° 57'	55° 30'	35	0°8	56	64° [illegible]	15° 06'	68	[illegible]
13	64° 47'	34° 33'	622	3°0	34	65° 17'	54° 17'	55		57	63° [illegible]	13° 02'	[illegible]	3° 4
14	64° 45'	35° 05'	176	4°4	35	65° 16'	55° 05'	362	3°6	58	64° 25'	[illegible]	[illegible]	[illegible]
15	66° 18'	25° 59'	330	0°75	36	61° 50'	56° 21'	1435	1°5	59	65° 00'	[illegible]	310	[illegible]
16	65° 13'	26° 58'	250	6°1	37	60° 17'	54° 05'	1715	1°4	60	65° [illegible]	[illegible]	[illegible]	[illegible]
17	62° 49'	26° 55'	745	3°4	38	59° 12'	51° 05'	1870	1°3	61	[illegible]	[illegible]	[illegible]	[illegible]
18	61° 44'	30° 29'	1135	3°0	39	62° 00'	22° 38'	865	2°9	62	[illegible]	[illegible]	[illegible]	[illegible]
19	60° 29'	34° 14'	1566	2°4	40	62° 00'	21° 36'	845	3°3	63	[illegible]	[illegible]	[illegible]	[illegible]
20	58° 20'	40° 48'	1695	1°5	41	61° 39'	17° 10'	1245	2°0	64	[illegible]	[illegible]	[illegible]	[illegible]
21	58° 01'	44° 45'	1330	2°4	42	61° 41'	10° 17'	625	0°4	65	[illegible]	[illegible]	[illegible]	
22	58° 10'	48° 25'	1845	1°4	43	61° 42'	10° 11'	645	0°05	66	[illegible]	[illegible]	[illegible]	
23	60° 43'	56° 00'	Kun Plankton undersøgt		44	61° 42'	9° 36'	545	4°8	67	[illegible]	[illegible]	[illegible]	[illegible]

Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn.	Bund-temperatur	Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn.	Bund-temperatur	Station Nr.	N. Brd.	V. Lgd.	Dybde i danske Fvn.	Bund-temperatur
68	62° 06′	22° 30′	843	3°4	92	64° 11′	32° 52′	976	1°4	118	68° 27	8° 20′	1060	—1°0
69	62° 40′	22° 17′	589	3°9	93	64° 24′	35° 14′	767	1°46	119	67° 53′	10° 19′	1010	—1°0
70	63° 09′	22° 05′	134	7°0	94	64° 56′	36° 19′	204	4°1	120	67° 29′	11° 32′	885	—1°0
71	63° 46′	22° 03′	46			65° 31′	30° 45′	213		121	66° 59′	13° 11′	529	—0°7
72	63° 12′	23° 04′	197	6°7	95	65° 14′	30° 39′	752	2°1	122	66° 42′	14° 44′	115	1°8
73	62° 58′	23° 28′	486	5°5	96	65° 24′	29° 00′	735	1°2	123	66° 52′	15° 40′	145	2°0
74	62° 17′	24° 36′	695	4°2	97	65° 28′	27° 39′	450	5°5	124	67° 40′	15° 40′	495	—0°6
	61° 57′	25° 35′	761		98	65° 38′	26° 27′	138	5°9	125	68° 08′	16° 02′	729	—0°8
	61° 28′	25° 06′	829		99	66° 13′	25° 53′	187	6°1	126	67° 19′	15° 52′	293	0°5
75	61° 28′	26° 25′	780	4°3	100	66° 23′	14° 02′	59	0°4	127	66° 33′	20° 05′	44	5°6
76	60° 50′	26° 50′	806	4°1	101	66° 23′	12° 05′	537	—0°7	128	66° 50′	20° 02′	194	0°6
77	60° 10′	26° 59′	951	3°6	102	66° 23′	10° 26′	750	—0°9	129	66° 35′	23° 47′	117	6°5
78	60° 37′	27° 52′	799	4°5	103	66° 23′	8° 52′	579	—0°6	130	63° 00′	20° 40′	338	6°55
79	60° 52′	28° 58′	653	4°4	104	66° 23′	7° 25′	957	—1°1	131	63° 00′	19° 09′	698	4°7
80	61° 02′	29° 32′	935	4°0	105	65° 34′	7° 31′	762	—0°8	132	63° 00′	17° 04′	747	4°6
81	61° 44′	27° 00′	485	6°1	106	65° 34′	8° 54′	447	—0°6	133	63° 14′	11° 24′	230	2°2
82	61° 55′	27° 28′	824	4°1		65° 29′	8° 40′	466		134	62° 34′	10° 26′	299	4°1
83	62° 25′	28° 30′	912	3°5	107	65° 33′	10° 28′	492	—0°3	135	62° 48′	9° 48′	270	0°4
	62° 36′	26° 01′	472		108	65° 30′	12° 00′	97	1°1	136	63° 01′	9° 11′	256	4°8
	62° 36′	25° 30′	401		109	65° 29′	13° 25′	38	1°5	137	63° 14′	8° 31′	297	—0°6
84	62° 58′	25° 24′	633	4°8	110	66° 44′	11° 33′	781	—0°8	138	63° 26′	7° 56′	471	—0°6
85	63° 21′	25° 21′	170		111	67° 14′	8° 48′	860	—0°9	139	63° 36′	7° 30′	702	—0°6
86	65° 03′	23° 47′	76		112	67° 57′	6° 44′	1267	—1°1	140	63° 29′	6° 57′	780	—0°9
87	65° 02′	23° 56′	110		113	69° 31′	7° 06′	1309	—1°0	141	63° 22′	6° 58′	679	—0°6
88	64° 58′	24° 25′	76	6°9	114	70° 36′	7° 29′	773	—1°0	142	63° 07′	7° 05′	587	—0°6
89	64° 45′	27° 20′	310	8°4	115	70° 50′	8° 29′	86	0°1	143	62° 58′	7° 09′	388	—0°4
90	64° 45′	29° 06′	568	4°4	116	70° 05′	8° 26′	371	—0°4	144	62° 49′	7° 12′	276	1°6
91	64° 41′	31° 00′	1236	3°1	117	69° 13′	8° 23′	1003	—1°0					

THE DANISH INGOLF-EXPEDITION.

VOLUME VI.

2.

PORIFERA.

(PART II.)

DESMACIDONIDÆ (PARS).

BY

WILL. LUNDBECK.

WITH 20 PLATES AND 7 FIGURES IN THE TEXT.

TRANSLATED BY TORBEN LUNDBECK.

COPENHAGEN.
PRINTED BY BIANCO LUNO
1905.

Ready from the Press October the 5th 1905.

CONTENTS.

Desmacidonidæ.

Porifera.

II.

By

William Lundbeck.

THE present work, as shown by the title, is a direct continuation of my work, "Porifera, Part I, The Danish Ingolf-Expedition, VI, 1," published in 1902. In the introduction to this first part I rendered an account of the material and of the geographical territory treated in the work. Since that time some new material from the territory has been added, and this material has been included in the work. The new material has especially been gathered by the surveying vessels the "Diana" and "Beskytteren" stationed at Iceland and the Faroe Islands, on the cruise of the "Thor", the steamer of the international investigation of the sea, in 1903 under the direction of Dr. Joh. Schmidt, and more particularly must be mentioned the very considerable material collected by Dr. A. Appellöf and cand. mag. Ad. Jensen during the cruise of the "Michael Sars" in 1902 under the direction of Dr. Hjort.

In the first part of the work the families *Homorrhaphidæ* and *Heterorrhaphidæ* of the sub-order *Halichondrina* were treated. The present part comprises part of the family *Desmacidonidæ*. Partly following Topsent I divide this family into the subfamilies *Mycalinæ* (= *Esperellinæ olim*) and *Ectyoninæ*; *Mycalinæ* I divide into two groups *Mycaleæ* and *Myxilleæ* (the latter corresponding to the subfamily *Dendoricinæ* of Topsent). I regard these two divisions as groups of one subfamily, as I think them more closely allied to each other than to *Ectyoninæ*, at all events when the question is of the typical forms of this sub-family. On the other hand, several genera of *Ectyoninæ* are assuredly closely allied to genera of the group *Myxilleæ*. The systematism of the sponges is still in many respects groping its way, and such is also the fact inside the family *Desmacidonidæ*. The separation into the two subfamilies *Mycalinæ* and *Ectyoninæ* is scarcely a quite natural one, in the way in which it is made at present, being chiefly based on the occurrence of special, socalled accessory spicules in the latter subfamily. Thus the dermal spicules with equal ends characteristic of the *Myxilleæ*, occur also in some *Ectyoninæ*-genera; the accessory acanthostyles are often very scarce, or the acanthostyles of the species are so very varying in size, that it is difficult to decide whether two separate groups of sizes are present. The decision is especially difficult in incrusting forms, where the character of the accessory styles jutting out from the fibres is wanting, all the styles being basal. A particular fact is also the occurrence of parallel, corresponding genera in the two subfamilies; thus *Myxilla* (

Dendoryx olim) corresponds to the *Ectyonin*-genus formerly known by the name of *Myxilla*, *Iophon* to *Pocillon*, *Iotrochota* to *Hymetrochota*, *Grayella* (= *Yvesia* Tops.) to *Pytheas*, and *Tedania* to *Acheliderma*; also these facts seem to tell against the naturalness of the system. It is therefore rather probable that the division into *Mycalinæ* and *Ectyoninæ* will have to be abandoned or altered, as has already been advanced by Ridley and Dendy (Challeng. Report, Monaxonidæ, 129), at the same time as they reduce Carter's family *Ectyonidæ* to a subfamily, and as will also be mentioned in several places of the present work. I have, however, not yet ventured to abandon this division, as my investigations have not hitherto shown me a more natural way of grouping. For the present the efforts must be directed towards a thorough examination of genera and species, as this will to a high degree facilitate the natural grouping with regard to the higher divisions.

In the introduction to the first part I have spoken of several descriptive terms and their use, to which I may here refer. The terminology of the spicules is the same with regard to megasclera and to the forms of microsclera occurring in *Heterorrhaphidæ*. In the family *Desmacidonidæ*, however, we meet new forms of microsclera belonging to the socalled chelate type, and it will be necessary to premise some remarks on the two principal forms of this type

Chelæ and Ancoræ.

The spicules belonging to these forms are at this moment by all authors with the exception of Levinsen comprised under the name of chelæ. This name was proposed in 1887 by Ridley and Dendy in Challeng. Rep., and this proposal was of some importance, as up to that time there had been no established term, but terms as anchorates , Haken , Anker a. s. o. had been used by the different authors. While Schmidt and Carter upon the whole have given good figures of these bodies, Bowerbank on the other hand was highly misled with regard to their forms; even Carter has in 1871 (Ann. Mag. Nat. Hist. 4th ser. VII, 277) pointed out this fact, but Levinsen and after him Ridley and Dendy have rendered a more particular account of it. Levinsen especially was he, who first and clearly showed (Dijmphna-Togtets zool.-bot. Udbytte, 1887, 354) that Bowerbank generally figures the chelæ in two positions, from before and from the side, and interprets these figures as two different forms. Another common mistake, that the tooth of the chela has not been seen, may be found in many works down to the present time; when this is the case the chela is figured with a plate in each end, but without a tooth; or only the tuberculum has been seen and interpreted as forming a small short tooth. This mistake is easily accounted for, as the tooth is often so thin, that it can only be seen under high magnifying powers and by proper light. In this respect Ridley and Dendy's Monaxonidæ (Challeng. Rep.) occupies a high position by its excellent figures of the chelæ. Otherwise the mistake is a common one; thus in the works by Vosmaer on the sponges of the Willem Barent -Expedition it is found throughout, and this holds also quite good of his work on the sponges in Bronn's Klassen und Ordnungen, where almost all the figures of chelæ are erroneous, no corresponding forms being found in nature. In a paper by Vosmaer and Pekelharing from 1898 (Verhandl. der Kon. Akad. van Wetensch. to Amsterdam, 2, IV, no. 3, 32) entitled On Anisochelæ and Isochelæ", and in which therefore a thorough examination of these features might be expected, we find nevertheless that on Pl. II, fig. 9, and especially fig. 11, which latter represents an almost grown (rather a quite grown) chela, no tooth has been drawn in the smaller end. Also in Topsent's otherwise excellent works too little attention has been paid to the study of the chelæ; in his work from 1892 (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II) the chelæ are shown in very small figures, and most frequently the tooth has not been figured. In the work on the sponges of the Belgic Antarctic Expedition from 1902 (Voyage du S. Y. Belgica, Spongiaires) the case is somewhat similar; thus the tooth is not drawn on the chela seen from the front, Pl. III, fig. 9 b. Even in the fine work from 1904 (Résultats des Campagn. scient. du Prince de Monaco, Fasc. XXV) errors of this kind are found; thus the chelæ on Pl. XIV, fig. 15 e, fig. 18 d, and Pl. XV, fig. 20, are drawn without the tooth, while others, especially the larger ones, are drawn correctly.

As mentioned above, all these forms are generally comprised under the name of chelæ, and are regarded as being principally of the same kind. In contradistinction to this view Levinsen in 1893 (Vidensk. Medd. fra den Nat. For. Kobenhavn 1893, 1) has advanced a new view, dividing these bodies into two principally different forms and giving to these the respective names of chelæ and ancoræ. The difference between these two forms is briefly, that chelæ have only one free tooth and besides more or less broad lateral alæ on the shaft, while ancoræ have more, 3—7 free, uniform teeth besides lateral alæ on the shaft. Levinsen regards the teeth in both forms as bendings of the axis. Carter and Ridley and Dendy regard the lateral teeth in ancoræ and the alæ in chelæ as formations of the same kind, and are most inclined to regard the lateral teeth in ancoræ as developed by the alæ of a chela being split of from the shaft. Vosmaer and Pekelharing in the above quoted paper from 1898 attack the interpretation of Levinsen, and declare that the teeth of the ancoræ cannot be interpreted as bendings of the axis, as long as an axial canal has not been made out in all the teeth of the ancoræ, and if these teeth are formed by the axis being bent and split in several branches, then a sponge with such spicules would not belong to the Monaxonidæ. The authors think it most probable that the ancoræ have arisen by a splitting of the tooth of the chela.

To these different theories it is only to be remarked that it may be regarded as a fact that chelæ and ancoræ are allied bodies, but that it cannot at present be decided, in what way one form may be thought to have arisen from the other. Now it is certain that in a few chelæ we may meet with a feature which is probably a splitting of the tooth, as in some *Asbestopluma*-species in the smaller end of the chela, and in the present work in the genus *Myxilla* instances will be shown of ancoræ with at all events a beginning splitting of teeth; but at present it is impossible to decide how this fact is to be interpreted. On the other hand it is certain that the two forms, as they now occur, are principally different: in one form, chelæ, only one tooth is found and alæ on the shaft, in the other form, ancoræ, several quite homologous teeth are always found as well as alæ on the shaft. Transitional forms have not been found hitherto, and when Ridley and Dendy say (Challeng. Rep. Monaxonida, XIX): "Numberless gradations exist between these two types", this is not correct; their view arises from the fact, that they put ancoræ and chelæ arcuatæ together in one group in contradistinction to chelæ palmatæ, but even from this point of view the statement is not correct. The objection of Vosmaer and Pekelharing, that the ancoræ, if the representation of Levinsen is correct, would be polyaxial spicules, seems to me to be of no importance, as the question might very well be of a secondary splitting of the axis of the original monactinal spicule. Otherwise I shall remark that it may be proved that the tooth of the chela can be traced back to a bent axial part, while the teeth of the ancoræ, in spite of the fact that their form quite corresponds to that of the tooth of the chela, are, perhaps, not axial bendings, but are formations which have, all of them, also the middle tooth, arisen in another way, through growth by apposition. I cannot, however, at present establish this as a sure fact. If it should prove correct, Levinsen of course is not right in designating the teeth of ancoræ as axial bendings, but the principal difference between chelæ and ancoræ will then be still greater. In this connection it may be well to remind of the fact that ancoræ may be found provided with an even number of teeth, without any middle tooth.

Besides the division into chelæ and ancoræ Levinsen, in the paper quoted, subdivides chelæ into two forms, chelæ palmatæ and arcuatæ. The former have a straight, or most frequently only slightly curved shaft, and rather large alæ forming together an almost triangular or oval plate, often with a deep notch below; the tooth is often rather broad. In the other form, chelæ arcuatæ, the shaft is most frequently rather strongly curved, the alæ are highly indented below and only attached to the shaft for a comparatively short way, thereby getting a somewhat tooth-like appearance; the tooth is most frequently rather narrow. To be sure, these two forms are not principally different, but differ only in form, and forms may also be met with that may only with difficulty be referred to either of them; but generally they form two well-marked groups, and are also characteristic for certain genera. Therefore there is every reason to keep this division.

By all the authors who acknowledge only one form, chelæ, these are generally described as tridentate or palmate. This division is a complete mistake; the forms called palmate are generally chelæ palmatæ, but in the term tridentate are comprised both chelæ arcuatæ and ancoræ. Thus Ridley and Dendy and Topsent use generally these terms; nay, in Topsent's work on the sponges of the Belgic Antarctic expedition we even meet again the old term bidenté. Under *Desmacidon setifer* it is said in the text of the chelæ dentés ou palmés, and on Pl. III, fig. 6 a series is figured of which it is said in the explanation of the figures, a, b, formes rudimentaires; this is correct, the figures show two developmental forms; then the continuation runs, c, isochèle palmé, d, isochèle denté, c', d', formes intermédiaires. All the figures belong to one form, a typical palmate chela, c is seen from the front, d from the side, while c' and d' are two a little contort specimens, and one end is therefore seen a little from the front, the other a little from the side.

Besides the division made by Levinsen of the forms belonging here, I further divide ancoræ into two classes which I call ancoræ spatuliferæ and unguiferæ. In the first form the shaft is most frequently straight or slightly curved, and the teeth are comparatively large and broad; their number is very frequently three, but there may be more. In ancoræ unguiferæ the shaft is most frequently more curved, the teeth are comparatively small and pointed, their number is three to nine, generally more than three. These two forms of ancoræ are only different in form, and transitional forms occur, but the two forms are most frequently well-marked and characteristic of particular genera.

In the palmate chelæ the ends may be either like or unlike each other, and according to this they are either isochelæ or anisochelæ; in the arcuate chelæ, the ends, as far as known, are always like, and accordingly they are isochelæ. In ancoræ spatuliferæ the ends, as far as known, are always like, they are isancoræ, while ancoræ unguiferæ may be isancoræ or anisancoræ.

According to the preceding the chelate microsclera may be divided into the following forms:

Chelæ — palmatæ (iso-, aniso-), arcuatæ (iso-)

Ancoræ — spatuliferæ, most frequently 3 teeth (iso-); unguiferæ, 3—9 teeth (iso-, aniso-)

All forms of microscleres belonging here may always be referred to one of the types chelæ or ancoræ. This does not seem to be generally acknowledged. Thus the small chelæ characteristic of the genus *Asbestopluma* have given rise to different interpretations, but in reality they are constructed on the same principle as the other chelæ. Even so deviating a form as the chela in *Mycale thaumatochelæ* described below is of the same fundamental structure, and this holds good also with regard to the peculiar wry chela in *M. titubans*; nay, even the bipocilla in the genera *Iophon* and *Pocillon* may be referred to the same form. Topsent (l. c. fasc. XXV, 209) proposes the term placochèles for the peculiar palmate isochelæ in *Guitarra* and *Esperiopsis villosa*; I cannot, however, see any reason for a special name for these forms, as they are typical isochelæ palmatæ. A typical chela thus consists of the following parts, which I designate by the following terms, generally in use: a shaft or an axis having in either end a bending, the tooth, and at either end two lateral extensions, the alæ; between the shaft and the tooth, at a right angle to these, is found a plate-shaped part, falx, and the thickened part of this structure shining through the fore side of the tooth, is called tuberculum. In ancoræ quite the same parts are found, the only difference being that in these several teeth are found each with falx and tuberculum.

With regard to the development of these forms many misconceptions have been advanced. As early as in 1857 Bowerbank (Phil. Trans. Roy. Soc. London CXLVIII, 304) and later in the first volume of Monograph 1864, 47, Pl. VI, fig. 144—147, has given a description with figures of these forms, which, to be sure, is not correct, but nevertheless rather good and free of the misconceptions arising later, as he has clearly understood that the first beginning was of the same length as the fully developed spicule. Also O. Schmidt in 1862 (Die Spong. des adriat. Meer., 8), although he does not understand the growth of these spicules, has seen that small and large chelæ occurring in the same sponge are not stages of growth of the same form. Later the misconceptions appear. Carter, in 1874 (Ann. Mag. Nat. Hist. 4, XIV, 100), advances the view that the anisochelæ begin as isochelæ; he has been led to this view by the fact that he upon the whole regards small isochelæ, in a species also provided with large chelæ, as younger stages of these, and so he is led to suppose a growth with the most peculiar alterations of form. That Carter has not later been quite sure of the correctness of his theory may be seen from the fact that in 1882 (Ann. Mag. Nat. Hist. 5, IX, 208) where he mentions small isocheles occurring together with large anisocheles, he says: and therefore the inequianchorate may possibly begin its development in this form (i. e. as isochela), and he continues, however it does not occur in the ovular embryo of *Esperia*, while the inequianchorate do. Ridley and Dendy, in Challeng. Monaxonida, follow Carter completely, though they have followed the development of anisochelæ in *E. mammiformis*. They still regard the small chelæ as developmental forms of the large ones in the same sponge, either the question is of isochelæ or anisochelæ; in several places however, they say possibly young forms. Levinsen, in his paper from 1893, gives an exhaustive description of the growth of the chelæ. In the introduction to part I of the present work I expressed the opinion that in this second part I should be able to corroborate his examinations with regard to a great number of forms, and this is also the case. In the descriptions of the separate species this fact will be more particularly mentioned. Here, as in the other spicules, the growth takes place exclusively by apposition, either simple apposition, or after fixed lines, and the younger forms must always be inscribable in the older ones. The chelæ and ancoræ therefore begin as axes of the full, or about the full length; in the chelæ the beginning is a straight or curved staff with shorter or longer axial bendings in either end, and tooth and alæ arise gradually and grow to their full size. In the ancoræ the growth takes place in a similar way, but their teeth, as before mentioned, are perhaps not axial bendings, but arise in another way. Vosmaer and Pekelharing, in their paper from 1898 quoted several times in the preceding, treat and figure the development of the anisochela in *M. syrinx*, but their discussion contains nothing new. When they conclude, on account of their having found chelæ that were a little contort, we have therefore the right to say that chelæ not only can be derived from spicula which have the shape of C, but indeed from spicula known as sigmata, this conclusion is unwarranted; developmental forms of the chelæ are in no instance sigmata, and may always easily be distinguished from these; the fact that chelæ may be contort, a feature that is much more frequent and may take place to a much higher degree than seems to be known by the authors, proves nothing at all.

Developmental forms of the chelæ have not rarely been misinterpreted. I shall here state the cases I have found. Carter (Ann. Mag. Nat. Hist. 5, IX, Pl. XI, fig. 17 d and h) calls these two figures with a query bihamates; they are developmental forms of an anisochela. He calls (ibid. 5, XV, Pl. IV) fig. 3 d bihamate-like spicule; it is the developmental form of an arcuate chela. Fristedt (Kgl. Sv. Vet. Akad. Handl. 21, no. 6, Tab. III) calls fig. 3 h spiculum c-curvato-obtusum, but regards it with a query as an undeveloped chela; it is an undeveloped arcuate chela. Lambe (Trans. of the Roy. Soc. of Canada, XI, sect. IV, Pl. II) calls fig. 4 e a sigma; it is a developmental stage of a palmate anisochela.

Levinsen, in his paper from 1893 several times quoted above, after having established the fundamental difference between chelæ and ancoræ, and rendered an account of the fact that they are never found together, expresses the opinion that this fact must involve the alteration in the system that species with chelæ and species with ancoræ cannot be kept in one genus. I can fully agree with this view, and therefore in the present work I have separated the species according to it. In this respect the question is for the present only of the genera *Myxilla*, *Lissodendoryx* and *Desmacidon Homœodictya*; the particulars will be found under these genera.

With regard to the examination I shall only add the further remarks that the examination of the structure of the skeleton has generally been made on dried preparations placed in xylol in not too thin sections, by which means distinct and complete views of the skeleton are obtained. Care must be taken, of course, that the skeleton is not distorted by the drying. I mention this proceeding, because I think it gives a better and more distinct view than is got when the sponge is cut in a moist state, and by the use of my descriptions of the skeletal structure it must be remembered that they are made from such preparations. For the examination of the structure of the spicules I have generally used Canada balsam-preparations; in a few cases I used Naphtalin-α-monobromatum, which proved to be very good when the question was of very thin silicious plates; also a mixture of Naphtalin-α-monobromatum with Canada balsam was in some cases found to be good. Storax resolved in benzol and alcohol has been used in a few cases; but in by far most cases Canada balsam proved very efficient; when the spicules are completely cleaned, it will in balsam-preparations almost always be possible to study the structure to the finest details.

Fam. III. Desmacidonidæ.

Subfam. 1. Mycalinæ.

Group. 1. Mycaleæ.

According to what has been shown by Thiele (Abhandl. der Senckenberg. nat. Gesellsch. XXV, 949) the name of *Esperella* Vosm. must be altered to *Mycale* Gray, and consequently the name of the subfamily and the group will also have to be altered.

Esperiopsis Carter.

The form varying: incrusting or irregularly solid, but frequently erect and leaf-shaped, or in other ways symmetrical. The skeleton may be constructed in various ways: in the erect forms it may consist of long, well developed and branched fibres, but in the solid forms and in the incrusting ones it gets a halichondroid or renierid structure. Spongin is most frequently present, the amount varying. Spicula: Megasclera monactinal, styli or subtylostyli; microsclera: the characteristic microsclera are isochelæ palmatæ, which may occur in one or several forms; to these may be added isochelæ arcuatæ, sigmata in one or more forms, toxa, or forcipes in different combinations.

The genus *Esperiopsis* was establised by Carter in 1882 (Ann. Mag. Nat. Hist. 5, IX, 300) to the species *villosa*, which he had originally referred to *Esperia*. The distinctive character of the genus is the fact that the characteristic microsclera are isochelæ, which was also the principal reason why Carter separated the species into a particular genus; to be sure he mentions also some other features, but they are of no consequence. Levinsen (Studier over Svampe-Spicula: Cheler og Ankere: Vidensk

Medd. nat. For. Kobenhavn for 1893.1894, 11) says that there is no reason to keep the genus, as in the old genus *Mycale (Esperella olim)* we have now exclusively anisochelæ, now exclusively isochelæ, and sometimes a mixture of both, and as the difference between an isochela and an anisochela may be very slight. I think, however, that there is good reason for keeping the genus, as the characteristic microsclera in *Mycale* are anisochelæ, and small isochelæ seem to be of very rare occurrence in this genus. Carter (l. c. 298) mentions this fact in a general way as occurring in some *Mycale*-species, among which he only mentions *M. plumosa* Cart., and Ridley and Dendy (Chall. Rep. XX, 65) state it with regard to *M. parishii* Bow. in which species the small isochela is of a particular structure[1].

With regard to the other objection made by Levinsen to the keeping of the genus it is to be said that the anisochelæ, to be sure, may approach isochelæ as to form, but no species is known, however, with regard to which there can be any doubt in this respect. The *Mycale*-species most closely allied to *Esperiopsis*, and more particularly to the *Esperiopsis*-species with renierid skeletal structure, is perhaps *Mycale ovulum* O. S., in which some of the anisochelæ may show only slight difference as to the size of their ends, but the ends however are never of quite the same size.

Another question is whether all the species for the present referred to *Esperiopsis*, are naturally closely allied. The species show great difference, as well with regard to form as to skeletal structure; also the combination of microsclera is varying to some degree, and rather many different forms may occur. To get a general view I shall put together, as far as possible, the described species with a statement of their microsclera; with regard to the species of Bowerbank I follow, with a few exceptions, the interpretations of Topsent (Revue Biol. du Nord de la France, VII).

	E. (Isodictya) Edwardii B.	Isochelæ palmatæ.
	- (-) *Normani* B.	—
	- ( ) *fucorum* Johnst.	—
	- (-) *Alderi* B.	—
	- (—) *scitula* B.	—
	- (—) *involuta* B.	—
	- (—) *hispida* B.	—
?	- *(Halichondria) compressa* B.	—
?	- (—) *Thompsoni* B.	—
	- *(Amphilectus) hispidula* Ridley	—
	- *Challengeri* R. and D.	—
	- *profunda* R. and D.	—
	- *anomala* R. and D.	—
	- *columnata* Tops.	—
	- *rigida* Lambe	—

[1] Carter, as is well known, thought these small isochelæ to be developmental phases of the anisochelæ. He puts forth this theory in 1874 (Ann. Mag. Nat. Hist., 4, XIV, 102), and here he figures for *M. aegagropila* Johnst. the typical anisochela, as also some small bodies situated in cells, which bodies he interprets as isochelate developmental phases of the anisochela. Levinsen (l. c. 9) has been of opinion that the question was here of small arcuate chelæ. As there is, however, every reason to suppose that Carter has really had before him *M. aegagropila* (he mentions one of Johnston's original specimens), and as in this species no small isochelæ are found, it is not possible to decide, what Carter has seen, and his figures are not to be explained. Developmental phases of anisochelæ they cannot be, as those have a quite different appearance.

E. vancouverensis Lambe	Isochelæ palmatæ.	
- *quatsinoensis* Lambe		
- *laxa* Lambe		
- *rugosa* Thiele	—	
- *pedicellata* mihi	—	
- *(Isodictya) collina* B.		sigmata.
? - *(Halichondria) rigida* B.	Isochelæ, sigmata. (If this species proves to be an *Esperiopsis*, *rigida* Lambe will have to change its name).	
- *cylindrica* R. and D.	Isochelæ palmatæ, ?toxa.	
- *symmetrica* R. and D.	—	sigmata of two forms.
- *typichela* mihi	—	of two forms.
- *pulchella* R. and D.	—	of two forms, isochelæ arcuatæ.
- *prædita* Tops.	—	isochelæ arcuatæ, sigmata.
- *villosa* Cart.	—	of three forms, sigmata.
- *flagellum* mihi.	—	of two forms, sigmata, sigmata flagellata.
- *decora* Tops.	—	of three forms, —
- *forcipula* mihi.	—	isochelæ arcuatæ, sigmata, forcipes.
- *polymorpha* Tops.	Isochelæ arcuatæ, sigmata of two forms, toxa (small, sharply bent).	
- *Schmidtii* Arnesen	—	sigmata.
- *glomeris* Tops.	—	
? - *(Holopsamma) turbo* Cart.	Isochelæ. Dendy, after having found isochelæ in this very deviating form, refers it to *Esperiopsis*.	

Halichondria foliata Bow., which Topsent, in the mentioned work, refers to *Esperiopsis*, is an *Echinoclathria*; the same holds good of *Esperia foliata* Frstdt.

In the generic diagnosis I have given as characteristic microsclera isochelæ palmatæ; as will be seen, three species deviate from this rule, viz. *polymorpha* Tops., *Schmidtii* Arnesen, and *glomeris* Tops. which have, as to chelæ, only isochelæ arcuatæ, which seem to be of quite typical form. As above mentioned, however, the difference between chelæ palmatæ and arcuatæ is not quite sharp, and perhaps it will be necessary only to say that the characteristic microsclera of the genus are isochelæ.

I shall still add that Kieschnick (Semon: Zool. Forschungsreisen in Austral. Band V, Denkschrift Med. Nat. Gesellsch. Jena, Band 8, 1900, 572, Taf. XLIV, Fig. 12, Taf. XLV, Fig. 51—52) has established a species, *E. viridis*. As the other species mentioned in this quite useless work it is unrecognizable, but it seems most nearly to be a *Chondrocladia*-species. Of microsclera are mentioned isochelæ with six teeth (the very bad figure shows seven), and smaller isochelæ with five teeth (to which a quite useless figure)

1. E. villosa Cart.

Pl. I, Fig. 4. Pl. VIII, Fig. 1 a—i.

1874. *Esperia villosa* Carter, Ann. Mag. Nat. Hist. Ser. 4, XIV, 213, Pl. XIII, figs. 13—15, Pl. XV, fig. 39.
1879. Unknown sponge Carter, Journ. of the Roy. Micr. Soc. II, 502, Pl. XVII a, fig. 12 a, b, c.
1882. *Esperiopsis villosa* Carter, Ann. Mag. Nat. Hist. Ser. 5, IX, 296.

1887. *Esperia villosa* Fristedt, Vega-Exp. vetensk. Iakttag. IV, 451, Pl. 25, figs. 33—39, Pl. 29, fig. 19.
1904. *Esperiopsis villosa* Topsent, Résultats des Camp. Scient. du Prince de Monaco, Fasc. XXV, 211, Pl. XVII, fig. 2 a—c.

Erect, more or less irregularly leaf-shaped. The surface finely shaggy from projecting spicules: the dermal membrane thin, with no separate skeleton, resting on spicules that are spread in a penicillate way. Oscula formed as small, conical projections, along the upper edge or a little down on the surface. The skeleton consists of polyspicular fibres branching up through the sponge and anastomosing: from this skeleton shorter fibres go off to the surface. Spicula: Megasclera styli or slightly marked subtylostyli 0·6—0·75mm; microsclera of four forms: isochelæ palmatæ of three forms, large ones of a particular narrow form 0·08—0·12mm, middle ones 0·078—0·092mm, small ones 0·021—0·031mm: sigmata, large 0·045—0·10mm.

This species has been pretty well described by Carter with the only misconception of the mutual relation of the three different chelæ, which is a consequence of his wrong interpretation of the growth and development of these bodies. The species seems most frequently or always to be erect and more or less leaf-shaped, but is otherwise of somewhat varying form and thickness, and frequently of an irregular appearance. With its base it is fastened to stones or some other underlayer, and most frequently its base is widely spread. The largest specimen in hand is of a height of ca. 13cm and a thickness of about 15—20mm. The colour (in spirit) is generally gray, sometimes passing a little into brownish. On account of its skeleton the sponge is rather firm, but may, however, be torn easily, and all the specimens are much damaged. The *surface* is finely shaggy on account of the projecting spicules. The *dermal membrane* is thin, with no skeleton, supported by spicules projecting in a fanshaped way. The *pores* are situated in the dermal membrane between the projecting spicules; sometimes they are very close-set, so that the membrane becomes a network. They are round to oval, and their size is generally between 0·02 and 0·15mm. *Oscula* are constructed in a peculiar way: along the upper edge of the sponge, or sometimes a little down on the surface is found a number of projections quite slightly conical; they are of an average height of a few mm., and have a diameter not exceeding 1mm. They consist of spicules and are apparently solid, but when cut off at the base they leave a hole, and are seen to be hollow in their lower part; in a few of them a little opening is also found in the top. All the oscula (they are only found distinctly in the best preserved specimen) may be supposed to be shut, open oscula were not seen. Further down on the sponge a few round holes are seen, which I take, however, to be due to damaging[1]). From the osculum a canal may generally be traced some way down in the sponge.

The *skeleton* consists of irregularly branched, polyspicular fibres, branching from the base up through the sponge, and frequently anastomosing. They are thickest in the lower part of the sponge; in the middle of the sponge they have an average thickness of ca. 0·35mm; they are polyspicular, and have a great number of spicules side by side. The fibres with their anastomoses form a rather dense and solid skeleton. From this skeleton close-set fibres go off to the surface generally curving somewhat upwards. These fibres divide on the way to the surface, and pierce the dermal membrane as

[1]) When Carter (l. c. 1874) says: Vents scattered here and there irregularly, it is presumably owing to the fact that his specimen has been damaged, and the real oscula have been wanting or indistinct.

bundles of spicules spread in a more or less fan-like or penicillate way; the fibres are generally of a length of 3—4mm. The dermal membrane is supported by the projecting bundles of spicules, and is provided with no skeleton of its own. The fibres and bundles of spicules that support it, are, however, often far from being perpendicular on the surface, and accordingly, when a piece of the skin is viewed under the microscope, it may appear, as if there was a reticulation in the skin, the fibres under it being also seen. In the fibres of the skeleton some spongin is seen, which, although not abundant, coats the fibres completely. As mentioned above the fibres are thickest at the base of the sponge, and the spongin is also most distinct here. Below the fibres pass into a thin basal membrane formed by spongin, and provided with scattered spicules; it is directly fastened to the substratum, from which it is easily separated, and then it shows a smooth surface.

Spicula: a. *Megasclera* are styli or very slightly marked subtylostyli; most frequently they are straight, sometimes quite slightly curved. They are thickest in the middle, and thus a little fusiform, the greatest thickness being not rarely nearest to the pointed end. The point is evenly tapering, but not long. Most frequently they are slightly restricted a little below the rounded end, and thus approaching to subtylostyli, but the restriction is not rarely imperceptible or wanting. The length is between 0·6—0·75mm, most frequently approaching the latter size; sometimes it may go down to 0·5mm. The thickness is between ca. 0·01—0·02mm. Finer spicules, developmental forms, occur, but in very small number. The specimen described by Topsent l. c. has somewhat larger megasclera; they are stated to be 0·935—0·980mm. b. *Microsclera:* Of these are found isochelæ palmatæ of three different forms, and sigmata. 1. The largest chelæ are of a peculiar shape. Carter calls them "weaver's shuttle-like"; they are narrow, the side-edges of the two alæ are parallel, and the alæ continue far down along the shaft, so that only a short space is left in the middle where the cylindric form of the shaft is seen. The shaft is straight. The side-edges of the tooth are likewise about parallel, or slightly converging towards the end, and the end of the tooth is rounded. When the tooth is seen from the front, it appears to have a thickened edge, but this is owing to the fact that the sides are curved inwards. When the chela is viewed from the side, it is seen that as well the sides of the tooth as the alæ on the shaft are curved inward so as to meet each other at the ends of the chela. Seen from the side the tooth most frequently bends a little outward at the end, while the outermost point is again bent inward in a claw-like way; the latter bend, however, is in so far only apparent, as it is owing to the bending in of the edge. The edge of the tooth being thus bent inward all round the tooth becomes hollow on the inward side. The tooth is generally of about the same length as the alæ, and its position is about parallel to the shaft. At its basal end the axis is seen as a little oval tubercle. These chelæ are sometimes somewhat twisted. The length is rather varying, from 0·08—0·12mm, and the greatest breadth, a little above the middle of the tooth, is ca. 0·013mm. Of these chelæ developmental forms are found; the youngest stage observed was formed as a fine staff having at both ends a large part recurved with a round curve, and the recurved ends were finely tapering (Pl. VIII, fig. 1 d). This staff thus represented the axis of the chela, alæ and tooth having not yet been formed; the development now consists only in the growing forth of the alæ and the tooth. The developmental forms have the full length of the chela, the youngest stage was thus measured to 0·1mm. 2. The middle form of chelæ is somewhat smaller and broader; also in these the shaft is straight or about straight. The alæ do not continue so far down the shaft, so that the free middle part of the shaft is about one third of the whole length or thereabout. The lateral edges of as well the alæ as the tooth diverge towards the middle of the chela, the terminal parts of which thus get a triangular form. The lateral edges of both the alæ and the tooth curve inward, and thus the alæ and the tooth turn concave sides towards each other. The tooth is generally a little narrower than the alæ together, and sometimes of the same length, sometimes a little shorter; it forms an acute angle with the shaft. The tuberculum is longish, and a rather inconsiderable falx is found. This chela may vary somewhat as to form, especially with regard to the breadth of the alæ and the tooth, and the length of the middle part of the shaft; also the end of the tooth may be differently rounded, and the lower edge of the alæ may join the shaft at a right angle or with an even curve. The length is generally between 0·078 and 0·092^{mm}, but a few smaller ones occur, down to 0·05^{mm}. The greatest breadth is most frequently 0·021—0·028^{mm}, but much narrower forms may be found. Also of this chela a few developmental forms were found; they are very like those of the preceding form, from which they may be especially distinguished by the fact that a falx is begun at an early stage. The incipient alæ are as to form somewhat different from the fully developed ones (Pl. VIII, fig. 1 f), but the final form is reached through mere apposition. 3. The third form of chelæ is considerably smaller than the preceding ones; these chelæ are of a form similar to that of the middle ones, but their shaft is somewhat curved; the breadth of the teeth is the same as that of the alæ taken together. The length is between 0·021^{mm} and 0·031^{mm}, only rarely towards the latter length, the breadth is 0·0057—0·007^{mm}. A few chelæ may be found, seeming by their size and by having only a slightly curved shaft to form a transition between the two latter forms. Carter, as may be seen from his description and figures, has seen all three forms of chelæ, but on account of his interpretation of the growth of the chelæ he has taken the smallest and middle forms to be developmental stages of the largest form. What Topsent l. c. says of the largest chelæ: Pour réaliser leur form, ces isochèles subissent une atrophie à peu pres complète de leur dents laterales is not correct; these chelæ, as the other chelæ in the sponge, and as all palmate chelæ, have distinct alæ on the shaft (Topsent's dents latérales), but these are narrow and their lateral edges are parallel. 4. Sigmata; they reach a more considerable size than is commonly the case, and in this respect they are exceedingly varying; they are of the common sigma-form, sometimes a little irregular, and their form may be somewhat varying, they may also be plane or contorted to some extent, mostly only to a slight degree. The length varies from 0·19^{mm} down to 0·045^{mm}, and the thickness varies in proportion from 0·011^{mm} to 0·002^{mm}. Monstrous forms of sigmata may occur, and especially one form is not rarely seen, in which one end is split into two or more points, as figured by Fristedt l. c. fig. 39. Besides sigmata are found quite singly some bodies which I must suppose to be developmental forms of sigmata; they are curved like the axis of a sigma, and the ends are tapering, but they are quite, or to a higher or smaller degree, wanting the recurved ends. They have been measured of lengths from 0·058—0·18^{mm} with thicknesses from 0·001—0·0025^{mm}. Thus this sigma seems to reach a considerable thickness, before its ends are properly developed.

Embryos. In some of the specimens embryos were found scattered in the body of the sponge, sometimes singly, sometimes several ones together. They were roundish, of a diameter of about 1^{mm}. Their spiculation shows some peculiarities. Of megasclera they have very fine styli, generally with a somewhat swollen upper end; they were measured to a length of 0·25—0·30mm and a thickness at the upper end of ca. 0·002mm. Of microsclera they have only the middle form of chelæ, which occur in all stages of development, as also fully developed, but they are considerably smaller than in the fully developed sponge, only reaching a length of 0·03mm [1]). Quite the same observation has been made by Ridley and Dendy with regard to the embryos of *Esperella mammiformis*, where the anisochelæ of the embryos had a length of 0·05mm, while in the grown sponge their length was 0·07mm. In the opinion of these authors this fact, however, has no especial peculiarity, as, according to their view of the growth of the chela, the small chelæ may quite simply grow to their full size. The specimens with embryos were taken during the month of July.

Locality: Station 28, 65° 14' Lat. N., 55° 42' Long. W., depth 420 fathoms; station 73, 62° 58' Lat. N., 23° 28' Long. W., depth 486 fathoms; station 81, 61° 44' Lat. N., 27° 00' Long. W., depth 485 fathoms; station 127, 66° 33' Lat. N., 20° 05' Long. W., depth 44 fathoms. It has further been taken on 65° 30' Lat. N., 28° 25' Long. W., depth 553 fathoms (the East-Greenland expedition 1891—92). Altogether five or six specimens. The mentioned localities are situated to the north and south of Iceland, in the Denmark Strait and in the Davis Strait.

Geogr. distr. Between Scotland and the Faroe Islands, depth 440 fathoms ("Porcupine", Carter); the eastern coast of Greenland, depth 140 fathoms (Fristedt); at the Azores, depth 1196 fathoms (Topsent). Carter's "Unknown sponge" is, no doubt, identical with *E. villosa*, it was taken by the "Porcupine", between Scotland and the Faroe Islands, 59° 56' Lat. N., 6° 27' Long. W., depth 363 fathoms; but it is to be noted that the bottom temperature was here ÷ 0·3°, while on all the other localities of the species it has been positive.

2. E. Normani Bow.

Pl. VIII, Fig. 2 a—d.

1866. *Isodictya Normani* Bowerbank, Mon. Brit. Spong. II, 320, 31, III, 141, Pl. LVI, figs. 1—5.

1880. *Amphilectus Normani* Vosmaer, Notes from the Leyden Museum, II, 117, 25.

1885. *Esperia Normani* Fristedt, Kgl. Sv. Akad. Hand., 21, No. 6, 42.

1893. *Esperella Normani* Levinsen, Det vidensk. Udbytte af Kanonbaaden "Hauch"s Togter, 422, 10, Tab. I, figs. 37—49.

Incrusting or more or less massive or cushion-shaped (sometimes somewhat branched). The dermal membrane thin, without spicules, resting on the skeleton below; it is pierced by the ends of the fibres, and the surface therefore is finely shaggy. Oscula scattered, most frequently on the end of slightly marked, conical projections. The skeleton of a renierid structure with polyspicular primary fibres and most frequently single transverse spicules. Spicula: megasclera curved styli 0·16—0·25mm; microsclera of one form, isochelæ palmatæ 0·020—0·021mm.

The typical form of this species is incrusting, especially on Hydroidea and branched Bryozoa; it may be of varying thickness and consequently somewhat varying in form; most frequently it forms larger or smaller covers, or it becomes cushion-shaped or lumpy. It seems, however, also to be

[1]) As all spicules are of the same size, or, at all events, of about the same size in small and large specimens of one species, it is to be supposed that very soon after the sponge having fixed itself, chelæ are formed of the size normal to the species.

able partly to assume a free, branched form, as stated by Levinsen l. c. The specimen of Levinsen, however, has incrusted a Hydroid, and presumably its form is partly owing to this fact; but the specimen has also free branches, in which nothing of the Hydroid seems to be found, as also the primary fibres of the branches may be found running longitudinally, while, if the question was of a cover, they would have to be supposed to run from the middle, from the body incrusted, perpendicularly on the surface. The largest specimen in hand has a greatest extent of ca. 75^{mm}. The colour (in spirit) is light yellowish. The consistency is rather loose and soft. The *dermal membrane* is thin and transparent without spicules; it is supported by the skeleton below and pierced by the ends of the fibres, consequently the *surface* is finely shaggy. On account of the apertures of the incurrent canals shining through, the surface gets the netlike appearance, as is found, for instance, in most *Reniera*-species. The *pores* are very close-set in the dermal membrane, so that it is reduced to a network; they are round and of an average size of 0·05—0·1^{mm}. *Oscula* are scattered on the surface; they have generally a diameter of from a little more than one to 3^{mm}; they are situated on the top of more or less marked, but always low, flatly conical projections.

The *skeleton* is of a renierid structure. It consists of fibres running from the base towards the surface where they pierce the dermal membrane. These fibres are polyspicular, and they have generally, as stated by Bowerbank and Levinsen, about three spicules in breadth; sometimes also a little more. The transverse fibres are almost always only represented by single spicules, they form no coherent fibres, and they are situated very irregularly. The distance between the primary fibres is on an average ca. 0·15^{mm}. In the deeper layers of the sponge the skeleton is irregular, and here no distinction can be made between primary and secondary fibres. Spongin is found in the skeleton, especially distinctly in the nodes, but it is white and exceedingly clear, and therefore not easily observed.

Spicula: a. *Megasclera* are somewhat curved styli; most frequently the curve is even, only rarely it is a little sharp; it is generally found in the middle, sometimes nearer to the head-end; the opposite end is evenly and rather long tapering. They are somewhat varying in length, partly in one individual, and partly in different individuals; upon the whole the length of the styli in the specimens in hand is between 0·16 and 0·25^{mm}. Also the thickness is varying, and is between ca. 0·0057—0·0114^{mm} [1]. Such is the thickness of the spicules that seem to be fullgrown, but developmental forms of every thickness down to quite fine ones are also found; they are only very little shorter than the fullgrown ones. b. *Microsclera:* these are only found of one kind viz. isochelæ palmatæ; they are a little curved, but the middle part of the shaft, between the alæ of the two ends, is straight or sometimes slightly curved inwardly; this middle part is about one third of the length. The tooth is of about the same length as the alæ, and its breadth is like that of the alæ taken together. On the sides the tooth and the alæ bend towards each other, but when the chela is viewed from the side these recurvings, on account of their fineness, are almost not to be distinguished. The length of the chelæ is 0·020—0·021^{mm}, and their breadth is ca. 0·0057^{mm}. Of the chelæ developmental forms are found; the youngest one observed appears as a thin staff with rather long recurvings in both ends, without

[1] In some specimens the needles have an average length of 0·23—0·25^{mm} with an average thickness of 0·01^{mm}; in others the length is on an average 0·17—0·20^{mm} with a thickness of 0·007^{mm}.

or almost without any beginning of the alæ or of the plate of the tooth. The developmental forms have the same length or about the same length as the fullgrown ones. The chelæ are found throughout the sponge, and in no small number in the dermal membrane.

Locality: The Faroe Islands, 9 miles to the east of the Nolsö revolving light, depth ca. 30 fathoms; 6 miles north and to west of Kalsö, depth 60 fathoms (Th. Mortensen); the Westmann Islands (Sæmundsen). Six specimens or fragments in all.

Geogr. distr. The species is hitherto known to the south as far as the Channel, Guernsey (Bowerbank), Luc and Le Portel (Topsent); farther north it has been taken off Bohuslän (Fristedt), and in the Cattegat on depths from $6^1/_2$ to 10 fathoms (Levinsen).

3. **E. sp.** (?Alderi Bow.)

Pl. VIII, Fig. 3 a—e.

We have a quite small specimen of an *Esperiopsis*-species sitting on a worm-tube, which specimen has a skeletal structure similar to that of the preceding species. The primary fibres have a few more spicules alongside each other, and they also pierce the dermal membrane, so that the surface is shaggy; but the spicules are different. *Megasclera* are styli, most frequently rather strongly curved and with an evenly tapering, rather long point. Their length is between 0·38 and 0·41^{mm}, and the thickness is about 0·01^{mm}. *Microsclera* are isochelæ palmatæ of a similar structure as in the preceding species, but they are straight or almost straight; besides they are a little larger, their length being 0·025—0·028^{mm} and the breadth ca. 0·07^{mm}. Also of these chelæ developmental forms were found of the same appearance as in the preceding species.

The chelæ of this species show a peculiarity, which, however, is not found in all of them, and which may be more or less marked where it is found. It consists in the fact that the recurved final part of the axis, which must be supposed to run along the middle of the tooth, some way down the tooth bends off from it inward, and, when the chela is viewed from the side, appears as a projecting point or knob on the inside of it; when the chela is viewed from the front it appears through the tooth as a little tubercle close to the edge. As mentioned, the feature, hovewer, is far from being a constant one, in some of the chelæ it is not found, and it may also be found singly in other species. — Lambe (Proceed. and Transact. of the Roy. Soc. Canada, X, 1893, Sec. IV, p. 68 seq.) has described four *Esperiopsis*-species, which, to judge from the figures (no mention is made of it in the text), have chelæ, in which the mentioned structure is strongly marked. As is well known, the same structure is again found in the chelæ of the genus *Homœodictya*, and this genus or subgenus has been established just on this structure. The *Esperiopsis*-species showing this structure of the chelæ, to be sure, are closely allied, but as the character does not seem to be a constant one, it can here scarcely be used as a generic mark.

Locality: St. 127, 66° 33' Lat. N., 20° 05' Long. W.; depth 44 fathoms.

Geogr. distr. *E. Alderi* Bow. is from Northumberland.

Note. The *Esperiopsis*-species placed by Bowerbank under the genus *Isodictya*, appear to be closely allied, and there is a great probability that Bowerbank has established too many species, but it will not be possible, without a close examination of the type specimens, to unravel the species;

Vosmaer refers *E. Alderi* as a synonym to *Normani*, and also Topsent has made considerable reductions, and has for instance referred *Alderi* to *fucorum*, but for the present nothing can be said of the correctness of these identifications. When I have thought that the present species might possibly be *Alderi*, the only reason has been the size of the spicules; the peculiarity of the structure of the chelæ would scarcely have been observed by Bowerbank.

4. **E. pedicellata** n. sp.

Pl. I, Fig. 2. Pl. VIII, Fig. 4 a—c.

Erect, stalked, somewhat club-shaped; the upper part lobate or winged. The surface slightly shaggy; the dermal membrane thin. The skeleton an irregular network of polyspicular longitudinal fibres and irregularly scattered spicules. Spicula: Megasclera styli 0·35—0·94^{mm}; microsclera of one form, isochelæ palmatæ 0·013—0·015^{mm}.

The contour of this species, of which we have only one specimen, is most nearly club-shaped; below it passes into a stalk attached to a shell of *Astarte crenata* Gray. The form is otherwise irregular, the upper part being provided with irregular, broad and deep furrows running longitudinally, between which are found lobes that may be so compressed as to form wings. The length of the somewhat damaged specimen is 65^{mm}, and the greatest breadth is 25^{mm}. The consistency is rather firm, almost fleshy. The colour (in spirit) is something between gray and brown, approaching to olive colour. The *surface* of the sponge, in the state of preservation in which we have it, is provided with projecting spicules, but by far the greatest part of the dermal membrane is wanting; to judge from the places where it is preserved, the sponge in its undamaged state is slightly shaggy. The *dermal membrane* is exceedingly thin and transparent. When it is torn off and examined it shows some irregularly scattered spicules, which thus seem to belong to the dermal membrane itself; otherwise it seems to be resting on the irregular skeleton below, and some spicules project through it. Neither *pores* nor *oscula* are seen, I suppose, on account of the membrane only being preserved in so few places.

The *skeleton* consists of a rather irregular network; especially longitudinal fibres are found, the greater part of which are polyspicular and may be of varying thickness; they contain, however, always few spicules, and are not especially strongly marked In their longitudinal course some of them bend off towards the surface, which they meet at a very acute angle, and which, as far as I have been able to see, they pierce. Between the longitudinal fibres scattered spicules without any regular position are found, and transverse fibres are not formed. While in the upper part of the sponge the longitudinal fibres have a rather irregular course, in the stalk they run perpendicularly; they are here thicker and consist of more spicules, and some of the scattered spicules are placed transversally. Some spongin is found in the skeleton, especially discernible in the nodes, and it seems also sometimes to continue over the fibres; it is white and clear, and consequently only little conspicuous. In the stalk the spongin is more copious, and may be seen quite to wrap the polyspicular fibres.

Spicula: a. *Megasclera* are rather large styli, more or less curved, sometimes almost straight; the place of the curve may be somewhat varying, and it is sometimes a little irregular. The styli are slightly fusiform, tapering somewhat towards the rounded end. The other end is evenly and long tapering. The size of the styli is rather varying, the length thus from 0·36 to 0·94[mm], and the thickness in proportion from 0·012 to 0·024[mm]; the smaller ones are the least frequent. Developmental forms occur in small numbers down to quite fine ones, as the fullgrown needles they are of varying length. b. *Microsclera;* these are only of one kind, isochelae palmatae; they are of the common structure, the shaft is slightly curved, but with a straight middle part, and this free middle part is about one third of the length of the chela. The tooth is somewhat narrower than the alae taken together. When the chela is viewed from the side the recurved lateral edges of the tooth and the alae are only to be seen with difficulty, and only under very high magnifying powers. These chelae are very small, their length is 0·014—0·015[mm], and the breadth is 0·003[mm]; sometimes they are a little twisted. They are found copiously throughout the sponge and also in the dermal membrane.

This species is closely allied to the *E. columnata* established by Topsent in 1892 (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 90, Pl. V, fig. 5, Pl. X, fig. 5); it is of a similar form, and also the skeletal structure may be taken to be the same. Further they agree with regard to the size of the spicules and in the fact that the styli are comparatively large, while the chelae are very small, as also in that of the styli being of the same form. Topsent states the measures of the styli to be 0·75[mm] with a thickness of 0·016[mm], and the length of the chelae to 0·016[mm]. On the other hand there is a difference in the structure of the chelae they being in *E. columnata*, to judge from the figure, considerably broader, as well when seen from the front as in profile. A measuring of the figure of Topsent gives as the greatest breadth, when seen from the front, 0·009[mm].

Locality: Only one specimen from the Davis Strait, station 27, 64° 54′ Lat. N., 55° 10′ Long. W., depth 393 fathoms.

5. **E. forcipula** n. sp.

Pl. I, Fig. 5. Pl. VIII, Fig. 5 a—i.

(Formed as a thick leaf?) The surface smooth, the dermal membrane provided with spicules, on the pore side forming a network, but otherwise placed irregularly. Oscula scattered. The skeleton consists of polyspicular fibres branching up through the sponge, between them an irregular network. Spicula: Megasclera styli 0·54—0·68[mm]; microsclera of four forms, isochelae palmatae 0·011—0·018[mm], isochelae arcuatae 0·038—0·05[mm]; sigmata 0·03—0·085[mm]; forcipes 0·017[mm].

Of this species we have only a couple of fragments, the largest of which has an extent in breadth of 40[mm] and a height of ca. 30[mm]; the fragments would indicate that they have belonged to a sponge that has been erect and formed as a thick leaf, perhaps about as *E. villosa*, and in this case the fragments among other things show the upper part of the sponge. The colour (in spirit) is whitish yellow. The consistency is rather firm. The *surface* is somewhat wrinkled and folded, but otherwise smooth. The *dermal membrane* is thin, and on one side of the sponge where no pores are found, it is provided with spicules rather close-set, irregularly scattered, but parallel to the surface. On the other side of the sponge where numerous pores are found, the needles, on the other hand, are arranged as an irregular, polyspicular network round the pores. *Oscula* are simple, oval, or somewhat irregular openings of varying size in the dermal membrane. The spicules of the dermal membrane surround the oscular aperture, being arranged in a ring-like way round it, but at some distance from the opening itself, which is thus surrounded by a narrower or broader brim (probably changing according to the degree in which oscula are shut) of the membrane without styli. On the other hand, microsclera, especially the smaller form of chelæ, are found here in large numbers. *Pores* are only found on one side of the sponge where the spicules are arranged in a net-like way; they are round or oval, and have been measured to a size of 0·03—0·238^{mm}. As the pores are thus only found on one side it is possible that oscula are only found on the other, and this, perhaps, is again dependent on the form of the sponge; the fact cannot, however, be decided from the fragments in hand.

The *skeleton* consists of polyspicular fibres branching up through the sponge from the lower part and here and there anastomosing; in the upper part of the sponge they run as more or less parallel fibres. Here they all bend towards one side of the sponge, and run perpendicularly towards the surface. The consequence of this course of the fibres is that they are more or less parallel to the other side of the sponge. The side towards which the fibres bend, is the poreless one; they are here connected with the close-lying spicules of the dermal membrane, and support the membrane, but do not pierce it. The dermal membrane on the other side, which, as mentioned, is provided with pores, and the spicules of which form a reticulation, rests on the fibres running below it. The fibres are polyspicular, and consist of rather many spicules beside each other; they are of an average thickness of 0·09—0·12^{mm}. Between the fibres a quite irregular network is found, partly of fibres with few spicules, but chiefly of single spicules. In the lower parts of the sponge the longitudinal fibres are more close-standing than farther up. The spicules of the fibres are connected by a clear, not copious mass of spongin apparently, however, wrapping the whole fibre; it is especially distinct in the nodes.

Spicula: a. *Megasclera* are styli; they are slightly curved in various ways, and sometimes somewhat irregularly; they may also be almost straight. They taper evenly, but most frequently not much towards the point, and the point itself is therefore most frequently more or less suddenly pointed and may be longer or shorter, down to quite short; it is frequently more or less distinctly marked off, and the marked off point may also be longer or shorter. The needles are often a little thinner below the rounded end than at the end itself, but they cannot, however, be designated as subtylostyli. The length is between 0·54 and 0·68^{mm}, and the thickness is 0·010—0·014^{mm}; the thickest ones are generally not the longest. Finer, down to quite fine developmental forms are found, but only in small numbers; they are only a little shorter than the fullgrown ones, the finest ones have a length of 0·47^{mm}. The developmental forms are all long tapering. b. *Microsclera:* of these are found two forms of isochelæ, smaller isochelæ palmatæ and larger isochelæ arcuatæ, further sigmata and forcipes. 1. The small palmate isochelæ may be somewhat varying in form, the middle part of the shaft between the end parts being straight, or more or less curved; this part is a little more than one third of the length of the chela. When the middle part is curved the whole shaft forms an even curve; when it is straight, the end parts, from which the lateral alæ go off, form obtuse angles with the middle part; the tooth being directed somewhat forward the angle between the tooth and the shaft becomes rather large. The tooth is of about the same length as the alæ, but it is considerably narrower than these taken together, and is ovate; the lateral edges of the alæ are refolded through the whole length, so that the folded part is seen, when the chela is seen from the front. These chelæ are very small, their length is between 0·011—0·018^{mm}, and their greatest breadth is 0·007^{mm}. 2. The arcuate isochelæ have a rather slightly curved shaft, the lateral alæ of which are pointed and tooth-like, and of the same length as, or a little shorter than, the tooth; the tooth may be narrower or broader, but, when viewed just from the front, it is lanceolate and more or less pointed. Tuberculum is oval, most frequently pointed, or lengthily triangular; when the chela is seen a little from the side, the tooth and tuberculum appear more pointed. The length of the chela is somewhat varying, from 0·038mm to 0·05mm; the thickness of the shaft is ca. 0·004mm. Most frequently these chelæ are a little twisted, so that the two teeth are not quite in one plane. Of this chela I have seen a few developmental forms, but only rather grown ones with half-developed tooth and alæ. 3. S i g m a t a; these are more or less contort; they reach to a rather considerable size, but are very varying in this respect, the length being between 0·03mm and 0·085mm, and the thickness proportionally 0·002—0·006mm. These sigmata show an interesting fact well worth to be noticed. Towards the bendings the shaft generally shows a slight expansion (as seen in Pl.VIII, fig. 5 g); this is not owing to the shaft here being thicker, but to the fact that it is somewhat compressed. When a sigma is seen under the microscope, the hook that on account of the twisting is turned towards the beholder (in the figure the upper one), appears also narrower than the other, and the compression may also be seen on broken sigmata where a transverse section is seen; the transverse section seems to be somewhat triangular with the narrowest edge turned inward. Of these sigmata developmental forms of different thickness are not rarely found; the finer they are, the less developed are the recurved ends; in the very finest ones, of a thickness of scarcely 0·001mm, the recurved ends are not yet formed. The mentioned structure of the end parts of the shaft may already be traced in the developmental forms. 4. F o r c i p e s; these are of the common, more or less hairpin-like, form with a round curve above and two more or less parallel legs; the legs are most frequently slightly diverging, but may also be quite parallel, or slightly converging, the latter, however, being perhaps only apparently the fact and owing to a twisting. They are thorny, which is, however, on account of their smallness, only very little conspicuous; the legs end in a quite small knob-like swelling. When the forcipes are seen under sufficiently great magnifying powers the thorns are seen to be found especially on the inner side of the legs; they are comparatively long, and directed a little upward; also on the upper side of the curve some smaller thorns are found, and there seems likewise most frequently or always to be found a small thorn on the inner side of each knob. A slight granulation may also in most cases be seen on the other parts of the forceps. Sometimes the legs are not of equal length. These forcipes are exceedingly small and may easily be overlooked. Their length is 0·017mm, the thickness at the curve, where it is greatest, is ca. 0·001mm; quite few, somewhat larger forcipes were seen. The microsclera are found as well throughout the tissue as in the dermal membrane; in the tissue sigmata are of most frequent occurrence, while in the dermal membrane the two forms of chelæ seem to be found most frequently.

Locality: The Davis Strait, depth 80—100 fathoms (Th. Holm), a couple of fragments.

Remarks: This species has a quite interesting spiculation, and it is the first *Esperiopsis*-species, in which forcipes have been found. Therefore there might be some doubt with regard to its being referred to this genus, and there might be a possibility of referring it to *Forcepia* Cart. As, however, the species has no special dermal spicules, and thus wants a character very significant to the *Myxillinæ*, and as forcipes also occur outside of the genus *Forcepia*, and the occurrence of these bodies therefore scarcely alone is sufficient for the establishing of a genus, I think it most natural to refer the present species to the genus *Esperiopsis*. Topsent (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 1892, 100, Pl. VI, fig. 5, Pl. X, fig. 9) has established a species *Forcepia versatilis* wanting dermal spicules; but in embryos found in the sponge small diactinal spicules were found which Topsent takes to represent the dermal spicules, but they are not further developed, so that the species later on has none of them. This species, however, is no *Forcepia*, but an *Asbestopluma*, as will be more particularly mentioned under this genus.

6. E. flagellum n. sp.

Pl. IX, Fig. 1 a—h.

Incrusting: the surface slightly uneven from projecting bundles of spicules; the dermal membran thin without spicules. The skeleton irregular consisting of polyspicular fibres and bundles of spicules. No spongin. Spicula: Megasclera styli 0·39—0·44^{mm}*; microsclera of four forms, isochelæ palmatæ of two forms, large ones 0·043—0·083*^{mm}*, small ones 0·018—0·021*^{mm}*; common sigmata 0·095—0·25*^{mm}*; flagellate sigmata 0·03—0·13.*

This species grows as a quite thin incrustation on a dead branch of *Amphelia oculata* otherwise very much overgrown by Bryozoa. On the branch are further found an *Iophon*, a *Mycale placoides*, and a *Hamacantha Bowerbankii*. With regard to the outer form of the species can only be said that it is a quite thin crust; its contour is irregular, following the form of the substratum, and the limits are otherwise most frequently only seen with much difficulty. Its greatest extent may be given to about 40^{mm}, the thickness is only one or two millimetres. The colour (in spirit) is yellowish or slightly reddish yellow. The consistency is loose. The *surface* has small and scattered projections owing to projecting bundles of spicules, but by examination with a magnifying-glass they are only very little conspicuous. The *dermal membrane* is thin, without any particular skeleton only provided with microsclera. *Oscula* and *pores* have not been found.

The *skeleton* consists chiefly of short fibres or bundles of spicules rising from the base up through the sponge. Sometimes they meet upwards pyramidally, and give rise to the unevennesses of the skin. They may also be longer and run almost parallel to the surface finally bending into it; these longer fibres may also be branching. Here and there scattered bundles of spicules and a few scattered spicules are seen. The fibres are polyspicular, and the average thickness may be given to 0·05^{mm}. Spongin has not been observed and seems not to be found.

Spicula: a. *Megasclera* are slender, straight styli, generally with a very slightly swollen head end, and thus approaching subtylostyli; they are of about equal thickness in their whole length, and the point is short and bounded by rather straight lines. The length is rather constant, varying from 0·39—0·44^{mm}, the thickness is 0·006—0·007^{mm}. Developmental forms of the styli occur singly, down to quite fine ones that are long tapering. b. *Microsclera;* of these four forms are found, two forms of isochelæ palmatæ, larger and smaller ones, common sigmata, and flagellate sigmata. 1. The large isochelæ are straight, the alæ stretch so far down the shaft, that the free middle part is less than one third of the length, the lateral edges diverge towards the middle of the chela, and are rather much refolded; the tooth is a little narrower than the alæ taken together, but of the same or about the same length, and it increases also in breadth towards the end; it is likewise hollow inward. Tuberculum is longish. When the chela is seen obliquely from behind, the axis may be seen to continue as a thickening down the middle of the tooth and stop a little before the end; this point may often, when the chela is seen from the front, appear as a small tuberculum. The size of this chela varies rather much, the length from 0·043–0·083^{mm}, and the breadth proportionally from 0·015–0·024^{mm}. 2. The small isochelæ have a slightly curved shaft, the free middle part of the shaft is less than one third of the length. The tooth is a little narrower than the alæ taken together and of about the same length; the alæ are much refolded. The length of these chelæ is between 0·018^{mm} and 0·021^{mm}, and the breadth is ca. 0·004^{mm}. 3. Sigmata of the common form; these are curved in the common way, and the ends are highly, almost rectangularly recurved. They are larger than is commonly the case, but vary much in size; the length is between 0·095 and 0·25^{mm}, and their thickness is 0·005–0·01^{mm}. Of these sigmata a few developmental forms were found; they are fine and want the recurved ends, they were found of lengths up to the greatest length of the sigma. 4. Flagellate sigmata; these are long sigmata curved in such a way as to get two parallel arms, the ends are pointed and recurved in a hooklike manner almost in a right angle, the recurved parts sometimes reach each other. They are exceedingly varying as to size, the longer axis from 0·03–0·13^{mm}, and the shorter axis from 0·024–0·083^{mm}, the thickness in the middle is 0·0018–0·005^{mm}; otherwise the greatest thickness is not here, but at the ends just before the recurving. These sigmata are plane. Of this form I have seen a single developmental form; it was of the same form as the fullgrown ones, but without the recurved ends. All the forms of microsclera occur both in the dermal membrane and in the other tissue of the sponge; the common sigmata are found in greater numbers than the flagellate ones, and are upon the whole the forms of the microsclera most frequently found.

This interesting species is very closely allied to the *E. decora* described by Topsent (Résultats des Camp. scient. du Prince de Monaco, Fasc. XXV, 212, Pl. XVII, fig. 8); this latter species forms also a quite thin incrustation, and the skeletal structure seems to be the same. Also the spiculation is much the same, as well with regard to the megascleres as to the microscleres, and also in the occurrence of the flagellate sigma, which is formed in quite the same way in both species. But with regard to the spiculation, besides some difference in the size of the spicules, the differences are found, that the chelæ in *decora* seem to be of three forms, and that trichodragmata are found in this species. This latter fact especially forms a distinct character, whereas the two largest forms of chelæ in *decora* are all but equal.

Remarks: The occurrence in this species of the form of sigmata that I have called flagellate sigmata, is very interesting and surprising; this form has hitherto only been known in the two *Gellius*-species *flagellifer* and *porosus*, and in the *Porcella clavisepta* from the Azores established by Topsent in 1896 (Bull. de la Soc. de France, XXI, 117, fig. a–d), which the author in 1904 in the work quoted above (223, Pl. XVI, fig. 5, Pl. XVIII, fig. 7) refers to *Hamacantha*. The sigma occurring in the present species is of a quite similar form as those of the mentioned two *Gellius*-species, the only difference being that in the latter one arm is generally longer than the other, while in the present species both arms are of equal length, in which feature this sigma quite agrees with those of as well *E. decora* as *H. clavisaepta*. It is also of some importance that the developmental form of this sigma has been found here, as it has not been known before.

Locality: Ingolf, station 55, 63° 33' Lat. N., 15° 02' Long. W., depth 316 fathoms. Only one specimen.

7. **E. typichela** n. sp.

Pl. I, Fig. 3. Pl. IX, Fig. 2 a—c, Figs. 3—4.

Incrusting, the surface with very small, close-set, conical projections, and with scattered long, flagelliform appendices; the dermal membrane thin, without spicules. The skeleton consists of polyspicular fibres, chiefly running from the base to the surface. Spongin wanting. Spicula: Megasclera styli 0·33—0·45^{mm}; microsclera, isochelæ palmatæ of two forms, larger ones 0·064—0·075^{mm}, smaller ones 0·021—0·025^{mm}.

The specimen in hand of this species grows incrusting on a *Hornera lichenoides*, but it grows over more branches, so that it forms a continuous plate, and it grows quite round the *Hornera* so as to show a surface on both sides. The greatest extent of the sponge is 30^{mm}, and the thickness from surface to surface reaches at most 5^{mm}. The consistency is soft. The colour (in spirit) is gray. The *surface* is to the naked eye smooth, but under a magnifying glass it is seen to be covered with close-set, conical projections owing to the ends of the fibres. Further it shows the peculiarity that long, fine, flagelliform appendices formed by a spicula-fibre project scattered round on the sponge. In the present state of the sponge these free fibres are lying along the surface and appear to the naked eye as sinuous threads. The *dermal membrane* is exceedingly thin; it contains no skeleton, and rests on the mentioned projecting ends of the fibres. *Pores* are found in the dermal membrane in the areas between the projecting ends of the fibres; they are generally so close-set, that the membrane becomes a network. They are round to oval, and their size was measured to 0·059—0·14^{mm}. *Oscula* were not found.

The *skeleton*. It is a difficult task to examine the structure of the skeleton continuously on account of the soft consistency of the sponge. It consists chiefly of polyspicular fibres running from the base to the surface where they project and form the conical projections mentioned above. The average thickness of the fibres is ca. 0·03^{mm}. No transverse fibres are formed between these fibres, but fibres or bundles of spicules are found, especially down towards the base, placed horizontally or irregularly. The mentioned fibres that run from the base to the surface, are only short on account of the small thickness of the sponge; but frequently they are not placed perpendicularly, but more or less obliquely, and often they are very decumbent, and so become considerably longer. The projections caused by the fibres, therefore, are not perpendicular to the surface, but more or less oblique. Now a few of the projecting fibres are prolonged and form the mentioned long, fine appendices scattered on the surface of the sponge. These appendices, which thus seem simply to be prolonged fibres, are at the base a little thicker than the other projections having here a thickness of ca. 0·16^{mm}, but they taper towards the point. They may reach a length of up to 10^{mm}. They consist of a fibre surrounded by a thin layer of tissue. At the base of the fibre there are many spicules alongside, but towards the point they grow fewer, and at the very end they are quite few, in quite undamaged appendices perhaps only a single one. In the covering layer of tissue an abundance of microsclera is found; along the fibre, at least to the middle of it, the large chela is arranged in beautiful rosettes, and between these rosettes the little chela is found in dense crowdings (Pl. IX, fig. 1), but forming no rosettes. The sponge is throughout highly intervowen with sand and small silicious particles.

Spicula: a. *Megasclera* are very slender, straight styli; they taper evenly, but not much, towards the pointed end, the point itself is rather short. The length varies from 0·33—0·15^{mm}, and the thickness from 0·004—0·0057^{mm}. Finer developmental forms are found, but only singly. b. *Microsclera* are two forms of isochelæ palmatæ. 1. The large chelæ are of a very regular and beautiful form. The shaft is straight, the free middle part a little curved inward. The alæ reach so far down the shaft, that the free middle part is only about one fourth of the length, and their sides are somewhat refolded. The tooth is of the same length as the alæ and only a little narrower. Its edge is curved a little inward. Tuberculum is longish, broadest below. When the tooth is seen from the inside the axis may be seen some way down it. Not rarely a slight twisting of the chela is observed. The length is 0·064—0·075^{mm}, and the breadth is 0·021^{mm}. A few developmental forms of this chela were seen. 2. The small chela has a quite slightly curved shaft, the end parts are so long, that the free middle part of the shaft is quite short. The lateral edges of the alæ form a far more curved line than in the large chela, and their lower edge is straight. The sides of the alæ are somewhat refolded. The tooth is of the same breadth as the alæ, and the tuberculum is a little longish. The alæ and the tooth form a very small angle with each other. The length is 0·021—0·025^{mm}, quite singly specimens were seen of a length of 0·035^{mm}. The breadth is 0·008^{mm}. The occurrence of the chelæ is quite singular; to be sure they are to be found throughout the tissue, but especially at the surface. The large chela occurs as rosettes which seem to be attached to the fibres, especially at the dermal membrane, but not in this membrane itself. It is seen arranged in rosettes in the layer of tissue on the projecting ends of the fibres. Also the small chelæ are especially seen at the surface; they do not form rosettes but occur in groups or dense crowdings. Both kinds of chelæ occur also, as before mentioned, in the flagelliform appendices. The occurrence of the large chela in typical rosettes is rather interesting, as this fact is otherwise not known in the isochelæ, but has only been observed in anisochelæ. Carter mentions rosettes of chelæ in *Mycale titubans*, and thinks here to have found isochelæ in rosettes; as will be mentioned hereafter, under the species in question, its chelæ, however, are anisochelæ.

This species shows itself to be related to the preceding one; the megasclera are of the same form, and also the large chela is of the same structure. Also the skeletal structure seems to be the same as well with regard to the arrangement as to the fact that spongin is wanting. On the other hand the small chela is of a different structure, and no kind of sigmata is found

Locality: Forsblads fjord, East Greenland, depth 50—90 fathoms (the Amdrup-Expedition 1900). Only one specimen.

Mycale Gray.

The habitus may pass through the whole series of forms from thinner or thicker incrustation through massive forms to erect, often lobate, or finally branched or more or less irregularly lump- or cup-shaped *forms that will then be more or less symmetrical. The skeleton consists of polyspicular fibres: in the erect forms it is well developed, often dendritically branched, in the massive and incrusting forms it may be of renierid or more irregular structure, or it may in the incrusting ones consist of slightly branched fibres running from the base to the surface without transverse fibres. Spongin is most frequently found, in varying, frequently only slight amount. Spicula: Megasclera monactinal, styli or subtylostyli; microsclera: the characteristic microsclera are anisochelæ palmatæ of one or more than one form, the largest ones often in rosettes; to these may be added sigmata, trichodragmata, toxa, and, rarely, small isochelæ palmatæ.*

The genus *Mycale*, like *Esperiopsis*, passes through a series of forms from thin incrustations to erect, rather symmetrical forms. The development of the skeleton is connected with this fact. The lowest skeletal structure I take to be the one occurring in some thin, incrusting forms, and consisting of fibres running from the base to the surface and sometimes slightly branching, as has been described and figured by Vosmaer and Pekelharing with regard to *M. aegagropila* (Verhandl. d. Koninkl. Akad. v. Wetensch. te Amsterdam, 1898, 2, VI, No. 3, Pl. I, fig. 3—4). The fibres are here quite free without connecting transverse fibres or transverse spicules. This structure quite without transverse fibres is, perhaps, owing to the fact that these sponges are quite thin crusts. When we get to thicker or massive species, transverse fibres or transverse spicules are found, and the skeleton gets a renierid or more irregular structure which in the erect forms may pass to a dendritic structure.

The typical *Mycale*-anisochela, as it is found for instance in *lingua* and *placoides*, is a very characteristic one distinguished by reaching a rather considerable size. It may vary very much in size without showing distinctly marked, different sizes, but it may also occur in several well-marked sizes or forms; the largest ones very often occur in rosettes, which is not known to be the case with regard to the smaller ones. Small isochelæ may occur, but rarely, for instance in *M. parishii* Bow., where they occur together with anisochelæ, sigmata, and trichodragmata, and in *M. plumosa* Cart., where, according to Carter, they occur together with anisochelæ, sigmata, and toxa. Also sigmata may be found of more than one size, for instance in *M. macrosigma* Lindgren. — The microsclera mentioned in the diagnosis may occur in different combinations. In some species only anisochelæ are found, either of one or more than one form, further chelæ and sigmata, chelæ, sigmata, and trichodragmata, which latter combination is very frequent, then chelæ, sigmata, and toxa, or chelæ and trichodragmata; finally, as mentioned, small isochelæ may in a few instances be added to the combination.

1. **M. placoides** Cart.

Pl. IX, Fig. 5 a—l.

1876. *Esperia placoides* Carter, Ann. Mag. Nat. Hist. Ser. 4, XVIII, 316, Pl. XIII, fig. 12, Pl. XV, fig. 32.
1880. Vosmaer, Notes from the Leyden Museum. II, 147, 32.
1892. *Esperella placoides* Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 89, Pl. I, fig. 15.

Erect, somewhat club-shaped, sometimes compressed or more irregular. The dermal membrane thin, without spicules, pierced by projecting spicules, and the surface consequently finely shaggy; it is provided with sinuous or branched pore-furrows. Oscula in the upper part of the sponge on the top of *small oscular cones. The skeleton consists of polyspicular fibres branching up through the sponge. The spicules piercing the dermal membrane are smaller than the other spicules of the skeleton. Sp. da Megasclera styli or subtylostyli, sometimes with the upper end formed like a handle; the styli of the skeleton 0·447—0·715mm, those of the dermal membrane 0·3—0·5mm; microsclera of three forms, anisochelæ palmatæ 0·025—0·092mm, the large ones frequently in rosettes; sigmata 0·017—0·027mm; rhaphides in trichodragmata 0·043—0·085mm.*

Mycale placoides has been rather carefully described by Carter in the place quoted, and he has rendered an account of most of the characteristic structural features. On account of the great resemblance between this species and the following one, it will, however, be of importance that a full description is given of both of them. The form of the sponge seems to be somewhat varying, but is always erect; the hitherto known specimens, mentioned and figured by Carter and Topsent, are erect and more or less cylindrical or club-shaped, being somewhat narrowed below. All the specimens before me are more or less damaged, but with regard to the form it may, however, be decided from them that the sponge, besides the mentioned form of which I have some specimens, may also be more or less compressed, or be drawn out into some broad and irregular lobes reaching through the whole length. The specimens mentioned by Carter and Topsent had a height of 6·5—9cm. Most of the specimens before me are considerably larger, the club-shaped specimens thus up to a height of 17cm. The largest specimen consists of some fragments which were stated by the collector, Dr. Mortensen, to have belonged to one specimen. Its form has been somewhat compressed, presumably as a thick leaf. It has been a very large specimen; but the lower part wanting, and, I suppose, to a rather great extent, the height cannot be given, but the breadth above has been ca. 30cm, and the thickness 5—6cm. The consistency is soft and not elastic, and therefore the sponge, in spite of the thick fibres, is rather fragile. The mentioned largest specimen is stated to have been very slimy, when it was taken up in the trawl. The colour (in spirit) is generally whitish yellow. The *surface*, as is well known, has a characteristic appearance being completely furrowed by a large number of sinuous or branching furrows that may be arranged in very different ways. The parts between the furrows are finely shaggy from projecting spicules, while the furrows are smooth. The *dermal membrane* is thin without any particular skeleton; it is supported by the ends of the fibres, the spicules of which are spread in a penicillate way, and project a little through it, and it is stretched over the furrows of the surface. *Pores* and *oscula*. As has been very well described by Carter, the mentioned furrows in the surface are pore areas. They may shew a very different arrangement, being sinuous and branched in many different ways. They may be placed rather near to, or more far from, each other, and consequently the parts between them may be larger or smaller plates, or may be reduced to projecting knobs or rather long keels. Then the furrows may be quite narrow, almost quite closed, or broad and flat; this latter feature is probably mostly caused by the greater or lesser contraction of the skin in the place in question. The pores are found in the membrane that is stretched in the furrow, most frequently very close-set, so that the membrane resembles a sieve. Of the strings of tissue separating the pores, some are generally thicker principal strings, between which the pores are placed more or less arranged in series. These strings, which may be distinctly seen by means of a magnifying glass, pass in the more narrow areas more or less transversely from one side of the furrow to the other. The size of the pores is generally 0·035—0·1^{mm}. The thin pore membrane is not directly supported by the skeleton, and only microsclera are found in it, especially chelæ, partly in beautiful rosettes, partly scattered, but also sigmata and rhaphides, singly and as trichodragmata. As mentioned by Ridley and Dendy under *Esperella murrayi* (l. c. 67), a fine longitudinal striation is also found here in the strings of tissue between the pores, which, as supposed by the mentioned authors, is perhaps owing to muscle-like fibres. Frequently no pores are seen in the membrane of the furrows, but then it is to be supposed that they are closed. Oscula are found in the upper end of the sponge, and sometimes some way down the sides; they are formed like small cones, of a height of only a few millimetres. The oscular aperture is found at their point, and has a diameter of 1—2^{mm}. The wall of the oscular cone has a dense spiculation of needles placed parallel to the longitudinal axis of the cone; these needles are of the same form as those supporting the dermal membrane, that is to say of the smaller form. On the upper part of the sponge, where oscula are especially found, the pore furrows are wanting or are only found to a slight degree.

The *skeleton* is of the dendritic type; from the base fibres issue which anastomose and branch, most frequently more or less irregularly, up through the sponge. The real, single fibres are generally not particularly thick, at most about 0·47^{mm}; but especially in the lower part of the sponge several fibres are often united into strings apparently forming a single fibre, and reaching to a considerable thickness, but under the microscope they are seen to be formed of several close-set fibres. Towards the surface the fibres branch copiously, and run as parallel fibres of a thickness of about 0·06^{mm} and with a distance of 0·25—0·30^{mm} towards the dermal membrane; here the spicules spread in a penicillate way and pierce the membrane. Where the pore furrows are found, the fibres pass off to the sides, so that the membrane in the furrow is not supported or pierced by spicules. No transverse fibres are found, but between the fibres and their finer branchings spicules and bundles of spicules are scattered irregularly and more or less densely. In the outer part of the skeleton, at the surface, it becomes more regular by the fact that the ends of the fibres here run parallelly with fixed intervals; some transversely placed spicules are here found interwoven between the fibres. These transverse spicules, as well here as deeper in the sponge, are generally of a form differing somewhat from that of the spicules forming the fibres; they belong to the shorter and thicker forms, and are always a little curved. The spicules in the outer end of the fibres, which are spread in a penicillate way, consist of styli of a definite kind, smaller than the other styli of the skeleton, as has already been observed by Carter. Spongin is found in the fibres uniting the spicules; but nevertheless the fibres are loose and little capable of resistance; with regard to this fact, however, there is some difference between different individuals.

Spicula: a. *Megasclera* are styli or slightly marked subtylostyli. They are of two forms, as the spicules that support the dermal membrane spread in a penicillate way, as mentioned, are smaller and of a form somewhat different from that of the skeletal spicules. These spicules supporting the dermal membrane may, for the sake of shortness, be called dermal spicules, although they cannot be said to form any particular dermal skeleton. The skeletal styli are straight, or have a larger or smaller curve nearest to the upper end; this end is rounded and sometimes slightly swollen. The upper end of the styli are not rarely formed as stated by Bowerbank with regard to *M. c. tr. ti* and *M. lingua*; in this case a kind of handle is found on the spicule, the upper end being narrowed for a shorter or longer way and then passing rather abruptly into the thicker part. This structure of the spicule may be more or less marked, and is frequently almost imperceptible, and it is very often quite wanting. The feature may, moreover, be different in different individuals, so that it is found more frequently and more marked in one individual than in another. The needle is thickest in the middle, and the tapering end runs into a point rather much varying in length as well in one individual as in different individuals. The length of the styli varies from 0·447–0·715^{mm} and the thickness from 0·010–0·016^{mm}; these are the limits within which I have found the needle varying in the species, but there may be some difference in different individuals, and in one individual the needles do not generally show so great a variation. The limits most frequently found may be given as to length 0·5–0·65^{mm}, as to thickness 0·011–0·015^{mm}. As before mentioned, the transverse spicules occurring outside of the fibres are oftenest a little shorter and thicker than those forming the fibres, and they are curved. Finer developmental forms are only seen in small numbers. The dermal spicules are straight; they are of a particular form, their thickest part being found nearest to the pointed end, while they are evenly tapering towards the rounded end, which is often very slightly expanded. Sometimes at the rounded end they may be of the same handle-like form, as is mentioned in the skeletal spicules. While their size and the length of their point, and by these features to some degree also their form, is rather constant in one individual, they vary not a little in different individuals. It is, however, chiefly only the length of the point which is varying, but this fact again influences the form and the length of the whole spicule. In some individuals the point is quite short or even rounded, and then the thicker part of the spicule is found close to the point; in others the point is even and of a middle length, and in others again very long, up to quite exceedingly long and thin; in the latter the thicker part of the spicule is then found about in the middle. That it is really only the point that is of varying length, is also seen by the fact that the longer the point, the longer is the spicule. The length varies altogether in the different individuals from 0·3–0·5^{mm}; in the separate individuals it is, for instance, 0·3–0·38^{mm}, 0·35–0·42^{mm}, 0·42–0·5^{mm}, and these lengths are quite corresponding to the smaller or greater length of the point. The thickness, which is also a little varying, as well in the species as in the separate individual, is 0·007–0·01^{mm}. b. *Microsclera* are anisochelæ palmatæ, sigmata, and rhaphides in trichodragmata. 1. The anisochelæ are of the common *Mycale*-type; the shaft is slightly curved, the alæ of the larger end are broad and diverge towards the middle of the chela, and their sides are much refolded. The tooth is rather narrow, and most frequently somewhat rounded at the end; the tuberculum is long and narrow, and there is a rather broad falx. The alæ of the smaller end are broad, and diverge only a little towards the middle of the chela, and their sides are much refolded; the tooth is rather broad, and the end is straightly cut off, the tuberculum is small and elliptic. Both alæ and tooth here being broad they leave only a narrow slit between them. While the alæ and the tooth of the larger end converge towards the end of the chela, this is only to a slight degree the case with those of the smaller end, and consequently this end gets a peculiar, straightly cut off appearance. Both the alæ and the tooth in the smaller end of the chela are curved about in a circular line, so that a transverse section through the chela would here be almost a circle. These chelæ vary very much in size. Their greatest length is 0·092^{mm}, but there may be a little difference in different individuals, so that in some they reach at most 0·086^{mm}. The thickness of the shaft is ca. 0·005—0·007^{mm}, and the greatest breadth is ca. 0·030—0·035^{mm}. This largest form of the chelæ may vary a little in form in different individuals, especially the upper end may be a little shorter or longer. From the greatest length the chelæ may now vary down to so small a size as 0·025^{mm}; at the same time the dimensions of the several parts of the chela are also altered, the ends, especially the larger one, becoming longer in proportion to the free middle part of the shaft. While thus in the large chelæ the larger end, the free middle part, and the smaller end are in a mutual proportion about as 2 : 2 : 1, these parts are in the smallest chelæ about as 2 : 1 : 1. In the series of variations of the chelæ the forms which would follow nearest to the largest ones, are of very rare occurrence, so that the chelæ would almost seem to fall in two groups, the larger ones only little varying in size, and the smaller ones very varying in size. That such is the fact would also be implied by another thing, viz. that only the large chelæ occur in rosettes, while the small ones are never seen arranged in that manner. This recalls to some degree the feature in several *Desmacella*-species, in which only the larger of the two occurring forms of sigmata are developed in bundles, while the smaller form is never arranged in that way. Developmental forms of the chelæ are also found, but most frequently only in very small numbers; only in a few individuals they were a little more numerous. As the chelæ they are found in all lengths. The youngest developmental form I have seen, is an exceedingly fine staff recurved in both ends, a little more in one end than in the other. During their growth as well the shaft as the recurved parts grow thicker while in the curves the axis remain thin; the alæ and the plate of the tooth is by and by developed, by which fact the parts of the axis situated in them disappears or is effaced, while the free middle part of the axis gets its final thickness. The part of the axis situated in the curve itself, on the other hand, is not thickened, but keeps its original thickness, and from this part inward is developed the thin plate, the socalled falx, connecting tooth and shaft. The falx is already developed at an early stage. The chelæ are found both throughout the sponge and in the dermal membrane, as well singly as in rosettes; as above mentioned only the large ones are found in rosettes; these rosettes are seen especially often in the pore membrane covering the furrows. The large chelæ are also found singly. 2. S i g m a t a; these are of the common form, and are almost always more or less contort. Their length, which may be somewhat dependent on the degree of contortion, is between 0·017—0·027^{mm}; the thickness is between ca. 0·0008—0·0014^{mm}. 3. R h a p h i d e s; these are sometimes seen singly, but most frequently in bundles, t r i c h o d r a g m a t a; the length of the individual rhaphides varies from 0·043—0·085^{mm}; such is the variation in the species, but in the single individuals it is not so great, for instance 0·047—0·067^{mm} and 0·064—0·085^{mm}. In individuals with the shortest styli also the shortest rhaphides are found. The thickness is about 0·001^{mm}. The thickness of the bundles is 0·013—0·018^{mm}. Sigmata and rhaphides occur both in the dermal membrane and throughout the sponge, especially rhaphides in dragmata are of frequent occurrence in all parts of the tissue.

Locality: Station 1, 62° 30′ Lat. N., 8° 21′ Long. W., depth 132 fathoms; station 7, 63° 13′ Lat. N., 15° 41′ Long. W., depth 600 fathoms; station 55, 63° 33′ Lat. N., 15° 02′ Long. W., depth 316 fathoms. Further it has been taken on 65° 39′ Lat. N., 28° 25′ Long. W., depth 553 fathoms (the East-Greenland Expedition 1891—92); 64° 15′ Lat. N., 11° 15′ Long. W., depth 192 fathoms (Wandel); the bay of Skagestrand in Iceland (Wandel); at the north end of Nolsö, depth ca. 100 fathoms (Th. Mortensen); 62° 30' Lat. N., 1° 56' Long. E., depth 275 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902); altogether ca. nine more or less damaged specimens. The localities are situated in the Denmark Strait, off the northern coast of Iceland, between Iceland and the Faröe Islands, off the east coast of the Faröe Islands, and to the north east of the Shetland Islands.

Geogr. distr. Besides on the localities mentioned above the species has been taken about 50 miles to the north north west of the Shetland Islands, depth 345 fathoms (the "Porcupine", Carter); further it has been taken farther south, off New Foundland, depth 673 fathoms (Topsent).

2. **M. lingua** Bow.

Pl. IX, Fig. 6 a–f.

1866. *Hymeniacidon lingua* Bowerbank, Mon. of Brit. Sponges, II, 187, 24.
1866. *Desmacidon constrictus* Bowerbank, ibid., II, 350, 4.
1874. *Raphiodesma lingua* Bowerbank, ibid., III, 119, Pl. XLVII, fig. 8, 237, Pl. LXXVII, figs. 1–6.
1874. *Desmacidon constrictus* Bowerbank, ibid., III, 181, Pl. LXXI, figs. 3–10.
1880. *Esperia lingua* Vosmaer, Notes from the Leyden Museum, II, 146, 24.
1886. *Esperella Vosmaeri* Levinsen, Dijmphna-Togtets zool.-bot. Udbytte, 20, 15, Tab. XXX, Fig. 11–14.
1887. *Esperia lingua* Fristedt, Vega-Exp. vetensk. Iakttag. IV, 449.
1892. *Esperella lingua* Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc II, 88.
1896. — Lambe, Transact. of the Roy. Soc. of Canada, ser. 2, II, sect. IV, 186, Pl. I, figs. 6, 6 a–f.
1904. *Esperella lingua* Topsent, l. c., Fasc. XXV, 200.

Erect and somewhat tongue-shaped, or more irregular. The dermal membrane thin, supported by projecting spicules, the surface consequently finely shaggy; it is provided with sinuous or branched pore-furrows. Oscula in the upper half of the sponge, on the top of small oscular cones. The skeleton consists of polyspicular fibres branching up through the sponge. The spicules piercing the dermal membrane of the same size as the other spicules of the skeleton. Spicula: Megasclera style or slightly marked subtylostyli, sometimes with the upper end formed like a handle, 0·53–1·15mm; microsclera of three forms, arcuate palmatæ 0·028–0·092mm, the larger ones often in rosettes; sigmata 0·021–0·032mm; raphides in trichodragmata 0·042–0·078mm.

This species presents many points of resemblance with the preceding one. It is erect, and those of the specimens in hand that are tolerably well preserved, are of a longish, somewhat compressed form, and may, in correspondence with the name, very well be designated as tongue-shaped. The largest specimen, which is much lengthened, is of a length of 23cm, but of a breadth of only 5·5cm, and the thickness is scarcely 3cm. Another specimen is of a height of 10cm, and the smallest specimen, which is more roundish, but also compressed, is of a height of a little more than 2cm. The consistency is rather soft, and the sponge is easily torn. The colour (in spirit) is most frequently whitish yellow or gray. The *surface* resembles that of the preceding species, and furrows of the same kind arranged in different ways are found. These furrows are also here smooth, while the other parts are a little more shaggy than in the preceding species. The *dermal membrane* is thin and has no particular skeleton, but is supported by the ends of the fibres projecting through it, and by the transverse spicules connecting the fibres. *Pores* and *oscula*. As mentioned above we find in this sponge as in the preceding one furrows in the surface that may present a very varying arrangement. These furrows are also here pore areas, the dermal membrane being stretched over them and provided with pores quite as in the preceding species. The pores are placed very close, and most frequently more or less arranged in transverse series separated by thicker principal strings. Also here a fine, muscle-like longitudinal striation is found in the strings of the tissue between the pores, which striation was seen still more distinctly than in the preceding species. The pores are round or oval, and in the examined pore area they had an average diameter of about 0·015—0·02^{mm}. The pore furrows in the specimens in hand are smaller and are present in smaller numbers than in the preceding species; in one of the specimens they are all quite closed, and then they appear as quite narrow keels arranged in a somewhat netlike manner. Pores seem also to be found outside the pore furrows; but it is difficult to decide this fact by material which is not fresh or especially well preserved. Ridley and Dendy state it to be found in *E. murrayi*. Oscula are small, more or less steep cones of a height of 2—3^{mm}. The oscular aperture is found in the end of these cones. The wall of the cones is provided with a very dense spiculation of spicules parallel to the longitudinal axis of the cone, and their ends project round the aperture. In the larger specimens oscula are found in rather large numbers and are restricted to the upper half of the sponge.

The *skeleton* is of a dendritic type, and is constructed as in the preceding species. It consists of fibres branching from the base up through the sponge and anastomosing. Also here the single fibres are closely united into thicker ones that are apparently single ones, and these thicker fibres are often not cylindrical. The single fibres have been measured to a thickness of at most 0·65^{mm}. Towards the surface the skeleton sends forth finer branches running parallelly, and supporting and piercing the dermal membrane; between these fibres some transverse spicules are found. The ends of the fibres which appear as bundles of spicules, are in this species formed of spicules of the same kind as the other spicules of the fibres, so that no specially formed dermal spicules are found. The transverse spicules found between the fibres that are parallel and run towards the surface, are also in this species of a form somewhat different from the form of those forming the fibres, being shorter, thicker, and curved. A slight amount of spongin unites the spicules of the fibres, but is only little conspicuous.

Spicula: The spiculation of this species is upon the whole like that of the preceding one. a. *Megasclera* are styli, or may have a slight tendency towards subtylostyli. Most of them are straight, but some are slightly curved; they are fusiform, tapering towards both ends, which holds good especially with regard to the shorter and thicker ones. The upper end is rounded and sometimes quite slightly swollen; the handle-like form of this end mentioned under the preceding species, is also sometimes found in the present one, and also here developed to very different degrees. The other end of the needles runs into a point, which may, especially in different individuals, be very varying in length, from being quite rounded to a long, fine point. The length of the needles is rather varying, as well in one individual as in different individuals. As mentioned the transverse spicules between the fibres running towards the surface are shorter and thicker than the other spicules, a distinct limit, however, cannot be drawn; these spicules do not vary much in length in the different individuals, and the smallest length of the needles, therefore, is rather constant. The greatest length of the needles, on the other hand, varies much in different individuals, and this length is dependent on the length of the point, so that the longer and finer the point is, the longer is the needle. The boundaries of the length of the styli upon the whole in the species are 0·53–1·15^{mm}, but when given for separate individuals, the length of the point being also taken into consideration, we get for instance 0·56–0·89^{mm} the point more or less rounded; 0·60–0·95^{mm} the point short; 0·65–1^{mm} the point rather long; 0·65–1·15^{mm} the point very long. The thickness of the needles is somewhat varying, and the longest ones are far from being the thickest ones, the mentioned transverse spicules being both the shortest and the thickest; the thickness is between ca. 0·013^{mm} and 0·02^{mm}. Some difference may be found in different individuals, especially with regard to the greatest thickness, which sometimes does not exceed 0·018^{mm}. Finer developmental forms are seen, but only singly. b. *Microsclera:* these are anisochelæ palmatæ, sigmata, and rhaphides in trichodragmata. 1. The anisochelæ are of the common *Mycale*-type and constructed in almost quite the same way as the chelæ of the preceding species, the only difference being that the tooth of the upper end is broader. The greatest length of the chelæ is 0·092^{mm}, but there may be some difference in different individuals. The thickness of the shaft is ca. 0·008^{mm}, and the greatest breadth is 0·028–0·04^{mm}. From the greatest length the chelæ vary in size down to 0·028^{mm}, and at the same time the proportionate dimensions of the different parts are altered in a similar way as in the preceding species. The chelæ are not rarely a little twisted. Also in the present species a break is found between the large chelæ and the largest of the smaller ones, and also here only the large chelæ are found in rosettes. A few developmental forms were found quite corresponding to those in *placoides.* 2. Sigmata of the common form, often somewhat irregular and more or less contort; their length, which is much dependent on the curve, is between 0·021 and 0·032^{mm}, and the thickness varies from 0·0010–0·0015^{mm}. 3. Trichodragmata; the single rhaphides are of a length of 0·042–0·078^{mm}, most frequently about midway between the two sizes; the thickness is 0·0008–0·0014^{mm}. The rhaphides are almost only seen in trichodragmata, of a thickness of 0·011–0·014^{mm}. The microsclera are numerous throughout the sponge, sigmata are of especially frequent occurrence in the dermal membrane. The large chelæ occur in many places, in rosettes in enormous numbers.

Remarks: In the above mentioned largest specimen taken at Upernivik, there are found here and there in the sponge, but in very small numbers, some peculiar spicules that may be designated as tylostrongyla, and whose form may be seen in the annexed figure (fig. 1), which represents three of these spicules and the end of a fourth, and shows different forms of the end-swelling. One end is rounded, while the other is swollen to a more or less pyriform expansion. These spicules always occur in a particular way being only found in the projecting bundles of spicules, always only one or a few spicules in the same bundle, and only here and there, so that many of the projecting bundles may be examined without any being found. In the bundle they are always placed with the swollen end outward, so that it is seen between the points of the other projecting spicules. It is easily seen that these spicules, with the exception of the swelling, are in all other respects of quite the same form as the normal spicules of the species; the not-swollen end is rounded or quite slightly dilated, in other words it has quite the same form as in the normal spicules, and consequently it is the point of the spicule that is transformed. Also its position agrees with this view, it having, like the other projecting spicules, the head-end turned inward. This spicule, which occurs here so scattered and in small numbers, must be regarded as an abnormal form, and in the bundles transitional forms are also found with slightly swollen or only rounded outer end. That the spicule should be of extraneous origin is quite out of the question, as well on account of its form, as its always occurring in the same way. — It would seem that projecting dermal spicules upon the whole are somewhat liable to be influenced with regard to the form, especially of the outer end, of which among others *Mycale placoides* furnishes an instance by its dermal spicules that vary so characteristically in different individuals.

Fig. 1. × 165.

The occurrence of this spicule, however, is not without interest, as it is of a quite similar form and occurrence as the dermal spicules in *Rhaphidotheca Marshall-Hallii* Saville-Kent (Ann. Mag. Nat. Hist. 4. Ser. VI, 219, Pl. XV, figs. 1—7) from the coast of Spain, and *Rhaphidotheca affinis* Carter (Journ. of the Roy. Micr. Soc. II, 497, Pl. XVII, figs. 1 and 3) from a locality between Scotland and the Faröe Islands, which latter species is probably identical with the former[1]. This species has the common *Mycale*-spiculation quite as in *lingua*, but in all, or almost all, the spicules of the projecting bundles the outer end is swollen in a pear-shaped manner. (Saville-Kent says expressly that a few pointed spicules are found in the bundles.) In this species the feature has thus no doubt become normal for all or almost all projecting spicules. The opinions advanced by Carter (Ann. Mag. Nat. Hist. 5, I, 170, Journ. of the Roy. Micr. Soc. l. c., and Ann. Mag. Nat. Hist. 5, IX, 299) that these spicules should be foreign and embodied by the sponge, and that their form should have been altered by the sponge after the embodiment, with reference to which latter fact he, in the place last quoted, even says: ..... has been shown to be adventitious or appropriated, having first belonged to another sponge», are devoid of all foundation, and it is a peculiar thing that Carter has not been able to see, from their form and way of occurrence, that they belonged to the sponge. The whole question debated in the places quoted, whether needles may occur turning the pointed end inward in the sponge and projecting with the head-end, is likewise of no consequence, as it is a fact that the mentioned spicules turn their head-end inward in the sponge.

[1] Vosmaer (Notes from the Leyden Museum, II, 141, 8) refers, with a query, *Rhaphidotheca Marshall-Hallii*, as a synonym to *Esperella nodosa* O. S. In the description of Schmidt, however, there is no base at all for this referring.

— Saville Kent's species, however, is not the only one with such spicules, and the transformation of the ends of the projecting needles seems in some instances to go still farther. Topsent (Bull. de la Soc. de Fr. XXI, 1896, 149, fig. 2 a—f) has thus established a new genus, *Gomphostegia*[1]) with the species *loricata* that is also a Mycaline with the typical *Mycale*-spiculation, but with projecting spicules the outer ends of which are widened to a slightly crenelated disc and thus form a mail. In these needles, which Topsent calls Exotyles , the head-end, which is turned inward in the sponge, is formed in quite the same way as in the other styli in the sponge. Thus there seems to be a gradual development in the formation of the ends of the projecting dermal spicules from forms where it only occurs as an abnormal fact, through such where it has become a normal feature, to forms in which it has been developed to an exceedingly high degree.

Locality: Station 3, 63° 35′ Lat. N., 70° 24′ Long. W., depth 272 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; further it has been taken at Upernivik (the Reverend Mr. Sorensen); 72° 53′ Lat. N., 20° 36′ Long. W., depth 96 fathoms (the East-Greenland Expedition 1891—92); 63° 15′ Lat. N., 9° 35′ Long. W., depth 270 fathoms (Wandel); 62° 30′ Lat. N., 1° 56′ Long. E., depth 275 fathoms (Ad. Jensen, the cruise of the Michael Sars , 1902). Altogether six specimens, most of which damaged. The localities are situated in the Davis Strait, off East-Greenland, between Iceland and the Faröe Islands, and to the north east of the Shetland Islands.

Geogr. distr. The species has further been taken off the southern Greenland, 61° 15′ Lat. N., 49° 11′ Long. W., depth 70 fathoms, and 59° 33′ Lat. N., 43° 25′ Long. W., depth 120 fathoms (Fristedt); the northern coast of Scotland and the Shetland Islands (Bowerbank); the Kara Sea, depth 65 fathoms (Levinsen); the eastern coast of Canada, depths 75 and 80 fathoms (Lambe); off the north-west coast of Spain, depths 71, 133, and 160 fathoms, off New Foundland, depths 673 and 82 fathoms, and at the Azores, depths 69 and 185 fathoms (Topsent). Thus the species is in the mentioned seas distributed about from 73° to 40° Lat. N., with a bathymetrical distribution from 65—691 fathoms.

Remarks on the species Mycale placoides and lingua. These two species are exceedingly closely related to each other. The external form, the pore furrows, the structure of the skeleton, and, partly, the spiculation show great conformity. Among the distinguishing characters the most important one is the presence of particular dermal spicules (the spicules that are spread in a penicillate way and carry the dermal membrane) in *placoides*, while in *lingua* these spicules are of the same form and size as the other spicules of the skeleton. It is especially this character that is of value as a sure distinctive mark between the two species. Further the tooth in the larger end of the chela is broader in *lingua* than in *placoides*, as is seen from Pl. XI, fig. 5 e compared with fig. 6 e. Then the styli are upon the whole longer and thicker in *lingua* than in *placoides*, and finally the sigmata are also most frequently larger in *lingua* than in *placoides*.

If I have determined the two species as *placoides* and *lingua*, I must remark that Carter

[1]) In the work by Topsent from 1904 (p. 202, Pl. XIV, fig. 15) quoted in the list of synonyms he has acknowledged that *Gomphostegia* is synonymous with *Rhaphidotheca*.

expressly says of *placoides* that the spicules projecting through the dermal membrane are smaller than the others, while his other description agrees very well with the specimens before me. I have then determined the other species as *lingua*, but from the description of Bowerbank it is not to be seen with certainty, whether he has possibly had *placoides* or perhaps both species before him. Topsent, l. c. 1892, enumerates both *lingua* and *placoides*, but gives no description, so that it cannot be seen, which characters he takes to be the distinguishing ones. The peculiar handle-like formation of the upper end of the styli cannot be used, as this formation, as is seen from the preceding descriptions, is found in both species, and may occur very varying with regard to its frequency and degree of marking. Therefore I also follow Topsent in regarding Bowerbank's *lingua* and *constricta* as one species. When Topsent in the place quoted mentions that he has seen specimens of *lingua* with pore furrows, and others without such and with a uniform, slightly shaggy surface, I must suppose that in the latter the pore furrows have been closed, the slight keels then found being often only very little conspicuous.

I have omitted to quote *Esperia constricta* Vosmaer (Niederl. Arch. für Zool. Suppl. Band I, 1881—82, 45), and *Esperia lingua* Vosmaer (Bejdr. tot de Dierk. 12te Afl. 3die Gedeelte, 1885, 30), as it is impossible to decide, which of the two species mentioned here the author has had before him. The figures in the former place, Pl. III, fig. 99, and in the latter place, Pl. V, fig. 73, might both look like dermal spicules of *M. placoides*, but nothing can be decided with certainty. Neither have I quoted *Esperia constricta* Marenzeller (Die oesterreich. Polarst. Jan Mayen, III, 10), the author's good and rather copious account of the variation of the spicules would seem to indicate that he has had both species before him. Thus with regard to the geographical distribution we can, from these facts, only infer that one or the other, or both species occur in the Barent Sea between 72° and 75° Lat. N., and between 15° and 36° Long. E., on depths between 128 and 175 fathoms, as well as at Jan Mayen on depths from ca. 48—200 fathoms. The *E. Vosmaeri* established by Levinsen l. c. I have, by an examination of the type specimen, found to be identical with *M. lingua;* Levinsen does not mention rhaphides, which, however, are present. The *E. murrayi* established by Ridley and Dendy Challeng. Report, XX, 67, Pl. XIII, figs. 11, 13, 14, 16, 17, 18; Pl. XIV, figs. 1, 1a) is by Topsent l. c. referred to *E. placoides*, and by Lambe l. c. to *E. lingua*. If the chela figured by Ridley and Dendy fig. 17 is correct with regard to the tooth of its smaller end, a specific identity with *placoides* or *lingua* is out of the question, neither does the description of the dermal skeleton or the length 0·053mm given for sigmata agree with any of the two species. The *E. lingua* var. *arctica* established by Fristedt (Vega Exp. vetensk. Iakttag. IV, 449, Pl. 25, figs. 20—24, Pl. 29, fig. 18) cannot be *E. lingua*, only on account of the measures given for the spicules, but must be another, independent species.

3. **M. ovulum** O. Schmidt.

Pl. I, Figs. 6—8, Pl. X, Fig. 1 a—e.

1870. *Chalinula ovulum* O. Schmidt, Grundzüge einer Spongienfauna des atlant. Gebiet, 38, Taf. V, Fig. 1[1]).
1873. — O. Schmidt, Jahresber. d. Comm. zur wissensch. Unters. deutsch. Meere in Kiel für 1871, 99.

[1]) In the explanation of the plate the name, presumably by a misprint, is *Chalinula ovum*.

1875. *Esperia lanugo* O. Schmidt, ibid. für 1872—73, 118.

1879. *Esperia stolonifera* Merejkowsky, Mém. de l'Acad. imp. des sc. de St. Petérsb., Sér. 7, XXVI, Nr. 7, 22, Pl. I, figs. 13, 14, Pl. III, figs. 4, 5, 12—19 and 23—29.

1891. *Chalinula ovulum* Grentzenberg, Spongienfauna der Ostsee, Inaug. Dissert., Kiel 1891, 27, Fig. 13, 14.

1891. *Esperella lanugo* Grentzenberg, ibid. 34, Fig. 22—26.

1893. *Esperella ovulum* Levinsen, Det vidensk. Udbytte af Kanonbaaden Hauch's Togter, 423, 20, Tab. I, Fig. 40—41.

1903. *Esperella lanugo* Arnesen, Bergens Mus. Aarb. 1903, Nr. 1, 10, Taf. I, Fig. 6.

1903. *Mycale lanugo* Thiele, Arch. für Naturgesch. 1903, 381, Taf. XXI, Fig. 11.

Egg-shaped, or the larger specimens lengthened or quite irregular. The dermal membrane thin pierced by the projecting spicula-bundles, and the surface therefore finely shaggy. In the regular, egg-shaped specimens one single osculum, in the irregular ones several scattered oscula. The skeleton a rather regular network of polyspicular, primary fibres and singly placed transverse spicules. Spicula: Megasclera rather short, curved styli 0·166—0·31^{mm}; microsclera of one form, anisochelæ palmatæ 0·020—0·045^{mm}, characteristic by their smaller end being comparatively large.

This species grows almost always on Algæ, on Hydroids, or on erect Bryozoa. The specimens in hand are thus growing on *Ptilota pectinata* and on *Odonthalia dentata*; of Hydroids it is found on *Diphasia abietina*, *Hydrallmania falcata*, *Grammaria abietina*, *Sertularella* sp., and *Halecium* sp., and of Bryozoa on *Micropora borealis*. The smaller specimens are formed as regular round or egg-shaped, oftenest flat cushions, and grow most frequently more or less unilaterally on the Alga or the Hydroid; when a little larger they generally grow round it, but often keep a rather regular, somewhat flattened egg-shaped form. In this condition, in which the sponge has a rather characteristic appearance, its longitudinal extent is from 4 to 12—15^{mm}. When it grows larger it loses the regular form; thus it frequently increases in length, and becomes longish incrustations on the branches of the Algæ and Hydroids; it may also grow more roundly and become large lumps spreading over several branches. This form, I suppose, is most frequently formed by a coalescing of more individuals; such a coalescing, at all events, is frequently seen and gives rise to irregular forms. The largest specimen in hand of this form is of a greatest extent of 55^{mm}. The colour (in spirit) is lightly or more darkly yellow. The consistency is swampy and slightly elastic. The *surface* is very finely shaggy from projecting bundles of spicules. The *dermal membrane* is thin, has no skeleton of its own, but is supported by the projecting bundles of spicules. The *pores* are found in the membrane, often close-set and in large numbers; most frequently their form is oval, and they have been measured to sizes from 0·012—0·15^{mm}. *Oscula*. In specimens of the regular, egg-shaped form only one osculum is found situated on one side; it is circular and of a diameter of 1—1·5^{mm}, its edge is most frequently slightly projecting. In the larger, irregular specimens several oscula are found; sometimes each of them is placed on a slight projection, and this, perhaps, is a mark of the original individuals that are coalesced into one specimen.

The *skeleton* is of a quite regular structure consisting of polyspicular fibres. From the inmost part of the sponge, that is to say from the part attached to the incrusted foreign body, which body, in the sponges that are growing round it, runs through the middle of the sponge, fibres pass towards the surface

Nearest to the foreign body the skeleton is least regular, but a little farther out regular fibres occur running parallel to each other, continuing to the surface, and piercing the dermal membrane. These fibres are polyspicular with rather many spicules alongside, most frequently six to eight; with regard to this fact, however, some difference may occur in different individuals, so that the fibres may contain both fewer and more spicules. The distance between the fibres is about $0{\cdot}12^{mm}$, and the average thickness of the fibres may be given as $0{\cdot}035^{mm}$. Coherent transverse fibres are not formed, but between the primary fibres transverse spicules are found, most frequently singly, and without any regularity. Sometimes a tendency towards a more regular net of meshes may appear towards the surface. In many of the individuals the primary fibres do not pass straight towards the surface, but show a tendency to turn upward towards the upturned end of the sponge, so that the fibres in the egg-shaped roundgrowing specimens may radiate to all sides, but at the same time turn upward, so that it may be seen, especially in a longitudinal section, which end of the sponge has been turned up, and which has been turned downwards. Spongin is found in the fibres, but only to a small amount, and it is exceedingly white and clear.

Spicula: a. *Megasclera* are styli; they are more or less, often rather much, curved, and the curve is almost always nearest to the upper end. The other end passes evenly into a point of middle length, the outer end of which is most frequently somewhat shorter pointed. The needles are thickest about the middle, also tapering somewhat towards the rounded end, and being thus a little fusiform. The length is between $0{\cdot}166^{mm}$ and $0{\cdot}31^{mm}$, but in many individuals the needles do not vary so much; thus individuals are found in which they reach no greater length than $0{\cdot}23^{mm}$. Also the thickness is somewhat varying, from $0{\cdot}006$—$0{\cdot}11^{mm}$, and also in this respect some difference is found in different individuals. The thickest spicules are not always the longest ones. Besides the fully developed forms developmental forms of every degree of thickness occur, and in some individuals these forms are found in large numbers scattered in the tissue outside of the skeleton formed by the fibres; they were found down to an exceeding fineness, less than $0{\cdot}001^{mm}$, and developmental forms of this thickness were measured to a length of $0{\cdot}15^{mm}$. The developmental forms, in contradistinction to the fully developed ones, are long pointed. The individuals copiously provided with developmental forms of the styli seemed upon the whole to be in a state of lively formation of spicules, developmental forms of the chelæ being also seen abundantly. b. *Microsclera* are only of one kind, anisochelæ palmatæ. They are characteristic by the smaller end being comparatively large, larger than is common in the *Mycale*-anisochelæ. Their shaft is straight, and they are otherwise of the common type; the alæ of both ends are highly folded round on the side; the tooth of the larger end is narrower than the alæ and rounded at the end; the tooth of the smaller end is of the same breadth as the alæ, and it is somewhat pointed, which seems to be owing to the fact that the axis continues quite to the point of the tooth; the alæ of this end pass to the shaft in such a way as to make their upper or free edge parallel to the upper edge of the tooth. In each end an oblong tuberculum is found. The chelæ vary not a little in size and also in form; thus they may be more broad or more narrow, and the comparative sizes of the ends may be somewhat different; in a few cases there is almost no difference between the two ends, so that the chelæ approaches an isochela in form; generally, however, they are not to be confounded with isochelæ, as it is most frequently only the teeth that are of equal or about equal size, while the alæ of one end continue to be smaller than those of the other, as shown in fig. 1 d, Pl. X. The smaller the chela, the smaller is the free middle part of the shaft in proportion to the ends, which are, accordingly, comparatively longer than in the larger chelæ. The length of the chelæ varies between 0·020—0·045^{mm}, the breadth between 0·007—0·015^{mm}, and the thickness of the shaft between 0·001—0·002^{mm}. In several of the individuals developmental forms are found abundantly, corresponding to all sizes of the chelæ; the youngest forms are so fine as to be observed only with difficulty, of a thickness of ca. 0·0005^{mm}. These fine forms consist only of the axis, which is already of full length. From these youngest forms and to the fully developed chela all transitional forms are found. Of the chelæ the small ones are present in by far the largest number, while the large ones are more scarce, and do not appear to be found in all individuals, some being found, in which the greatest observed length of the chela is ca. 0·028^{mm}. The chelæ are found throughout the sponge; the largest may occur in rosettes, but this fact has only been observed in very few cases; also Merejkowsky mentions rosettes.

Remarks: When Schmidt, in 1870, established this species he referred it to the genus *Chalinula*, overlooking the chelæ, and in 1875 he made the same mistake. Also Grentzenberg l. c. must have failed to see the chelæ, there being no reason to doubt that it has really been the present species he has had before him. Levinsen was the first who, in 1893, when examining the type specimen of Schmidt, which is found in our museum, discovered the chelæ, and referred the species to the proper genus. In 1875 Schmidt l. c. established a species *Mycale (Esperia) lanugo*; the description, as is generally the case, is exceedingly brief, and no figures are given. It is, however, said of the chelæ that they are distinguished by the smaller end being larger than is else the case in *Esperella*, and that in a few chelæ both ends are equal, and just this fact is a very characteristic mark of *M. ovulum*. The terms used of the exterior, correspond also very well, it being said that it is roundish "von weicher, flockiger Beschaffenheit", which latter character Schmidt has even expressed in the name. Now it is a fact that specimens of *ovulum* sometimes, especially when of a whitish colour, may have a peculiar, woolly appearance, about like a little lump of wadding. In 1891 Grentzenberg l. c. enumerates *E. lanugo*, and gives figures of it, and to judge both from the habitus figure and the rather bad figure of the chela, as well as from the whole description, there can be no doubt that the species is identical with *ovulum*[1]. This, again, corroborates the referring of Schmidt's *lanugo* to *ovulum*; for, as far as can be seen, Grentzenberg has of this species only had the material of Schmidt. Thus we find the peculiarity that as well Schmidt as Grentzenberg has, both of them and each in a work of his own, enumerated one species as two different ones, partly as *Chalinula ovulum*, partly as *Esperella lanugo*; this peculiarity, however, may so far be understood, as the reason is that in one case the chelæ have been overlooked.

Under *E. lanugo* Grentzenberg mentions that besides the common skeleton it possesses "ein aus Fasern gebildetes Gerüst, dass Schmidt nicht erwähnt". He describes further that in a transverse section is seen about in the middle of the sponge a circular fibre, inside of which run four or five radiate ones coalescing in the middle. He figures this structure in fig. 24. The author thinks these fibres to be spongin fibres, and he mentions some cells which are said to form those fibres in a

[1] I have later had the opportunity of examining a type specimen of *M. [illegible]*, which proved the species to be identical with *ovulum*.

peculiar way. Now it is not said whether spicules are found in these fibres, but they are figured without such. A spongin skeleton of a so peculiar kind, not seen to be in any way connected with the other skeleton, would be quite unique. By a look at fig. 24 it is obvious that the question cannot be of spongin fibres; through the middle of each of the radiate fibres runs a line which is said to mark the coalescing, but in reality shows that the figured things are evidently vegetable cells. As before mentioned the sponge frequently grows round Algæ, which is also the case with the figure of the exterior given by Grentzenberg, and then the Alga runs about through the middle of the sponge; the author also says that the peculiar circular fibre is found nearly in the middle of the sponge. To be sure there can be no doubt that by the cutting out of the transverse section of the sponge the incrusted Alga — it looks like a *Polysiphonia* — has been cut through, and it is this transverse section which has been interpreted as the peculiar circular fibre with the radiate fibres inside.

The *Esperia stolonifera* established by Merejkowsky l. c. is by Levinsen referred to *ovulum* as a synonym, and to judge from the description and figures they are surely identical. I have, however, in no case observed the net of thin off-shoots mentioned by Merejkowsky for some of his specimens.

Locality: Of this species we have a great number of specimens, all from Greenland, Iceland, and the Faröe Islands. Greenland, without any designation of locality (Schmidt's type specimen); Egedesminde (M. Porsild); the Ingolf, off Bredebugt, on station 87, depth 110 fathoms; Rostin in Bredebugt (H. Jónsson); Önundarfjord, depth 10 fathoms (the author); to the east of Bakkefjord, depth ca. 70 fathoms (Hallas); Skulavig in Seydisfjord, depths 6 fathoms and 30 fathoms; Berufjord, depth 10 fathoms (A. C. Johansen); the Faröe Islands (Müller); at the north point of Nolso, depth ca. 100 fathoms, 6 miles N. to W. of Kalsö, depth 60 fathoms, Sandsbugt (Th. Mortensen).

Geogr. distr. Besides on the above localities the species has been taken in the Cattegat between Samso and Sealand (Levinsen l. c.); in Great Belt, depth 24 fathoms, and in the Baltic at Kiel, depth 3–6 fathoms, Darserort, depth $15^1/_2$ fathoms, Stoller bank, depth 3—5 fathoms (Schmidt, 1873), further at Bergen and Espevær (Arnesen), finally in the White Sea (Merejkowsky).

Note. Three of the *Mycale*-species mentioned in the literature, are with rather great probability to be referred to the present species; I do not, however, venture to decide this question with certainty, or to make any change of names on that account. The first of these species is *M. (Isodictya) lobata* Bow. (Mon. Brit. Spong. II, 326, III, 148, Pl. LVIII, figs. 19—22); Bowerbank, to be sure, mentions "bihamates", which are not figured; but these needles might very well be developmental forms of the chelæ, and such a fact might also be implied by the observation that they are "exter-umbonates". The second species is *M. (Isodictya) Clarkei* Bow. (l. c. II, 330, III, 142, Pl. LVI, figs. 11—15); the figure of the exterior of this species, which grows on Hydroids, is quite similar to longish specimens of *M. ovulum*. Topsent, in his list (Rev. biol. du Nord de la Fr. VII, 15 and 20) has taken this species to be an *Esperiopsis*, and has referred it as a synonym to *E. fucorum* Johnst. Bowerbank, however, calls the chela "inequi-anchorate", and the figure also shows an anisochela, but, to be sure, an anisochela in which there is only little difference between the two ends, such as occur in *M. ovulum*. The third species is the *E. modesta* established by Lambe (Transact. of Roy. Soc. of Canada XII, 1894, Sect. 4, 118, Pl. III, figs. 1, 1 a—d; ibid. Ser. 2, II, 1896, Sect. 4, 188, figs. 7, 7 a—d) [1]; Lambe mentions two kinds of styli, rather thick ones with short point, and thinner ones with long evenly tapering point, but the latter I take to be developmental forms, these having always a longer point than the fully developed ones.

4. M. thaumatochela n. sp.

Pl. X, Fig. 2 a—g.

1897. *Esperella intermedia* Vanhöffen (non Schmidt), Grönland Exp. der Gesellsch. für Erdkunde zu Berlin, II, 1, 248.

Incrusting. The surface shaggy from projecting bundles of spicules; the dermal membrane thin. The skeleton a tolerably regular network of polyspicular fibres. Spicula: Megasclera styli 0·35—0·48mm; microsclera of two forms, anisochelæ palmatæ 0·047—0·06mm, anisochelæ of a very peculiar structure 0·012—0·017mm.

Of this sponge we have only one small specimen growing on a fragment of a shell of *Pecten islandicus*, and a small, inconsiderable, loose fragment. As to the exterior the sponge is very insignificant, and all the interest attaches to the spiculation. The specimen is formed as a very thin incrustation, and its greatest extent is 15mm; but it looks, however, as if the whole specimen is not found on the fragment of the shell. The thickness is at most 1mm. The colour (in spirit) is light grayish-brown The *surface* is shaggy from projecting bundles of spicules. There is a thin *dermal membrane*, without spicules as far as I am able to see. In the dermal membrane circular openings are found, of a diameter of 0·047—0·35mm of which I take the greater ones to be *oscula*, and the smaller ones *pores*.

The *skeleton* consists of polyspicular fibres; as far as I have been able to examine the material, it is formed of fibres running from the base to the surface and projecting through the dermal membrane, and of other fibres perpendicular upon the former ones; it seems to be rather regular. In the nodes a slight amount of spongin is seen.

Spicula: a. *Megasclera* are styli, evenly and most frequently slightly, sometimes a little irregularly curved. They have an even point of middle length, which is often somewhat shorter pointed at the outer end. The size of the styli is rather constant, the length is between 0·35 and 0·48mm, and the thickness is 0·007—0·0115mm. b. *Microsclera.* These are of two kinds, anisochelæ palmatæ, and some small, peculiarly shaped bodies which may also be characterized as anisochelæ. 1. The palmate anisochelæ are of a fine regular form and chiefly of the common type. The alæ of the larger end, which are much refolded on the side, diverge downward with their lateral edges, and then they curve somewhat upward with a round bend going in to the shaft; the tooth is somewhat narrower than the alæ, elliptical, but broadest below and rounded, sometimes with a small pointing. The tooth and alæ of the lower end are of about equal breadth; in the middle of the distal edge of the tooth is generally found a pointing owing to the axis continuing quite to the end, and on either side of the pointing is found a little notch, so that the tooth is tridentate. In each end there is a longish tuberculum. The size of these chelæ is rather constant; the length varies from 0·047—0·06mm being most frequently about

[1]) Lambe, in both places, writes sp. nov., and has no reference in the latter place, but as the descriptions are almost equal, I suppose it to be his opinion that the species is the same. Otherwise Schmidt has already in 1862 (Spong. adriat. Meer) established an *E. modesta*, so that the name of Lambe's species, at all events, must be changed.

$0{\cdot}057^{mm}$, the greatest breadth is $0{\cdot}020$—$0{\cdot}022^{mm}$, and the thickness of the shaft is $0{\cdot}002^{mm}$. These chelæ are frequently found in rosettes. Quite single chelæ of smaller size are found, down to $0{\cdot}03^{mm}$. 2. The other silicious body found in the sponge is of a peculiar shape, and on account of its smallness and intricate structure it is difficult to get a clear view of it. Its form may be reduced to the anisochelate type. Below it consists apparently of a jar- or slipper-like part and above of four alæ issuing from the upper end, which alæ on four sides extend down over the slipper-like part. The lower part looks somewhat differently, according as the body is seen from one or the other side, and by a preliminary examination only two of the four alæ are seen, one on either side. By a more thorough examination under sufficiently high magnifying powers it is seen that, when the chela is in a certain position, an axis runs along one side, below turning upward to about the middle of the chela; when the chela is placed in such a way as to turn the axis behind, i. e. away from the beholder, the form of the lower part is all but slipper-like; the exact form of this part is only to be seen with difficulty, but it appears to consist, as usual, of lateral alæ issuing from the axis, and of a broad tooth before. Both the alæ and the tooth are on the sides folded towards each other, the interstice between them I have not been able to see with certainty, but it is about as shown on Pl. X, fig. 2 c. On either side the axis of the chela is in its upper part provided with rather narrow alæ separating from the axis about in the middle, and continuing downwards as a single pointed elliptical tooth. Further a free, pointed elliptical ala is found on either side with the flat sides turned laterally, and in the front is found a tooth of the same form. These structures are placed at equal distances from each other, and form the four apparently uniform alæ, which pass from above downwards to about three fourths of the length of the chela. The two lateral alæ together with the alæ of the dorsal side may be regarded as corresponding to the alæ of the axis of a common chela. That the lateral alæ are not teeth may be seen from the fact that above they are provided with an unsymmetrical, translucent part, while in the tooth there is a symmetrical tuberculum; they are likewise above and behind connected with the ala of the dorsal side. The alæ as well as the tooth are best seen when turned to the side so as to be seen from the edge, whereas, when turned towards the beholder, they are only to be seen with much difficulty, on account of their fineness and transparency. A good view of the mutual position of the parts may be got, when the chela is seen from the end in such a way, that the lower end is turned directly towards the beholder, who will then see an optical transverse section as fig. 2 f, Pl. X, where the tooth, the two lateral alæ, and the axis are seen at right angles to each other, and in the middle the lower part in connection with the axis and its alæ. These chelæ are very small, their length varying from $0{\cdot}012$—$0{\cdot}017^{mm}$, and the breadth being $0{\cdot}007$—$0{\cdot}008^{mm}$. Both the large palmate chelæ and the small peculiar ones occur abundantly.

This species so peculiar and characteristic by its spiculation has by Vanhöffen l. c. been determined as *E. intermedia* O. S. As I have had preparations of the specimens of Vanhöffen, I have been able to decide with certainty thas it is the present species he speaks of. Vanhöffen has, strange to tell, made a mistake with regard to the megascleres, and calls them beiderseits zugespitzte , whereas the are distinct styli. Schmidt says of his *Esperia intermedia* that it has unspitzige Nadeln , which I take to be a misprint for umspitzige , and further his species is provided with two different sorts of chelæ, so that an identification with this species, is, for many reasons, excluded. Vanhöffen has further overlooked the peculiar small chelæ[1].

Locality: The whole specimen has been taken by the Ingolf-Expedition at Holstensborg at a depth of 30 fathoms, and the loose fragment has been taken off Cape Dalton, East-Greenland, depth 9—11 fathoms (the Amdrup-Expedition 1900).

Geogr. distr. Vanhöffen has the species from West-Greenland, Karajak-Fjord, and mentions that it occurs as incrustations on worm tubes and Bryozoa.

5. **M. titubans** O. Schmidt.

Pl. X, Fig. 3a—h.

1870. *Desmacidon titubans* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet 55, Taf. V Fig. 18 a—c.

1882. *Desmacidon titubans* Carter, Ann. Mag. Nat. Hist. Ser. 5, IX, 298, Pl. XII, fig. 24 a—h.

Form? The skeleton an irregular network consisting for the greater part of polyspicular fibres. Spongin wanting. Spicula: Megasclera styli of two forms, larger ones 0·50—0·9mm, smaller ones 0·32—0·40mm; microsclera of two forms, anisochelæ of a peculiar, very form 0·024—0·052mm; sigmata 0·05—0·14mm.

Of this species, so peculiar and characteristic by the form of its chelæ, we have only very little material, so that I can only to a slight degree supplement the description given by Schmidt l. c. as to the exterior and skeletal structure. With regard to the outer form Schmidt only says, "unförmlicher, unregelmässiger Körper". The fragments in hand are also of a quite irregular form: the largest one is irregularly bifurcate and somewhat flattened; its extent in length is 25cm, but it is probably only a quite ruined fragment. The colour (in spirit) is yellow to olive. I can say nothing of its surface, pores, or oscula.

The *skeleton* appears as a rather irregular network of mostly polyspicular fibres, and longitudinal fibres seem especially to be found, while the other network is quite irregular. Upon the whole the fibres are not strongly marked, and no spongin has been observed. Schmidt says that the small form of styli are found as irregular bundles placed obliquely to the fibres; as far as I have been able to see, however, the fact is not so. The small styli seem to me to occur near the surface and the dermal membrane, and perhaps partly to be lying horizontally in the skin, partly to project as penicillate bundles.

Spicula: a. *Megasclera:* these are styli occurring in two different forms, also of different size. The large styli are evenly curved, the curve being almost always found nearest to the head-end and more or less pronounced; the other end tapers to a middle-long, sometimes rather long point. Their length is 0·59—0·9mm, and the thickness is between 0·015mm and 0·010mm. Finer developmental forms are found, but in rather small numbers. The styli of the other form are smaller; they are straight or almost straight, only rarely slightly curved. The head-end is quite slightly swollen, most frequently,

[1] On the preparations of Vanhöffen determined as *Z*[illegible], which he has lent to me, a query is found after the name and on one of them is added, "ist nicht *intermedia*", so that Vanhöffen seems himself to have noticed the erroneous determination.

however, to a quite imperceptible degree. The tapering may be somewhat varying, but the point itself is always rather short. The length is 0·32—0·40^{mm}, and the thickness in the middle is 0·005—0·008^{mm}. As has been mentioned, these styli, as far as I have been able to decide, occur near the skin. b. *Microsclera* are of two forms, chelæ and sigmata. 1. The chelæ are of a quite peculiar structure, but must be characterized as anisochelæ palmatæ. They are of a wry form; the shaft is somewhat curved, and besides being bent from behind to before it is also bent a little to the side. The tooth of one end is larger than that of the other, and otherwise the teeth are differently constructed. To facilitate the understanding of the description I call the end with the smaller tooth the upper end. When the chela is placed on the back with the upper end turned upward, and the upper tooth directly towards the beholder, and in such a way, that the upper part of the axis is turned directly upward, then the lower part of the axis is bent a little to the left. The frontside of the upper tooth is then turned directly upward; it reaches to a little more than half the length of the chela, is of a somewhat wry form, and has only a plate-shaped extension to the right; at the upper end a small, triangular tuberculum is found, and there is a small falx. On the upper part of the shaft an ala is only found on the right side; this ala is of a similar form and size as the tooth. When the chela is seen in the mentioned position, tooth and alæ are accordingly about opposite to each other. In this position the tooth of the lower end is seen on the left side of the chela, and is seen from the edge, as the front of it is turned out towards the side; it reaches to about the middle of the upper tooth, being therefore most frequently somewhat larger than the latter. If now the chela is turned a fourth part of a turning to the right, so that the upper tooth is seen from the side, the lower tooth will be seen as a warped plate somewhat expanded towards the end, reaching up and bending in towards the shaft; at the base there is a roundish tuberculum. On the left side of the lower part of the shaft an ala is found reaching somewhat farther than the lower end of the ala of the right side, but it is rather narrow and bent forward, and is thus rather inconspicuous. Also on the right side of the lower part a small and short ala is found. When the chela is in the position first mentioned, it is seen, that it is especially the lower part of the shaft which is twisted in such a way, that the lower tooth is turned round on the side. In a few of the fragments in hand the chelæ are a little larger than in the others, and in these chelæ the plate-shaped end of the lower tooth is often marked off by an incision, and this part is finely dentate in the edge. As mentioned the chelæ vary somewhat in size, and seem especially to be varying in different individuals. The length is between 0·024^{mm} and 0·052^{mm}, when the chelæ are regarded collectively, but the variation is not so great in the single individual. In one specimen the length was 0·024—0·035^{mm}, in another 0·034—0·052^{mm}.

Schmidt has not quite understood the structure of these chelæ; especially his figures a and b are quite misleading; figure c, however, showing the chela from the front, is somewhat better. Carter l. c., on the other hand, has quite misunderstood them, and it might be doubted whether he has had the same species before him, if he did not mention that he has had a preparation of the type specimen of Schmidt. Carter figures and mentions the chela as an isochela, and he figures uniform alæ on both sides of the shaft and uniform teeth, the only deviation from the normal form thus being that the chela is somewhat twisted. This, as will have been seen, is a quite wrong representation, and when Carter thinks that this chela with regard to its structure recalls the diancistra in *Hamacantha*, and consequently will have these referred to the chelæ, his theory is of no importance. Carter mentions and figures rosettes; I have also seen such, but they were less distinct than elsewhere in *Mycale*-species. In the rosette the chelæ have the end with the larger tooth turned towards the middle of the rosette.

2. Sigmata. They are of a regular sigma-form; the ends are with a round curve bent round to about a right angle. They are plane or slightly contort; especially the smaller forms are contort, while the larger ones are most frequently quite plane. They are very much varying as to size, and may be rather large. The length varies from 0·05—0·14^{mm}, and the thickness proportionally from 0·0018—0·0057^{mm}. The measures given by Schmidt, are, no doubt, due to an error. As well chelæ as sigmata occur everywhere in very large numbers.

In spite of the peculiar chelæ of this species, I have placed it under the genus *Mycale*, because the chelæ must be referred to the type anisochelæ palmatæ, and its skeletal structure being hitherto only imperfectly known, I have thought it most convenient to keep it in this genus.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 97, 65° 28′ Lat. N., 27° 39′ Long. W., depth 450 fathoms. The former station is on the eastern slope of the Reykjanæs-ridge, the latter in the Denmark Strait. Altogether we have only four fragments.

Geogr. distr. Florida, depths 174—324 fathoms (Schmidt).

6. **M. intermedia** O. Schmidt.

1874. *Esperia intermedia* O. Schmidt, Die zweite deutsche Nordpolarfahrt, II, 2, 433, Taf. I, Fig. 40.
1903. *Mycale intermedia* Thiele, Arch. für Naturgesch. 1903, 381, Taf. 21, Fig. 12.

This species I have not had before me. It would not be possible to recognize it by Schmidt's description, but Thiele has l. c. given a new description of it. Of *spicules* it has the following forms: a. *Megasclera* oxea, ca. 0·45^{mm} long and 0·010—0·012^{mm} thick; b. *Microsclera* large anisochelæ palmatæ in rosettes, 0·05—0·06^{mm} long, with the smaller end rather large; small anisochelæ palmatæ ca. 0·018^{mm}; the latter do not form rosettes.

This species deviates from all other *Mycale*-species by its diactinal megascleres; Thiele therefore says that there may possibly be some reason for separating it from the genus *Mycale*, but this he will not do, however, as long as only this one species is known, and in this I follow him.

Locality: Northern East-Greenland.

Asbestopluma Norman.

Erect, stalked forms; the upper part penniform, or with side-branches issuing from all sides of an axis or collected at its upper end, or the sponge formed like a long-stalked cup. The skeleton is exactly corresponding to the form, and consists of a spicula-axis often divided into parallel fibres; in this axis is inserted fibres running one through each side-branch. Sometimes a coat with particular, densely interwoven spicules on the stalk. In the skeleton of the axis spongin is found. Spicula: Megasclera monactinal styli or subtylostyli, and, where a coat is found on the stalk, in this coat minutely spined tylostyli or tylostrongyla; microsclera: the characteristic microsclera are small anisochelæ palmatæ of a peculiar form with a strongly marked contrast between the two ends; to these may be added larger anisochelæ palmatæ and sigmata, or only sigmata or forcipes.

The generic name *Asbestopluma* was used for the first time in 1882 by Ray Lankester, who, in a paragraph "Dredging in the Norwegian Fjords" (Nature XXVI, 478) under the sponges mentions "*Asbestopluma* (a new genus of Norman)". As, however, it was nowhere described, nothing was known of it. In 1901 Topsent, however (Résultats du Voy. du S. Y. Belgica, Spongiaires, 23) has rendered an account of the genus and given a description of it on the basis of a preparation from Norman, and then it turned out that Norman had established the genus *Asbestopluma* on the species *Cladorhiza pennatula* of O. Schmidt[1]). Now Topsent thinks, and, no doubt, justly, that sufficient characters are found to justify the keeping of the genus, which will comprise the symmetrical, *Cladorhiza*-like forms which are not, as *Cladorhiza*, provided with ancoræ, but with palmate anisochelæ. Topsent, however, wants the genus to be interpreted as a sub-genus of *Cladorhiza*, only separated from it by the mentioned character. I, on the other hand, regard the genus, exactly on account of its chelæ, as most closely allied to *Mycale*, and therefore I place it just after *Mycale* as an independent genus. It will comprise all the symmetrical forms, hitherto referred to *Esperella*, with small anisochelæ of the characteristic type more thoroughly mentioned under the different species, either alone or together with other forms of microsclera.

Thus the genus is well characterized both with regard to its outer form, its skeletal structure, and its spiculation; but at the same time it, especially with regard to its outer form and spiculation, divides into three groups that seem to me so strongly marked, that I think it most correct to establish three subgenera for these groups.

Asbestopluma Norman s. str.

Penniform, lateral branches issuing biserially from an axis, or with lateral branches all round, often, however, showing a distinct bilaterality. The skeleton a spicula-axis divided into parallel fibres or fibre-like parts, in which axis the fibres supporting the lateral branches are inserted. The stalk is coated with a layer containing particular spicules. Spicula: Megasclera styli and subtylostyli, the former in the axial fibres, the latter in the lateral branches, and further irregularly sinuous, minutely spined tylostyli or tylostrongyla in the coating of the stalk; microsclera: the characteristic anisochelæ palmatæ are small, the alæ of the larger end pass far down towards the opposite end, which is narrow; further always sigmata and often large anisochelæ palmatæ.

1. A. pennatula O. Schmidt.

Pl. II, Figs. 1—6. Pl. X, Figs. 4a—o, 5—7.

1875. *Cladorhiza pennatula* O. Schmidt, Jahresber. der Commiss. zur wissensch. Unters. deutsch. Meere in Kiel für 1872—73, 1875, 119, Taf. 1, Fig. 14—16.

1882. *Cladorhiza bihamatifera* Vosmaer, Niederl. Arch. für Zoologie, Suppl. Band I, 47, Pl. I, figs. 105—112.

1885. *Esperia bihamatifera* Armauer Hansen, The Norwegian North-Atlantic-Exp. XIII, Spongiadæ, partim, 15, Pl. III, fig. 7, Pl. IV, fig. 2, Pl. VII, figs. 5 and 14.

[1]) Topsent l. c. tells that the preparation of Norman had the inscription "*Asbestopluma pennatula* Schultze", but he thinks, and, no doubt, justly, that this is a slip of the pen for *pennatula* Schmidt.

1887. *Cladorhiza Nordenskiöldii* Fristedt, Vega-Exp. vetensk. Iaktt. IV, 455, Pl. 25, figs. 56—59, Pl. 31, fig. 25.

1896. *Cladorhiza Nordenskiöldii* Lambe, Proceed. of the Roy. Soc. of Canada, Ser. 2, II, Sect. IV, 186, Pl. I, figs. 9, 9 a—f.

1901. *Asbestopluma pennatula* Topsent, Résultats du Voyage du S. Y. Belgica. Spongiaires, 24 et 28, Pl. III, fig. 9 a—d.

1903. *Cladorhiza pennatula* Thiele, Archiv für Naturgesch. 1903, 385.

1903. *Esperella plumosa* Arnesen, Bergens Museums Aarb. 1903, No. 1, 11, Taf. II, Fig. 1, Taf. IV, Fig. 3, Taf. VI, Fig. 7.

Slender, penniform; the axis a little compressed and the more or less long lateral branches inserted in the narrow sides. The axial skeleton with a rather powerful, close-spiculed external layer. Spicula: Megasclera styli in the axis 0·08–1 mm, subtylostyli in the branches and in the outer layer of the axis 0·52—0·75 mm, irregularly sinuous, minutely spinulous tylostrongyla in the coating of the stalk 0·05—0·137 mm; microsclera of three forms, anisochelae palmatae of two forms, the characteristic ones 0·010—0·0114 mm, the large ones with the lower end polylobate 0·048–0·063 mm, sigmata 0·021–0·024 mm.

By the description of Schmidt cited above this species would not be recognizable; the recognition has only been possible by the description and figures of Topsent l. c. The species is erect and more or less penniform. It consists of an axis carrying for some way above a row of rather short lateral branches on either side. At the base the axis is somewhat thickened. All the specimens in hand are broken off below, but judging from the best preserved specimens and from stalk-fragments that must be of the lower part of the stalk, the stalk is here provided with more or less numerous, rather short lateral processes placed irregularly so as to form a kind of root. This part is presumably imbedded in the mud, and the consequence is that the sponge is generally broken by the trawling, so that the root-part does not come up. Above the lower part the axis is regularly cylindrical and continues so till the spot where the branches begin. Here it becomes somewhat compressed, in such a way that the lateral branches issue from the two narrow sides. There may be some difference in the length of the part carrying the lateral branches as compared with the total length. The greatest length of the lateral branches is up to 5 mm, in one case up to 7 mm, but they may decrease in length and be so short as to be almost imperceptible. With regard to this fact the case may be somewhat different: either all the lateral branches may be long, or all short; or as well long as short ones may be found, and then they are generally placed in such a manner, that the short ones are found below, the long ones above. One's first impression is that the lateral branches, when short, are damaged or more or less broken off. The case is, however, that the branches, when long, are quite thin and tapering outward; the thickness is about 0·1–0·2 mm. The distance between them, which is, however, far from being equal, may be put down to about 1 mm. Now the more the branches are shortened, the thicker they become, and the smaller becomes the distance between them. When shortest they form a series of quite slight, more or less confluent projections along either side, so that the the sides appear slightly indented or sinuous. These quite short lateral branches show no trace of damage or fracture, and the spicules projecting from them are entire. Accordingly the feature cannot be owing to damage

Neither do I think, however, that the question is of a constant difference as to form; on the contrary the fact of the long lateral branches being always thin and with few spicules, while the short ones are thicker and with more spicules, leads to the supposition that the feature is due to contraction, and I think that it must be explained in this way. An examination of a series of different individuals tends absolutely in this direction, and thereby we get a natural explanation of the always constant relation between the length and thickness of the branches. When the branches are long and thin they are slightly curved upward. As before mentioned they are placed along each of the narrow sides of the axis, but they are not arranged in any certain manner, and the distance between them may be somewhat different. Two branches are often found beside each other on the same side, but then they are generally very close to each other, sometimes more or less coalesced; in other instances, however, the distance between them is somewhat greater. Sometimes the branches are, even pretty distinctly, placed in two rows on either side, and this structure is perhaps, strictly spoken, the most common one; but when the rows are very close to each other and the single branches are not placed directly opposite to each other, the feature is only seen indistinctly. When the branches are short, those that are thus close to each other seem to coalesce to one branch, so that we get only one thick spicula-bundle. At the upper end the branches become short and are turned upward, and they continue in a fan-shaped manner round this end. In the lower part of the sponge, towards or quite up to the spot where the lateral branches begin, the stalk is surrounded by a more or less thick layer densely packed with particular spicules, which layer will be more thoroughly mentioned under the skeleton. This feature contributes to some degree to the thickening of the lower part. The stalk is generally straight, but sometimes it, or especially its lower part, may be irregularly bent and cracked. The largest specimen is of a length of ca. 180^{mm}, but it is broken below; the part of it carrying lateral branches is of a length of a little more than 100^{mm}. The specimen is very slender, the stalk in its broadest part is only of a thickness of $1-1{\cdot}5^{mm}$, at the very base 2^{mm}. Some fragments of another specimen, which I suppose to have been upon the whole a larger one, are more robust, the stalk in its broadest part being 4^{mm}. All the specimens, as mentioned, are broken below, but to judge from stalk-fragments in hand, the sponge may grow to a considerable length. Thus we have stalk-fragments of a length of 110^{mm}, broken in both ends and carrying neither lateral branches nor root-like off-shoots. The thickest stalk-fragments are of a diameter of $5-6^{mm}$. The smallest specimen, which is likewise broken below, is of a length of 20^{mm}, and the stalk is $0{\cdot}3^{mm}$ thick. The colour (in spirit) is white or yellowish white. The consistency is firm on account of the skeleton, but the sponge is fragile. The *surface* of the stalk and the branches is smooth without any projecting spicules; in the lower part of the stalk where the mentioned coating grows thicker, wrinkles and folds may be seen. While the stalk is smooth, also in the places coated with the mentioned layer, the root-part and especially the root-branches are shaggy, owing to the projecting of the needles of the coating layer. No bounded *dermal membrane* is to be observed. Outermost in the axis a dense layer of spicules is found belonging immediately to the skeleton of the axis. On the outside of the spicula-fibre of the lateral branches a thin layer of tissue is found closely filled with microscleres, and the same layer may also be found in the axis between the bases of the branches, as it may also be traced here and there in other places of the axis, but it is not bounded outward as a membrane. Neither *oscula* nor *pores* have been observed. From the arrangement of the skeleton it was to be expected that the pores might be found on the narrow sides of the axis between the branches, but here none were discovered. The possibility is perhaps not to be excluded that the lateral branches may act as oscula, in which case it would have to be supposed that in their most extended state they are hollow and connected with the canals of the stalk mentioned below under the skeleton; such a thing, however, has not been observed[1].

The *skeleton* consists in the axis of parallel needles, closely connected with each other, and with the points turned toward the upper end of the sponge; accordingly the axis is firm and hard. It is, however, not massive, but pierced, throughout its length, by a number of canals separated by close-spiculed parts, and the whole structure is outmost surrounded by a close-spiculed layer. All the spicules are parallel to the longitudinal axis of the stalk. It is no easy thing to get a clear view of the number and arrangement of the canals, as whole transverse sections of the hard stalk are only to be obtained with great difficulty. There are always two rather large canals, one along the middle of either broad side of the axis; then the rule seems to be that on each side of these canals two small ones are found occupying, accordingly, the corner parts of the stalk; thus we have altogether ten canals, but sometimes there seem to be still more. Down in the stalk the structure is about the same, and the two chief canals may generally be recognized, but most frequently there seem here to be fewer canals and less regularity. In the thickened parts at the base of the stalk many more canals and more irregular ones are seen. To judge from observations on the few root-fragments in hand, the canals would seem also to pass into the root-branches. The stalk is sometimes a little twisted in the lower part, and then the canals follow the winding always following the longitudinal direction of the spicules. The skeleton of the branches consists of an axis, which may be more or less thick in proportion to the length of the branch, and is constructed of parallel spicules with their end turned outward; it is inserted in the narrow sides of the principal axis between the longitudinally running spicules of this axis in such a way, that the spicules of two lateral branches placed opposite to each other meet in the middle, and the spicules inserted in the principal axis are spread in a fan-shaped way in the longitudinal direction of this axis. As more thoroughly mentioned below under the spicules, the skeleton of the axis consists of styli with an admixture of subtylostyli especially in the outer part, while the skeleton of the branches consists of subtylostyli. The outside of the axis is, in its lower part, coated with a layer of varying thickness. It is rather firm and compact, showing a smooth surface with here and there some wrinkles and folds. It reaches towards, or almost quite up to the place where the lateral branches begin. It may be of varying thickness, from a scarcely perceptible crust to a rather considerable layer, the thickness being greatest towards the base, but also

[1] With regard to all the symmetrical, branched *Mycale*-species — i.e. the genus [illegible] — it is a fact that neither pores nor oscula have ever been mentioned in the literature. Either they are not mentioned at all, or it is stated that they have not been found. Now several things might indicate that this fact with regard to some species is caused by the dermal membrane generally being absent on the material obtained for examination. The specimens sometimes show ruined remains of a membranous character, especially at the base of the branches. With regard to the present species it is, perhaps, not improbable, that in the undamaged sponge the dermal membrane is, to a higher or smaller degree, suspended over the lateral branches, so that these are only partly free, and then pores and oscula are presumably found in this membrane. It is obvious that such a suspended thin membrane is easily destroyed, as the sponges in question is upon the whole from great depths and may be damaged in the trawl, or to a still higher degree in the swabs, with which instruments most of the individuals of the Ingolf-Expedition have been obtained.

here somewhat varying. The greatest thickness was measured to about 2^{mm}. When the layer is thick it is frequently not of equal thickness all round, but the axis may be placed very eccentrically. In the thickened part of the stalk the thickening is often chiefly due to the outer layer, but the axis itself may also be thickened and the layer comparatively thin. The layer is quite compact showing no canals, and is easily separated from the axis itself. The skeleton of this layer consists of exceedingly densely interwoven, winding and finely spinulous tylostrongyla, which, although the layer contains no spongin, are only to be separated with great difficulty. The spicules of the other parts of the skeleton are united by a mass of spongin, quite clear under the microscope and consequently only to be seen with difficulty. On a transverse section the axis is seen to be slightly yellowish, while the sponginless coating of the stalk is whitish, and, when dried, gets a quite snow-white colour.

Spicula: a. *Megasclera:* these are the spicules, partly of the skeleton proper, partly of the stalk-coating. The spicules of the skeleton are of two forms: styli, chiefly forming the skeleton of the axis, and subtylostyli, forming the skeleton of the branches, but also occurring in the axis. The styli of the axis may again be divided into two groups: long, slender, most frequently straight ones, and short thick, and curved ones; these two groups, however, are not sharply separated, but connected by transitional forms, while there seem to be no transitions between the styli and the subtylostyli. The styli are fusiform and evenly tapering towards both ends; in the rounded end, moreover, a short, rather abrupt tapering is found, by which the styli are still more easily to be distinguished from the subtylostyli; this tapering is most marked in the thick forms. The other end has a short, somewhat stubby point. The length is 0·68—1^{mm}, the thick ones generally not exceeding 0·875^{mm}, and sometimes going down to ca. 0·6^{mm}. The thickness varies altogether from 0·015—0·032^{mm}; for the two forms it may be stated to be about 0·015—0·021^{mm}, and 0·021—0·032^{mm}. Of the styli the thicker ones, to be sure, are found throughout the axis, but they are especially numerous towards the base. The subtylostyli are slender and straight, the head is only little marked and is placed a little below the rounded end. The point is short and often almost stubby. They are fusiform, tapering a little towards either end. The length varies from 0·52—0·75^{mm}, and the thickness in the middle is 0·009—0·017^{mm}. As mentioned above, the subtylostyli form the skeleton of the branches, and are also found in the stalk, especially in the outer layer. The spicules of the coating of the stalk are tylostrongyla, minutely and densely spinulous; they are sinuous and curved in very different manners. The head is rather distinctly marked, sometimes it is placed a little in on the needle; the other end is broadly rounded, and the needle is of about the same thickness throughout its length; sometimes it tapers a little towards the end. The length is between 0·05 and 0·137^{mm}, the thickness was measured to 0·001—0·0028^{mm}. The thinnest forms that have been observed, thinner than 0·001^{mm}, are so finely spinulous, that the spinules are almost not to be observed, and the very finest ones are perhaps quite smooth; I suppose them to be developmental forms. b. *Microsclera:* these are anisochelæ palmatæ of two forms and sigmata. 1 The characteristic anisochelæ are small and of the structure peculiar to the subgenus. The shaft is curved. The two ends are exceedingly different; the upper end is provided with very large alæ folding round on the side, the tooth is considerably shorter and narrower. When the chela is seen from the side, the axis is seen to bend round below like a hook, and alæ and tooth are present in the common way; these parts are very narrow, but they are only to be seen with extreme difficulty, and so it is not possible to state their form exactly. When the chela is viewed with the smaller end turned directly towards the beholder, however, the alæ and the tooth are distinctly seen together with the part of the axis between them (Pl. X, fig. 4 h). These chelæ are very small, their length is 0·010—0·011^{mm}, and the breadth is 0·0057^{mm}. 2. The large anisochelæ are of a peculiar structure not quite easily understood. The shaft is about straight. The two ends are very different; the larger one is of the common *Mycale*-structure, the alæ are much refolded on the side, and the tooth is considerably narrower than the alæ; a rather long tuberculum is found pointed downward. The form of this end is rather constant in one individual, but may be somewhat varying in different individuals. The variation consists in this end becoming longer in proportion to the total length, the lower edge of the alæ bending much downward on their way outward from the shaft so as to form a far out-drawn lower corner, and the tooth becoming longer and at the same time narrower. The alæ and the tooth may get so great a length as to reach the structures from the lower end of the chela. The smaller end of the chela is of a peculiar structure and shows a remarkable irregularity. When the chela is viewed from the front or from the side, some small teeth appear to issue from the lower end. Only when the chela is placed with the small end turned towards the beholder, it is possible to get a clear view of the structure. The shaft is then seen to have a narrow ala on either side; next three laps or teeths are generally seen below, one on either side and one in the middle. The middle one is either undivided or more or less split in two; most frequently it is completely divided, and then we get altogether four laps. This is the construction when it is regular, but frequently it is irregular and unsymmetrical, so that we see two laps on one side and only one on the other, or the two laps of the middle tooth are of unequal size. Also the alæ of the shaft may be unsymmetrical, as upon the whole this end is subject to much variation. The laps or teeth are so thin and transparent, that, when the chela is not seen from the end, they are hardly to be observed. Unfortunately I have found no developmental stages of this chela, and so it is impossible to ascertain how the construction of the smaller end is to be interpreted, whether we have here real teeth, or one tooth divided into laps, or finally the lateral teeth are to be interpreted as belonging to the alæ of the shaft. When two teeth are found in the middle this is surely the result of cleavage, which may also be seen from the fact that in such cases we find a median tuberculum the upper part of which is split. Also the lateral teeth seem to be provided with a tuberculum, but by this fact it is not proved, however, that they are independent teeth. Perhaps the developmental forms may solve this question. The length of the chela is between 0·048 and 0·063^{mm}, the greatest breadth is 0·022—0·027^{mm}, and the thickness of the shaft is ca. 0·004^{mm}. As the length is proportionate to the mentioned variation in the form of the upper part, it is rather constant in one individual. The longer the upper end is in proportion to the total length, the shorter is the chela. 3. Sigmata: they have a comparatively little curved shaft, while the tolerably short ends are strongly bent in a hook-like way. A peculiar feature is that the shaft towards the bendings is compressed, and therefore a little broader, seen from the side. They are contort, most frequently a quarter of a turning, and they may therefore, by a slight glance and under small magnifying powers, recall small tylostyli, as observed by Schmidt l. c. That they may appear as tylostyles arises from the fact that the hook which is turned upward is not seen as a hook, but may give the impression of a swelling. Their length is 0·021—0·024^{mm}, and the thickness about

0·0014mm. All the microsclera occur in great numbers in the tissue coating the branches and the axis of the part carrying branches; especially the small chela is found in enormous numbers.

Embryos: In most individuals of this species embryos were found. They are oval or round, most frequently a little flattened, of a diameter of 0·5—ca. 1mm. They were frequently seen to be surrounded by a quite clear and transparent membrane. They occur in different, sometimes rather great numbers, and are situated in the mentioned axial canals. Most frequently they are placed in a single row in one of the principal canals (Pl. II, fig. 1), but they may also be found in the side canals, and they may be so densely crowded as to cause larger or smaller swellings (Pl. II, fig. 4). With regard to spiculation they show some differences that are rather interesting. They have only sigmata and the small anisochelæ. Sigmata seem to be the form of spicules first occurring, and in some specimens only these occur. In some specimens the sigmata, or most of them, were somewhat smaller than those of the developed individuals. While in the larger embryos sigmata and chelæ were found in very great numbers, they were scarce in others, and in some of the embryos no spicules seemed to be present at all.

Remarks to the synonymy. I have been able by examination of one of the specimens of the Barents-Expedition to identify as *pennatula* the species mentioned by Vosmaer l. c. as *Cladorhiza bihamatifera.* Vosmaer mentions it as a difficult thing to get a clear understanding of the large chelæ and says, — I now believe that they are to be considered as *Esperia*-anchorates, where all the teeth are fully developed, and not two with one rudimentary . What is meant by this phrase is unintelligible, as the larger end of these chelæ is of the same structure as in all common *Mycale*-chelæ. — Of Armauer Hansen's material I have examined a few specimens which proved to be *pennatula,* but under his *bihamatifera* several species are mingled together; from the figures it may however with rather great certainty be decided, which of them belong to the present species. Of Fristedt's *Cladorhiza Nordenskiöldii* I have examined a fragment of the type specimen, which proved it to be *pennatula*; Fristedt must have overlooked the small chelæ. Also Lambe l. c. must have overlooked these chelæ, as the *Cladorhiza Nordenskiöldii* mentioned by him is certainly identical with *pennatula.* It is easily understood that he has overlooked them, as he has had only the lower part, where the small chelæ only occur much scattered. Finally the *E. plumosa* established in 1903 by Arnesen l. c. is identical with *A. pennatula*, which fact I have been able to decide with certainty, as I have examined a fragment of one of the type specimens. In the quite insufficient description no account is rendered of the two forms of chelæ; the length of 2·7mm given for the megascleres must be due to an erroneous measuring; in the specimen examined by me I have found none larger than 0·95mm.

Locality: Of this species the Ingolf-Expedition has obtained a great number of specimens. Station 6, 63° 43′ Lat. N., 14° 34′ Long. W., depth 90 fathoms; station 39, 62° 00′ Lat. N., 22° 38′ Long. W., depth 865 fathoms; station 40, 62° 00′ Lat. N., 21° 36′ Long. W., depth 845 fathoms; station 67, 61° 30′ Lat. N., 22° 30′ Long. W., depth 975 fathoms; station 68, 62° 06′ Lat. N., 22° 30′ Long. W., depth 843 fathoms; station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms; station 94, 64° 56′ Lat. N., 36° 19′ Long. W., depth 204 fathoms; and station 144, 62° 49′ Lat. N., 7° 12′ Long. W., depth 276 fathoms. On station 78 the greatest number of specimens were taken. The stations are situated between the Faröe Islands and Iceland, south of Iceland and in the Denmark Strait at the eastern coast of Greenland. The depths vary from 90—975 fathoms; the bottom temperatures on the stations were from 1·6 til 7·0 C. Further I have before me one specimen from the northwestern coast of Norway, Lyngen, depth 160 fathoms (O. Nordgaard).

Geogr. distr. The species is further known from the following localities; off Bukenfjord and Haugesund, depth 106—115 fathoms (Schmidt l. c.); Tronhjem Fjord (Arnesen l. c.); the Barent Sea, depth 220 fathoms (Vosmaer); the east coast of Greenland, depth 130 fathoms (Fristedt); the Gulf of St. Lawrence, depth 200 fathoms (Lambe). Accordingly the species is a northern one, and has hitherto been found from about 23° 20′ Long. E. to about 65° Long. W., and between 50° and 74° 10′ Lat. N. As is commonly the case, it reaches considerably farther south at the American coast than at the European; thus at the coast of Norway it has only been obtained to about 59° Lat. N.

2. **A. bihamatifera** Cart.

Pl. II, Figs. 7—8. Pl. XI, Fig. 1 a—g, Fig. 2.

1876. *Esperia cupressiformis* var. *bihamatifera* Carter, Ann. Mag. Nat. Hist. Ser. 4, XVIII, 318, Pl. XIII, fig. 14, Pl. XV, fig. 34 a—b.

Shorter or longer lateral branches pass off from the axis all round. The axial skeleton is divided into a number of fibres, between which the fibres of the lateral branches are inserted; outmost in the axis a thin layer of spicules is found. Spicula: Megasclera styli in the axis 0·63—1·01mm, subtylostyli in the branches and, in small numbers, in the axis 0·58—0·71mm, irregularly sinuous, finely spinulous tylostyli in the coating of the stalk 0·09—0·10mm; microsclera of three forms, anisochelæ palmatæ of two forms, the characteristic ones 0·010—0·011mm, the large ones with polylobate lower end 0·051—0·061mm, sigmata 0·018—0·021mm.

This species in its outer form is very similar to the preceding one, but it is distinguished from it by the fact that the lateral branches are always placed in several rows, and accordingly they are not arranged along the two sides of the axis, but issue from all sides of it. It consists of an erect axis, which, for a shorter or longer part of the upper end, carries lateral branches going off to all sides. All the specimens are broken below, but a few of them seem to be fairly entire; the latter are on the lower part of the stalk provided with quite short, irregularly placed lateral off-shoots forming a kind of root. As in the preceding species the length of the branches may vary very much, and I suppose that also here a contraction may take place. The greatest length of the branches is ca. 11mm, and then they are very fine, on an average about 0·17mm. They are found in decreasing lengths down to quite short projections, which are then considerably thicker. The branches are directed somewhat obliquely upward; when they are long they are generally directed upward in a curved manner. The branches, as mentioned, pass off to all sides; but when they are of a certain length there is always some difference between them, those along the two sides being somewhat longer than those on the other parts of the axis. At the top the branches continue over the end of the axis, and seem here always to be short. The stalk is all but cylindric; it tapers upward, and in its lower part, towards, or quite up to, the branches it is covered with a layer provided with special spicules; in the specimens in hand this layer is very thin and of a darker colour. The stalk is straight, or more or less curved; in the upper part it is most frequently rather straight, and the part carrying the branches is always straight; while the lower part may be curved or bent angularly in different ways. The longest specimen, which is broken below, but has root-branches, has a length of 100^{mm}, and the part carrying the branches is 13^{mm} long. The smallest specimen is 28^{mm} long, and the part with the branches only 4^{mm} long. The colour (in spirit) is white to yellow, the stalk, on account of the coating, is of a lighter or darker brown. The consistency is firm, but the sponge is fragile. The *surface* is smooth, only on the root-branches the spicules of the coating layer seem to project a little. On the part of the axis carrying branches, between the bases of these, a thin *dermal membrane* is seen, in most specimens highly damaged; it continues on the inner part of the branches, but can be traced no farther. It is supported by the spicules in the outmost part of the axis, and it is abundantly provided with microscleres of all three forms. The *pores* are found in the very thin dermal membrane; they are round and have been measured, as an example, to a size of $0{\cdot}047$—$0{\cdot}119^{mm}$. They were especially seen in the parts of the membrane that are stretched between the inward or upward turned side of the base of the branch and the axis, and therefore they are turned somewhat upward. They are only to be observed with difficulty, and they are most easily seen when the preparation is half-dry. Immediately inside the dermal membrane is found a system of lacunæ, separated by membranes with circular openings. A few larger openings were seen in the dermal membrane, which might possibly be *oscula*; otherwise the possibility is also found here that the branches form oscula; to be sure, their spicules are continued to the very middle of the axis, but this fact does not prevent that they may be hollow and open into the system of canals.

The *skeleton.* The skeleton of the axis consists of a number of fibres running parallel to each other in the longitudinal direction of the axis, and consisting of spicules with the point turned upward. In the interstices between these fibres the lateral branches are inserted. In a transverse section the fibres are seen to be arranged circularly round the middle (Pl. XI, fig. 2). Round the fibres again, in the periphery of the axis, some spicules are found supporting the dermal membrane; these spicules form no conspicuous layer, being often rather much scattered; in a transverse section, however, they are generally seen tolerably distinctly. As they are arranged between the bases of the branches they are not always quite parallel to the longitudinal axis. Some canals running in the longitudinal direction, are seen in the transverse section, between the dermal layer and the fibres. I have not been able to decide whether they continue through the axis as longitudinal canals, or they are only subdermal cavities belonging to the cavities into which the pores open immediately. Down in the stalk no separate fibres are found, but it consists entirely of close-packed spicules, and irregularly arranged canals run through it. Also in this species a twisting of the lower part of the axis was observed in some individuals. The skeleton of the branches, as in the preceding species, consists of bundles or fibres of spicules turning the points outward. They are inserted in the axis between its longitudinal fibres, so that they meet in the middle. The inserted part of the fibres of the branches is compressed in such a way, that in a transverse section it appears to have a thickness of only a few spicules, while in a longitudinal section it has the full thickness, or the spicules are spread in a somewhat fan-shaped manner. The skeleton of the axis consists of styli with a mixture of subtylostyli. As before mentioned, a coating layer of the same nature as in the preceding species is found on the stalk below the part carrying branches. It is most frequently very thin, and at the lowermost part of the stalk it is at most $0{\cdot}2^{mm}$ thick. It consists of close-packed, finely spinulous tylostyli, and is otherwise of the same structure as in the preceding species; it becomes also snowy-white when dried. In the stalk the spicules are united by a clear mass of spongin.

Spicula: a. *Megasclera.* The megascleres of the skeleton are partly styli forming the axis, and partly subtylostyli forming the skeleton of the branches and also occurring in the axis. The styli are straight or slightly curved; they have a short, most frequently somewhat stubby point. They are fusiform, also tapering somewhat towards the rounded end, and here they end with a somewhat more abrupt tapering. Also in this species they may be divided into two groups, the longer, slenderer, oftenest straight ones, and the shorter, thicker, and curved ones, but they pass into each other without any marked boundary. The length varies from $0{\cdot}63$—$1{\cdot}01^{mm}$, and the thickness from $0{\cdot}020$—$0{\cdot}0357^{mm}$; the longer ones did not commonly reach a thickness of $0{\cdot}030^{mm}$. As in the preceding species the shorter and thicker styli become more predominant towards the base of the stalk. The subtylostyli are straight; they are fusiform and taper somewhat towards each end, the point is short, but rather sharp. The head is placed a little below the rounded end and is most frequently a rather slight swelling. The length of the subtylostyli is rather constant and is between $0{\cdot}58^{mm}$ and $0{\cdot}71^{mm}$. The thickness is $0{\cdot}011$—$0{\cdot}018^{mm}$, most frequently about $0{\cdot}017^{mm}$. The spicules of the coating of the stalk are finely spinulous tylostyli; the head is marked in different degrees, most frequently rather distinctly, sometimes it is placed a little down on the needle; the opposite end is long pointed, but the outmost point is stubby or cut off. The tylostyli are irregularly curved and sinuous. The length is between $0{\cdot}09^{mm}$ and $0{\cdot}10^{mm}$, the thickness about $0{\cdot}001$—$0{\cdot}003^{mm}$. b. *Microsclera* are anisochelæ palmatæ of two forms and sigmata. 1. The characteristic anisochelæ are those typical for the subgenus, and they are of quite the same form as those in *pennatula.* Their length is $0{\cdot}010$—$0{\cdot}011^{mm}$, and their breadth is ca. $0{\cdot}005^{mm}$. 2. The large anisochelæ are also af a similar form as in the preceding species; the shaft is straight; the larger end is not subject to the variations in form and size found in *pennatula*, but makes always about half the length of the chela; the alæ are folded far round on the side, and their lower edge is rather straight without forming a far drawn out lower corner. The tooth is about as long as the alæ and is somewhat narrower than these; at the end it is cut off with rounded corners; a long, downward pointed tuberculum is found. With regard to the smaller end of the chela the description given under *pennatula* will almost entirely hold good; the only difference being that this end in proportion to the size of the chela is smaller than is most frequently the case in *pennatula*; also it is generally less irregular, and the variation consists chiefly in the fact that the middle tooth is either whole or split. The length is $0{\cdot}051$—$0{\cdot}061^{mm}$, the breadth $0{\cdot}020$—$0{\cdot}025^{mm}$, and the thickness of the shaft is about $0{\cdot}005^{mm}$. 3. Sigmata; these are of the same form as in *pennatula* with only little curved shaft and short ends, bent in a hook-like way. The shaft is likewise compressed or sharpened like an edge inward towards the bendings, and they are contort, most frequently a quarter of a turning. The length is $0{\cdot}018$—$0{\cdot}021^{mm}$, the thickness in the middle is ca. $0{\cdot}001^{mm}$. The microscleres occur in large numbers in the dermal membrane and in the tissue of the part carrying the branches.

As will have been seen, this species is very closely allied to the preceding one, and differs from it especially by the facts that the branches are polyserial and the spined tylostyli of the coating layer more pointed, and these two characters are constant and are found together in all the material I have examined. It will also have been seen from the description that the skeleton of the axis is constructed in a somewhat different way. After Carter's descriptions and figures I regard the identification as certain, as both the spicula-figures, especially that of the large chela, agree very well, and also the figure of the exterior of the small fragment Carter had show that the question is of a species with branches arranged polyserially. Of Armauer Hansen's figures of exteriors those on Pl. VII, figs. 2, 3, and 15 might perhaps be *bihamatifera*, but as it is said in the text that only one of all the specimens had sigmata, the question is more likely of the species *lycopodium*. The question cannot be decided with certainty, as the fact that sigmata of two different specimens are figured, both on Pl. III, fig. 5, and Pl. IV, fig. 2, shows that the quoted statement is wrong, and I have also examined two specimens, which were both of them *pennatula* and consequently both provided with sigmata.

Locality: Station 15, 66° 18' Lat. N., 25° 59' Long. W., depth 330 fathoms (bottom temperature ÷ 0·75 C.); station 59, 65° 00' Lat. N., 11° 16' Long. W., depth 310 fathoms (bottom temperature ÷ 0°1 C.); station 126, 67° 19' Lat. N., 15° 52' Long. W., depth 293 fathoms (bottom temperature ÷ 0°5 C.); station 138, 63° 26' Lat. N., 7° 56' Long. W., depth 471 fathoms (bottom temperature ÷ 0°6 C.); altogether eight specimens. The stations are situated in the Denmark Strait, north and East of Iceland, and north of the Faröe-Islands, and they are seen all to belong to the cold area with negative bottom temperature. It is of interest to see that this species, which is so closely allied to the preceding one, from which it differs only by slight, but constant characters, occurs exclusively in localities with negative bottom temperature.

Geogr. distr. With regard to the specimens of the present species from the Norwegian North-Atlantic Expedition the more particular localities are not known; if the species are represented in the material, it must be supposed to have been taken on one of the stations in the cold area. The locality is also wanting for the specimens of Carter, but on account of other sponges in the same jar he thinks that the locality may possibly be in the western entrance of the British Channel. This is probably not the case, however, as the species is a native of colder bottom, and I suppose that Carter's specimens originate from one of the cold stations of the „Porcupine".

3. **A. furcata** n. sp.

Pl. II, Figs. 9—10. Pl. XI, Fig. 3 a—h.

The axis slender, dichotomously branched once or several times. The lateral branches very short, placed all round, only on the upper ramifications. The axial skeleton divided into fibre-like parts, outmost a thick layer of spicules. Spicula: Megasclera styli in the axis 0·39—0·65^{mm}, subtylostyli in the branches and outmost in the axis, 0·268—0·36^{mm}, curved, finely spinulous tylostrongyla in the coating of the stalk 0·068—0·005^{mm}; microsclera of three forms, anisochelæ palmatæ of two forms, the characteristic ones 0·010—0·014^{mm}, the large ones with unsplit or split lower tooth 0·044—0·054^{mm}, sigmata 0·015—0·017^{mm}.

This species is of a very slender form; it begins below with a stalk that gradually branches dichotomously. The most ramified specimen branches three times, so that the two branches formed in the first instance divide again, and the newformed branches divide also. In one specimen one branch divides into three, sending off two lateral branches while the principal one itself continues in the middle. In another specimen a coalescing of two stalks has taken place; as the lower part of the specimen is wanting it cannot be seen, whether the two branches belong to one individual, or two different individuals are coalesced. The stalk is somewhat widened below and has been attached to some firm object. The stalk may be straight or somewhat curved, and it is about cylindrical. On the ramifications lateral branches are found more or less extensively; they are generally only found on the outmost ramifications, sometimes also some way down the branches below the last division. Thus in the smallest specimen, which has only two branches, they are found some way down the stalk. The lateral branches are small, almost scale-like and most frequently very much directed upwards, sometimes almost quite adpressed. They are arranged in several rows, but very irregularly, so that the rows in some places are close together, while at other places the intervals are greater. The axis is slightly compressed in the parts carrying lateral branches. The branches end with a compressed part forming an extended, and on account of a little notch somewhat heart-shaped, head. Perhaps the question is only of a beginning new cleaving. In a single fragment the last ramifications end without this head, and this is perhaps a specimen in which the growth has ceased. The stalk has a thin coating of the common nature, and this layer generally reaches far up, often to the last, or last but one, division. The largest specimen in hand, the above mentioned most richly branched one has a height of 140^{mm}, the stalk to the first division is 35^{mm} long. The smallest specimen, which is only divided once, is 65^{mm} high. The species, as mentioned, is very slender, the stalk of the largest specimen has only a diameter of 2^{mm}, and farther up the thickness is $1-1{\cdot}5^{mm}$. The lateral branches do not reach more than 1^{mm} in length. The consistency is of the common firmness. The colour (in spirit) is whitish yellow to light brownish; the coating layer of the stalk is always a little darker. The *surface* is smooth, but on the part with branches it appears under the microscope to be shaggy from the projecting cheke. No distinct *dermal membrane* was seen; outermost in the skeleton a dense layer of spicules is found, and outside of this a thin layer of tissue, copiously provided with microscleres. *Oscula* and *pores* were not observed.

The *skeleton*. The skeleton of the axis consists of closely united, parallel needles. Through the axis run a number of canals, which in the ramigerous part seem to be arranged in a more or less ringlike way, and are separated by narrow parts of spicules, as also the fibres of the lateral branches, where such are found, pass in between them. Lower down in the stalk the canals are not regularly arranged, so the separating spicula-parts are also here, when seen in transverse sections, irregularly sinuous. Accordingly, the skeleton of the axis is by the canals divided into fibres or narrow, fibrelike parts. Outmost a dense layer of spicules is found, which is most frequently rather easily loosened on the stalk below the ramigerous part, while on this part such is not the case, and here where the lateral branches are inserted, the needles of this layer do not exactly run in the direction of the longitudinal axis. In the lower part of the stalk the axial skeleton is twisted in a spiral manner. The skeleton of the lateral branches consists of bundles of spicules; they are inserted between the spicules of the axis in the common way, and reach to, or about to, the middle. The skeleton of the axis consists of styli, among which in the outer layer of spicules shorter subtylostyli are intermingled; the skeleton of the lateral branches consists of short subtylostyli. The skeleton of the coating layer of the stalk consists of closely interwoven, finely spinulous tylostrongyla. The spicules of the axis are united by a clear mass of spongin.

Spicula: a. *Megasclera:* these are the styli of the axis and the subtylostyli of the lateral branches, besides the spicules of the coating layer of the stalk. The styli in the axis have in this species no abrupt tapering towards the head-end, and as the subtylostyli show most frequently an almost indiscernible swelling, the difference between them is chiefly to be sought in the size. The styli, to be sure, vary somewhat in form and size, but they cannot here be said to be divided into two groups. They are straight, or slightly, only rarely a little more highly, curved; they are slightly fusiform with the greatest thickness in the middle. The point may be a little varying, but is always short or rather short; most frequently it is bounded by straight lines. The length is 0·39—0·65^{mm}, the extreme measures, however, occurring rarely. The thickness, which has no definite proportion to the length, is between 0·010^{mm} and 0·024^{mm}. The subtylostyli are straight, only sometimes quite slightly curved. They are only a trifle thicker in the middle than towards the ends; the head, which is placed a little down on the needle, is generally a scarcely perceivable swelling; the point is short, but bounded by straight lines. The length is 0·268—0·36^{mm}, the thickness is 0·007—0·011^{mm}. The spicules of the coating of the stalk are minutely spinulous tylostrongyla; they are more or less irregularly curved, most frequently to a rather slight degree. The head is round and distinctly developed, they do not taper much towards the opposite end, and this end has a little swelling, so that in form they approach tylotes. They are smaller than in the preceding species, the length is 0·068—0·095^{mm}, and the thickness about 0·001^{mm}, a little more or less. b. *Microsclera* are anisochelæ palmatæ of two sizes and sigmata. 1. The characteristic small anisochelæ are of the type of the subgenus, and are of the same form as in the preceding species; they are, most of them, 0·010^{mm} long and 0·005^{mm} broad, but chelæ may be found reaching to a length of 0·014^{mm}. 2. The large anisochelæ are also of a similar form as in the two preceding species. The shaft is straight; the larger end is about half so long as the whole chelæ; the tooth is considerably narrower than the alæ, it is broadest below, and rather straight cut off with rounded corners or sometimes more rounded; a long, downward pointed tuberculum is found. The smaller end is more regular than in the preceding species, and its form is more like that of the common type. The shaft has a pair of short alæ, rather broad above, and forming together a triangle; then there is a curved tooth of similar size, most frequently, however, a little shorter than the alæ. As the tooth is in a rather oblique position to the shaft, it appears always somewhat shortened, when the chela is seen exactly from the front, and its curved form is also seen. Accordingly, when the tooth has this form, the structure of the smaller end is quite normal; the tooth, however, is often split into two lobes, and the splitting may be more or less pronounced; lateral lobes, however, are never found. Also here the tooth is so thin and transparent, that a clear view of the form can only be got by regarding the chela from the end. The length is 0·044—0·054^{mm}, the breadth about 0·021^{mm}, and the thickness of the shaft is about 0·004^{mm}. 3. Sigmata are of the same form as in the preceding species with the same edge-like expansion of the shaft towards the ends, and they are also contort. The length is 0·015—0·017^{mm}, and the thickness about 0·001^{mm}. All forms of microsclera occur in great numbers in the tissue.

Embryos. In this sponge embryos were most frequently found; they occurred partly in the upper ramifications, partly somewhat lower down. They were, as far as I could see, situated in the canals just inside the outermost layer of spicules, but each embryo appeared to be inclosed in a cavity of its own, and the places in which they occurred were a little swollen and thus fusiform. The embryos are roundish or oval, and have an average diameter of 0·3mm. In contradistinction to the embryos found in *pennatula*, both megascleres and microscleres are found here. The megascleres are all subtylostyli; they are similar to those in the grown individual, but are often a little more curved, and the head may be marked off in different ways; they have also on an average a somewhat longer point. They are smaller than in the grown sponge and have an average length of 0·208mm. Of microscleres only the small chela and sigmata are found; both of them are fully developed, and they show a peculiar and surprising feature, being both a little larger than in the grown sponge. Thus sigmata reach a length of 0·021mm, and the chelæ are 0·0114—0·0143mm long. According to this it must be supposed that the first formed of these chelæ and sigmata are a little larger than the final form, which appears later. Chelæ and sigmata are present in great numbers. The embryos seem here to leave the sponge by a bursting of the wall, the outer layer of spicules being in several places swelled out by the embryos underneath, and in a few cases a hole and an empty cavity are seen.

Locality: Station 101, 62° 23' Lat. N., 12° 05' Long. W., depth 537 fathoms (bottom temperature ÷0°7 C.), one specimen. Further it has been taken on 62° 53' Lat. N., 4° 14' Long. E., depth 450 fathoms, one specimen, and east of Iceland without any statement of depth, five specimens (Ad. Jensen, the cruise of the "Michael Sars" 1902). The localities are situated east and northeast of Iceland, and at the coast of Norway. With regard to the two last localities no bottom temperature has been given, but they are situated in the cold area, and thus this species is also a native of the cold bottom.

Note. Of Armauer Hansen's figures to *Esperia bihamatifera* (The Norwegian North-Atlantic Exp.) I am inclined to suppose, and I think there is great reason for supposing, Pl. VII, fig. 4, and especially Pl. III, fig. 5 to be the present species.

As will have been seen, the species of this subgenus are distinguished by a peculiar coating layer on the stalk. At first one might be inclined to think that the question was of a separate sponge incrusting the stalk of these sponges, as is also pointed out by Topsent by the mentioning of *pennatula* and *Belgica* l. c.; but the constant occurrence of the layer, and the difference of its spicules in the different species proves it to be a formation belonging to the sponge. Those species of the subgenus of which rather intact specimens have been examined, show a formation of roots. This formation is connected with the fact, that they are no doubt sunk into the bottom of the sea, as it would seem, with a very long part of the stalk. I suppose that this is also the reason why they are provided with the coating layer. The species *furcata*, however, is an exception, as it is not sunk into the bottom, but is attached with its base. Nevertheless it has the coating layer, but it is very thin and shows the peculiarity that it reaches very far up, often to the last ramifications.

Lycopodina n. subg.

Lateral branches issuing all round from an axis, or the branches collected in the upper end of this axis; sometimes the lateral branches are more or less coalesced. The skeleton consists of a spicula-axis, and the branches are supported by fibres inserted in the axis, or in other ways connected with it. Spicula: Megasclera styli or subtylostyli; microsclera: the characteristic anisochelæ palmatæ are small, the alæ of the larger end pass down quite to the opposite end, which is rather broad; to these spicules forcipes are most frequently added.

4. **A. cupressiformis** Cart.

Pl. II, Figs. 11—14. Pl. XI, Figs. 4 a—f, 5.

1874. *Esperia cupressiformis* Carter, Ann. Mag. Nat. Hist. Ser. 4, XIV, 215, partim, specimen in interclusione commemoratum exclusum, Pl. XIV, fig. 16 a.—f., figs. 17—18, Pl. XV, fig. 37.

1885.? *Esperia bihamatifera* Armauer Hansen, The Norwegian North-Atlantic Exp., XIII, Spongiadæ, partim Pl. VI, fig. 1, Pl. VII, fig. 1.

1886. *Esperella cupressiformis* var. *robusta* Levinsen, Dijmphna Togtets zool. bot. Udbytte, 364, 18 a, Tab. XXIX, Fig. 10—11, Tab. XXXI, Fig. 7—14, 16 a, b, c.

1887. *Cladorhiza cupressiformis* Fristedt, Vega-Exp. vetensk. Iakttag., IV, 457, Pl. 25, figs. 66—69, Pl. 31, fig. 27.

1900. *Esperella Fristedtii* Lambe, partim, specimina dua e tribus commemoratis, Transact. of the Royal Soc. of Canada, Ser. 2, VI, Sect. IV, 21, Pl. I, figs. 2, 2 a.—e.

Irregularly situated short lateral branches pass off all round from the axis, or the branches coalescing to a curled surface; sometimes all the upper part or only the uppermost portion of it leaf-shaped. The skeleton consists of a spicula-axis, the ramigerous part is supported by an irregular skeleton, from which the fibres of the lateral branches pass off, but they are not inserted in the axis. Spicula: Megasclera subtylostyli or styli 0·35—0·84^{mm}; microsclera of two forms, the characteristic anisochelæ palmatæ 0·023—0·025^{mm}, forcipes 0·038—0·048^{mm}.

This species is of a slender, erect form. Below it consists of a more or less long stalk, all but cylindrical, which is most frequently one fourth of the total length. The upper part is somewhat thicker than the stalk and carries a number of short lateral branches, placed irregularly, and issuing all round. These branches may be very short, so that they almost do not project over the surface, or there may between them, or instead of them, be found low ridges especially running longitudinally, and then the upper part shows only a highly wrinkled, folded, or curled surface; but in most cases the projections are formed as cylindrical, a little conical branches rising with a broad base from the axis. They reach at most a length of about 3^{mm}. Sometimes the sponge is above widened to a small leaf-shaped part (Pl. II, fig. 11), and one specimen consists of a quite short stalk passing into a broad, rather thin leaf with a grooved and wrinkled surface (Pl. II, fig. 12). Below the sponge is attached by a somewhat widened part of the stalk. The specimens in hand from the territory treated here are torn off from the substratum, but specimens from the Kara Sea are attached to shells (*Astarte* sp.), worm-tubes (*Spiochætopterus typicus* and especially *Pectinaria hyperborea*), and to pebbles. The largest specimen (from the Kara Sea) has a length of ca. 135^{mm}, the stalk is 26^{mm} long, the greatest thickness is 7^{mm}, and the stalk is ca. 2^{mm} thick. Then we have specimens of all sizes downward, the smallest specimen is 15^{mm} high. The mentioned leaf-shaped specimen has a height of 77^{mm}, and a breadth of ca. 70^{mm}, its stalk is only 13^{mm} long. The consistency of the upper part of the sponge is softer than in the preceding species, the stalk is hard. The colour (in spirit) is whitish gray to whitish yellow. The *surface*, apart from the nature described above, must be said to be smooth, only in the ends of the lateral branches bundles of spicules project. In the specimens in which no lateral branches properly so called are found, but only longitudinal ridges and irregular projections, spicules project through these, and thus these individuals get a more shaggy appearance. Under the microscope also other parts of the surface may appear shaggy from the projecting chelæ. The upper part of the stalk is smooth, but it becomes shaggy towards the base. A *dermal membrane* may distinctly be observed, and is easily isolated; it is thin and transparent and highly filled with chelæ, on the other hand there is no dermal skeleton proper, but the membrane rests on the skeleton below, and when it is isolated, needles may be seen scattered in it. *Pores* have not been observed in the dermal membrane. *Oscula:* the mentioned lateral branches act, no doubt, as oscula; the fact is, that these branches are not solid, but are chiefly formed by the dermal membrane, which is here supported by spicules parallel to the longitudinal axis of the branches. If a branch is cut off it is seen to be hollow, and leaves a hole; on the other hand, an osculum is not distinctly seen at the point of the branch, as the spicules are here closer joined. As the branches are very numerous, and as pores have not been observed, it might be supposed that also the inhalent system was connected with the branches; it is, however, more probable that the pores are closed.

The *skeleton*. The skeleton of the axis consists of close-lying spicules parallel to the longitudinal direction. The axis, however, is not quite compact, the spicules being collected into close-lying fibres; in the interstices an irregular reticulation of spicules is found, which spicules are placed obliquely to, or across of, the longitudinal direction; sometimes, however, this feature is little prominent, and then the axis is more compact. It continues from the stalk up through the sponge, quite to its uppermost end, and it keeps about the same thickness. The outer skeleton, which supports the upper part, consists of a quite irregular net-work of spicula-bundles and scattered spicules, with short fibres here and there. As mentioned, the lateral branches are supported by spicules apparently forming a fibre, but really only supporting the wall of the branch; these spicules do not reach to the axis but pass only into the other skeletal net. In the lower part of the stalk, where it is shaggy, spicules are woven into it, projecting more or less horizontally, and over the surface. A coating with special spicules is not found. In the mentioned leaf-shaped specimen the skeletal structure has been modified in an interesting manner; the short stalk continues as such only a short way into the leaf, and then it is lost. It does not cease, however, but is, as it were, spread in the plate, rather close-lying fibres, radiating towards the edge, running through the plate; these fibres correspond to those of the axis, and they are, like those, connected by spicules and spicula-bundles, which are placed transversely or obliquely in the interstices. This whole structure forms a thin skeletal plate in the middle of the leaf-shaped part, and on both sides is found a tissue with a skeleton constructed in the same manner as the skeleton outside the axis in the other individuals. In the axis the spicules are united by a rather copious, but white and clear mass of spongin, which is most developed towards the base; in the skeleton outside of the axis, on the other hand, no spongin seems to be present.

Spicula: a. *Megasclera* are long, slender subtylostyli, sometimes styli. They are straight, or slightly, most frequently somewhat irregularly curved. The head-end is only very slightly swollen, the opposite end tapers evenly to a rather long point which is often somewhat more abruptly pointed at the end. The needles are here of only one kind, and are the same in the stalk and in the other skeleton, the only difference being that in the lower part of the stalk they become gradually shorter, and the needles that here project and make the stalk shaggy are also short. These short needles are generally more highly curved, and are most frequently styli without any head-swelling, but they cannot be separated from the others as a particular kind. The length is between ca. 0·35 and 0·84^{mm}, but in these measures are also included the needles occurring towards the base of the stalk; if the lower part of the stalk is excluded the lower limit of the length may be put to about 0·5^{mm}, and in a spicula-preparation in which no sample from the lower part of the stalk has purposely been added, the length of the needles therefore will be found to be ca. 0·5—0·84^{mm}, and the shorter ones will only occur more rarely. The thickness varies from ca. 0·008—0·014^{mm}; the longest ones are not the thickest. Finer, to quite fine developmental forms are seen in small numbers. b. *Microsclera:* these are of two forms, anisochelæ palmatæ and forcipes. 1. The anisochelæ are of a form characteristic of the subgenus; the larger end is of a similar form as in the preceding subgenus; the alæ are very large and reach far down, quite down to the lower end, and there is a considerably shorter and narrower tooth. The smaller end is of a peculiar structure, not easily understood. When the chela is lying on the side a pair of small points are seen at this end, one at the outer end of the axis, the other a little higher up. The best view is got when the chela is seen in such a way as to turn the smaller end directly towards the beholder (Pl. XI, fig. 4 d), and then it is seen that alæ and tooth are present as usual. The peculiar feature is that the alæ do not run along the shaft in the common way, but are placed almost transversely on it. The axis then continues with a slight bend, and at the end of it the tooth is placed parallel to the alæ; it has a distinct tuberculum. When the alæ and the tooth are seen from the side, they are seen as the mentioned two points. When the chela is viewed from the front under sufficiently high magnifying powers, a pair of refractive ridges are seen about where the alæ of the upper end cease; these ridges are the upper part of the alæ of the lower end where they go off from the axis; they are here the most narrow, but downward they become gradually broader, and fold round on the side; the whole thing might be described by saying that the upper outer corner of the ala had been cut away by a large cutting rounded inward. The tooth, which is also somewhat curved, has a form corresponding to that of the alæ, being also most narrow above, but increasing in breadth downwards, and thus showing the same cutting. The folded sides of the alæ and the tooth meet on the side leaving only a narrow opening between them; as a consequence of the form the lateral edges are here short. The described form of the alæ and the tooth, together with their position with regard to the axis, is the cause why they appear as two points when viewed from the side under small magnifying powers. The anisochelæ are 0·022—0·025^{mm} long[1]) and ca. 0·012^{mm} broad. Developmental stages

[1]) A few chelæ were seen of a length of 0·014^{mm}, but they, no doubt, belong to the embryos present in the sponge, see below under Embryos.

of this chela were found abundantly on all stages from so fine ones, that they are hardly to be seen. Levinsen l. c. has already given an account of the development of this spicule. — The construction of the lower end of this chela has never been correctly understood, and neither Carter's nor Fristedt's figures are correct. Levinsen, on the other hand, has given good figures, l. c.; the lower end on Pl. XXXI, fig. 7, cannot, however, appear as it is figured, when the chela is seen in the stated position, but only, if it is seen considerably more obliquely from one end or the other. Neither has Levinsen clearly understood that the question is of the common parts, ake and tooth, in a somewhat modified shape. 2. Forcipes. These are of the common form with a round bend above; the legs are parallel or more or less diverging, and end in a small swelling; the upper part between the legs is somewhat thickened, and appears, especially when the forceps is seen from the side, as a tubercle-like swelling. The length is 0·038—0·048mm, and the thickness above is ca. 0·0021mm; the thickness of the middle of the legs does not exceed 0·0014mm. The chelæ occur in enormous numbers; they are partly found in the tissue, but especially in the dermal membrane, in which they are exceedingly close packed, so as to render it quite shaggy; they appear always to be turned with the larger end outward. In contradistinction to the chelæ the forcipes are limited in their occurrence, being only found in the point of the sponge, as has been pointed out by Levinsen; in this respect it is an interesting fact that in the mentioned leaf-shaped specimen the forcipes are found throughout the leaf-shaped part, which fact would seem to prove this whole part to correspond to the point of an individual of the common form.

Embryos. In several individuals of this sponge embryos were found. They are situated in the tissue in very great numbers; they are globular, the larger ones a little oval, and they are rather small; the size is very varying, and was measured from 0·05—0·27mm. They are in the tissue surrounded by a membrane, and they appear each of them to be situated in a little cavity. Their spiculation presents some points of interest. They are provided with both megascleres and microscleres. The megascleres are straight or often rather strongly curved tylostyli and subtylostyli, most frequently with rounded end; they are often more or less irregularly formed, and besides quite irregular forms occur, small short styli, strongyla, and other forms, as also small, more or less irregular siliceous globules. The greatest length measured of the needles was 0·12mm, and they may reach a thickness of ca. 0·007mm, but they occur in all degrees of thinness, down to exceedingly thin ones; in the same embryo, however, they are always of about the same thickness. They are only found in small numbers, 12—16 needles were counted in each embryo. They are always arranged in a particular way in the embryo, viz. as a bundle placed radiately with one end towards the centre and the other towards the periphery; this bundle may perhaps be interpreted as the first indication of the axis. The needles of the bundle are turned in different ways, some of them have the head-end turned inward, others outward. The microsclera are anisochelæ occurring in no small numbers, as well fully developed ones as developmental forms, but they are considerably smaller than the chelæ of the grown individuals, their length being only 0·014mm. In the smallest embryos no spicules were seen.

Observations on the synonymy. In spite of the peculiar and evidently very diagrammatic figure of the exterior found in Carter, it may no doubt be regarded as certain that the question is of his species. If, for instance, his figure is compared with my figure of the exterior Pl. II, fig. 14 it will be seen that this latter, if it were drawn in the same way as Carter's figure, would get a quite similar appearance. The other form mentioned in a parenthesis, to which belong the figures 16, g, h, and 19, a, b, I suppose, on the other hand, to be *A. infundibulum* Levins. Of Armauer Hansen's figures the cited ones may with great probability be referred here. The two varieties enumerated by Levinsen under his *cupressiformis* are certainly two well separated species, and only var. *robusta* belongs to the present species, while var. *lycopodium* is a separate species. Of Fristedt's *Cladorhiza cupressiformis* I have examined a type-specimen; the species is identical with the present one, and when Fristedt says that his species is wanting forcipes, he must have overlooked them, I suppose, on account of their being only found in the upper end; the fact is that they are really found in his specimen. With regard to Lambe's species *Esperella Fristedtii* the facts are rather peculiar; I have examined a fragment of one of his specimens. First this fragment proved to have forcipes, which must accordingly have been overlooked by the author; but then this fragment did not belong to this species, but to the following one, and accordingly it evidently belongs to the specimen that Lambe mentions separately. According to the description and the figures there can now be no doubt that the two other specimens are *A. cupressiformis.* The spicules mentioned by Lambe and figured in fig. 2, d and e, also corroborate this view, as they are exactly the embryonal spicules mentioned above under the embryos. When Lambe says that his species deviates from *cupressiformis* by not having forcipes and by its outer form, the reason of the first fact is that forcipes have been overlooked, and the latter fact cannot well be decided from Carter's diagrammatic figure of the exterior. When he further mentions differences in the form of the chelæ this statement is of no consequence, as neither Carter's figures nor those of Lambe himself are correct; Carter's, however, are far the better ones.

Locality: Ingolf, station 3, between the Faröe Islands and Iceland, 63° 35′ Lat. N., 10° 24′ Long. W., depth 272 fathoms, and at East-Greenland on the following localities: 72° 40′ Lat. N., 20° 00′ Long. W., depth 100 fathoms; 72° 27′ Lat. N., 19° 50′ Long. W., depth 120 fathoms; and at the south coast of Jameson's Land, depth 10—60 fathoms (The East-Greenland Expedition 1891—92); five specimens in all.

Geogr. distr. The species was taken by the Porcupine between Scotland and the Faröe Islands, at depths of 384, 363, and 632 fathoms, with the following respective bottom temperatures: ÷ 0°8, ÷ 0°3, and ÷ 0°8 C. Then it has been taken in the Kara Sea, depth 51—81 fathoms (Levinsen); west of Taimur, 76° 18′ Lat. N., 92° 20′ Long. E., depth 40 fathoms (Fristedt); the Baffin Bay at depths of 200 fathoms and 60—100 fathoms (Lambe). Thus the species is known from a territory between 70° Long. W. and 92° Long. E., and between ca. 60° and 76° Lat. N., with a bathymetrical range from ca. 40—632 fathoms. The species seems chiefly to be a native of the cold bottom, as most of the mentioned localities, or perhaps all of them, have a negative bottom temperature. Only the Ingolf-station 3 is a sure positive locality with a bottom temperature of 0°5 C., but then it is also of some interest to notice the fact that the mentioned deviating leaf-shaped specimen is obtained just on this locality.

5. **A. lycopodium** Levins.

Pl. II, Figs. 15—17. Pl. XI, Figs. 6 a—d, 7.

1885. *Esperia bihamatifera* Armauer Hansen, partim, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, Pl. 3, figs. 3, 4.

1886. *Esperella cupressiformis* var. *Lycopodium* Levinsen, Dijmphna Togtets zool.-bot. Udbytte, 364, 18 b, Tab. XXIX, Fig. 12, 13, Tab. XXX, Fig. 15, 16 d.

1900. *Esperella Fristedtii* Lambe, partim, specimen unum e tribus commemoratis, Transact. of the Roy. Soc. of Canada, Ser. II, VI, sect. IV, 21, Pl. I, fig. 2 f—h.

The axis slender with closely placed lateral branches issuing all round. The skeleton consists of a spicula-axis divided into fibres, between which the fibres of the lateral branches are inserted; outside of the axial fibres only a few scattered spicules. Spicula: Megasclera styli 0·238—1·5mm; microsclera of two forms, the characteristic anisochelæ palmatæ 0·014—0·017mm, forcipes 0·050—0·056mm.

In outer appearance this species reminds somewhat of *A. bihamatifera.* It is of a slender, erect form; below it has a quite short stalk. The other part is set with thin lateral branches issuing all round. In different individuals the branches may be of different length, which does not, however, exceed 3—3·5mm. The question is also here, I suppose, of contractibility. In a single specimen in which the branches are short, they are, as it were, somewhat coalesced at their bases, so that this specimen, as to its exterior, may somewhat remind of the preceding species. One specimen is of a peculiar appearance, showing no branches, but having all the part that in other specimens carries branches closely set with projecting needles which are, however, collected into bundles on the lower part. In a transverse section it is seen, however, that the projecting spicules, which are apparently evenly distributed over the surface, are bundles, radiating from the middle towards the surface, and spreading to some degree so as to be spread in a penicillate way at the surface. The lateral branches go off horizontally, or are a little directed upwards. The branches are quite short below where they begin, and also at the top they are most frequently shorter than in the middle. The upper end is of a peculiar structure, the branches here coalescing to a different number of longitudinal keels, the edges of which are set with a dense fringe of projecting spicules. This structure may be more or less marked, and seems also sometimes to be wanting, but when this is the case it is difficult to decide whether the sponge may not be damaged. The specimens in hand that are not broken off below are attached to pebbles; from the Kara Sea we have specimens attached to shells and tubes of *Pectinaria hyperborea.* The largest specimen (from the Kara Sea) has a length of 120mm; the stalk is here very short, and its length cannot be given exactly, the projecting spicules of the stalk here, as in many of the specimens, passing by so imperceptible degrees into the lower short branches, that no distinct boundary can be observed. Below the stalk is fully 1mm thick. Then we have individuals of decreasing sizes, the smallest, apparently entire specimen is fully 20mm high. By far the greatest number of the specimens are very slender and of equal thickness throughout their length; a few specimens are somewhat more robust and a little thicker in the middle, so as to be slightly fusiform. The consistency is rather firm, but the sponge is flexible; the stalk is hard. The colour (in spirit) varies from white to light brown. The *surface*, with the exception of the stalk, must be said to be smooth, as spicules only project at the ends of the branches. The stalk, on the other hand, is very shaggy from rather close-set, projecting spicules which pass quite evenly into the lower short branches. The *dermal membrane* is without megascleres, and is distended by the skeleton of the branches; it is closely filled with chelæ. I dare not decide anything as to *pores* and *oscula.* A few, roundish apertures are seen in the skin, most frequently of a size of about 0·09mm; they belong presumably to the incurrent system; the excurrent system opens possibly in the branches, which would then act as oscula.

The *skeleton* is chiefly arranged as in *A. bihamatifera*. It consists of a spicula-axis, which is not compact, but formed by a number of fibres arranged in a circular way round the middle; between these fibres the short fibres or spicula-bundles that form the skeleton of the branches are inserted, so as to meet in the middle. The fibres of the branches may often be seen not to be solid, but their inner part is hollow, so that they do not pass to the middle as solid fibres, but some of their spicules are inserted in one place of the axis, some in another place. In the periphery of the axis no spicules are found here, as was the case in *bihamatifera*, the dermal membrane is supported and distended only by the skeleton of the branches; at most a few scattered spicules are found. In the lower part of the stalk where spicules project all round, no circularly arranged fibres are found, but the spicules of the axis are seen in a transverse section to be more evenly distributed, or irregularly grouped, and the projecting spicules are inserted between them. In the axis a small amount of spongin is found.

Spicula: a. *Megasclera* are styli; most frequently they are straight, more rarely quite slightly curved; only the shorter styli, and especially the quite short ones occurring down in the stalk, are always more highly curved. The long styli most frequently, but to an almost imperceptible degree, become thinner a little below the rounded end. The opposite end tapers gradually to a long point, which is sometimes, especially in the thicker spicules, more abruptly pointed at the extremity. There is no difference between the needles of the axis and those of the branches, but towards the base the needles of the axis get shorter, and here they occur of a particular form as short curved styli to which especially those needles belong that project and make the stalk shaggy. These shorter, curved styli, to be sure, occur here as a particular form, but they are connected with the other styli by a series of transitional forms. If all sizes are included the length varies from 1·5mm quite down to 0·238mm; if the lower part of the stalk is excluded, 0·6mm may be given as about the lower limit, and the upper limit of the basal spicules may be put about at 0·4mm, but, as before mentioned, the two forms pass into each other. If all the forms are included the thickness is between 0·007mm and 0·021mm; it is tolerably proportionate to the length, and with regard to the short curved styli it does not exceed 0·015mm. Some fine to quite fine developmental forms are seen. b. *Microsclera:* these are anisochelæ palmatæ and forcipes. 1. The anisochelæ are of the type of the subgenus and are constructed in quite the same way as those of the preceding species. Their length is 0·014mm, varying very little to both sides; in one large and robust specimen they reach a length of 0·017mm; the breadth is 0·007mm. 2. Forcipes; these are longer and finer than in the preceding species. They are thickest above, and may here, when seen from the side, show a slight, tubercle-shaped swelling. They are of a characteristic form; from the curve the legs continue parallelly or in a slightly diverging manner, then follows a bend in such a manner, that the ends converge (Pl. XI, fig. 6 d)[1]. The legs end in a small, distinct knob; they decrease in thickness outward, and in their outer part they are so fine, as to be only discerned with difficulty. The length is rather constant, and was measured to 0·050—0·056mm. As mentioned, they are very fine, the thickness of the legs does not exceed 0·0010mm above, and towards the point they are much finer.

[1] If specimens are sometimes seen with their legs bent in other ways, this is, no doubt, only owing to the fact that they are under pressure in the preparation

The chelæ are found in very great numbers, and especially the dermal membrane is closely filled with them; forcipes are few in number, and occur chiefly at the top of the sponge.

Embryos. Also in this sponge embryos are found in most specimens and in very great numbers. They are situated in cavities in the tissue. They are very varying in size, from 0·05–0·23^{mm}. The larger ones are provided with both megascleres and microscleres. The megascleres are styli which are straight or more or less curved. They reach a length of 0·16^{mm}. According to the stage of development of the embryo they are of different thickness, from rather fine ones to ca. 0·007^{mm} at the upper end. The megascleres seem to appear first, as in the smaller embryos with fine styli no chelæ were seen. The styli are collected into a bundle reaching almost quite through the embryo, some of them have the point turned one way, some the other way. When the embryonic styli are somewhat curved, they remind very much of the curved styli occurring in the lower part of the stalk of the sponge, but they do not reach the size of these latter[1]). The chelæ of the embryos are here of the same size as those of the grown sponge, only in a few cases they seemed to be a trifle smaller. In the smallest embryos no spicules were found. Levinsen thinks that in this species a formation of buds takes place in the point of the lateral branches. I am inclined to think that the question is of embryos leaving the sponge through the lateral branches, which, as before mentioned, perhaps act as oscula. I have not seen embryos lying in the branches, but they are often seen lying at their base, and in some cases they were found hanging at the very point of the branches.

This species, which by Levinsen l. c. has been established as a variety, is, besides by other characters, also by its spicules, as well megascleres as both forms of microscleres, separated from the preceding one in a constant and sure way. Levinsen's statement, that the styli are longer and finer than in the preceding species, is not quite correct; they are longer, to be sure, but at the same time they reach a greater thickness. Armauer Hansen's figures quoted above, I suppose to belong to this species. As mentioned under the preceding species I have been able to decide by an examination of a type-specimen that one of the specimens of *Esperella Fristedtii* mentioned by Lambe belongs to this species, viz. the specimen with longer and thicker styli and smaller chelæ. Thus Lambe's species *E. Fristedtii* must be dropped.

Locality: By the Ingolf Expedition the species has been taken on station 44, 61° 42′ Lat. N., 9° 36′ Long. W., depth 545 fathoms; station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms (bottom temperature ÷ 0·4 C.); we have it further from the following localities: 61° 30′ Lat. N., 4° 26′ Long. W., depth 505 fathoms (bottom temperature ÷ 0·4 C.) (Wandel); 70° 32′ Lat. N., 8° 10′ Long. W., depth 470 fathoms (the East Greenland Exp. 1890–91); 62° 40′ Lat. N., 1° 56′ Long. E., depth 365 fathoms (bottom temperature ÷ 0°3 C.); 60° 09′ Lat. N., 5° 22′ Long. W., depth 620 fathoms (bottom temperature ÷ 0·15 C.) (Ad. Jensen, the cruise of the "Michael Sars" 1902). Nine specimens have been taken in all. The localities are situated east and west of the Faröe Islands, west of the Shetland Islands, between the Faröe Islands and Norway, and south of Jan Mayen.

Geogr. distr. The Kara Sea, depths 51–81 fathoms (Levinsen), the Baffin Bay, depth 130 fa-

[1]) As these sponges are most frequently highly filled with embryos, it will generally be the fact, that embryonic spicules are found in the spicula-preparations, and by judging of the spiculation attention must be paid to this fact.

thoms (Lambe). Also this species seems to be a native of the cold bottom; to be sure, a bottom temperature of 4·8 C. is stated for station 44; but in its immediate neighbourhood, on station 43, so low a positive temperature as 0·5 C. is found.

It is worthy of notice that in the three species of the subgenus *Asbestopluma* and the two *Lycopodina*-species now treated, which are in all principal respects of the same outer form, the skeleton of the axis is formed in a somewhat different way. In *pennatula* only few spicules are found in the middle of the axis, and also between the canals only narrow spicula-parts occur; outermost, on the other hand, there is a powerful spicula-layer, to which the firmness of the axis is especially owing. In *bihamatifera* a circle of powerful fibres is found, and outermost only a thin spicula-layer. In *furcata* the axial skeleton is divided into more or less narrow spicula-parts, and outermost is found a rather powerful spicula-layer. In *cupressiformis* we find a strong skeletal axis situated in the middle, the spicules of which may be more or less gathered into fibres, which are then connected by a network of not parallel spicules. In *lycopodium*, finally, there is a circle of separate fibres, and here no spicula-layer is found outermost.

6. **A. hydra** n. sp.

Pl. II, Figs. 18, 19. Pl. XI, Fig. 8 a—f.

Formed like a tree with branches issuing from the upper end of a stalk. The skeleton consists in the stalk of a spicula axis, in the upper end of which the fibres of the branches are inserted. Spicula: Megasclera subtylostyli, in the axis 0·47—0·8^{mm}, in the branches 0·35—0·60^{mm}; microsclera of one form, anisochelæ palmatæ of the characteristic type 0·012—0·014^{mm}.

This small *Lycopodina*-species is of an exceedingly beautiful and elegant form. It consists of a stalk ending in a swelling above, from which issues a number of thin, undivided branches. Below it is by an expanded basal part attached to a small stone, a lump of sand, or the like. The stalk is cylindric and straight. The sponge is of small size, the largest specimen is 12^{mm} high, and the greatest length of the branches is 4—5^{mm}. The stalk is only ca. 0·15^{mm} thick, and the branches ca. 0·05^{mm}. The smallest specimen is 5^{mm} high. The branches may be of somewhat varying length, and in a few cases they are quite short or almost wanting. In the latter case the upper side of the swelling is densely shaggy from projecting spicules, which, as far as I have been able to decide, belong to the thinner form, occurring in the branches. The swelling, from which the branches issue, seems also to be always larger and more compact, when the branches are quite short or wanting, than when they are present in their full length; therefore I am also here inclined to think that the branches are able to contract. The consistency is firm, as the greater part of the sponge consists of spicules with comparatively little soft tissue, but the sponge is flexible and elastic. The colour (in spirit) is white or slightly whitish yellow. The *surface* is smooth on the upper part of the stalk and the branches, only in the ends of the branches the spicules project. The lower part of the stalk and the basal expansion are shaggy from projecting spicules. On the stalk and the branches only a very thin layer of tissue is seen; on the thickened part between the bases of the branches, on the other hand, there is a thicker layer of tissue, which is bounded outwardly by a *dermal membrane*, supported by no particular skeleton, but provided only with microscleres. *Pores* and *oscula* were not seen.

The *skeleton*. In the stalk the skeleton consists of needles closely united and parallel to the longitudinal axis. The spicula-axis formed in this way divides above into a number of more or less distinctly separated fibres bending a little outward, and between these fibres those of the branches are inserted. These latter fibres also consist of closely united, parallel spicules. As will be more particularly mentioned below, the spicules of the stalk are thicker and more fusiform, those of the branches more slender and less fusiform. In the stalk a rather slight amount of very clear spongin is found.

Spicula: a. *Megasclera* are subtylostyli of two forms, those of the stalk and those of the branches. The subtylostyli of the stalk are straight, rather thick, and highly fusiform, tapering much towards the head-end; the tapering may otherwise be somewhat varying. They have a head-swelling which is most frequently inconsiderable, and almost always placed a little below the end. The opposite end tapers from the middle evenly towards the point, but the end itself is somewhat more abruptly pointed, especially in the thicker ones. The length is rather varying, from 0·47—0·8^{mm}, and the thickness from 0·017—0·028^{mm}, the thickest ones being far from always the longest ones. The spicules of the branches are likewise straight, or very slightly curved, fusiform subtylostyli, but they are somewhat slenderer than those of the stalk, and so they are not so markedly fusiform as those. The swelling of the head-end is a little more pronounced, and is also here placed a little below the end. The opposite end is long and evenly tapering. Their length varies between 0·35—0·6^{mm}, and the thickness varies proportionately between 0·006—0·014^{mm}. As mentioned above the larger spicules form the skeleton of the stalk, and the smaller ones that of the branches, which is formed exclusively by these latter, but they may also be found in small number in the periphery of the stalk, and the spicules projecting in the lower part of the stalk are of this form. Thus the two forms of spicules have each of them a special place of occurrence, and they show also so much difference as to form, that they may generally be referred at once to their separate group. It is, however, scarcely to be supposed that they form two fundamentally different forms, as transitions are found between them, and these transitional forms occur exactly at the place where the stalk and the branches pass into each other. Here, in the thickened part, from which the branches issue, transitional forms are found that may be referred to one form as well as to the other. The basal expansion is formed by both kinds of spicules, the prominent ones seem chiefly to belong to the smaller form; but here again the two forms are not sharply separated, but transitional forms occur. b. *Microsclera:* these are of one kind only, anisochelae palmatae of the *Lycopodina*-type; they have a form quite similar to that of the chelae in the two preceding species, but they are a little smaller, the length is 0·012—0·014^{mm}, most frequently, however, the latter length; the breadth is 0·005^{mm}. The chelae, as usual, occur throughout the tissue, but are especially numerous in the dermal membrane.

Locality: Of this small, interesting, and beautiful species, which is easily recognizable by its outer form alone, the Ingolf-Expedition has obtained fifteen specimens in all; most of them were not found till after the return of the Expedition, when they were discovered in the bottom specimens growing on pebbles and particles of gravel. Station 113, 69° 31′ Lat. N., 7° 06′ Long. W., depth 1309 fathoms (bottom temperature ÷ 1°0 C.), thirteen specimens; station 119, 67° 53′ Lat. N., 10° 19′ Long. W., depth 1010 fathoms (bottom temperature ÷ 1 0 C.), two specimens. Thus also this species is a native of the cold bottom, and it is only known from great depths. Both the stations are situated between Iceland and Jan Mayen.

Cotylina n. subg.

Formed like a calyx (or head) on a rather long stalk. The skeleton consists in the stalk of a spicula-axis, in the calyx-wall of more irregular arranged spicules. Spicula: Megasclera styli or subtylostyli, often divided into several forms occurring in fixed places in the sponge; microsclera: the characteristic anisochelæ palmatæ have the alæ of the larger end reaching to about the middle of the shaft, the smaller end is somewhat longer than in Lycopodina, of a similar structure, but elliptical in a transverse section: to the chelæ may be added forcipes.

7. **A. infundibulum** Levins.

Pl. II, Figs. 20—21. Pl. XI, Fig. 9 a—m.

1874. *Esperia cupressiformis* Carter, partim, specimen in interclusione commemoratum, Ann. Mag. Nat. Hist. Ser. 4, XIV, 215, Pl. XIV, fig. 19 a, b.

1885. *Esperia bihamatifera* Armauer Hansen, partim, the Norwegian North-Atlantic Exp. XIII, Spongiadæ, Pl. III, fig. 6.

1887. *Esperella infundibulum* Levinsen, Dijmphna Togtets zool.-bot. Udbytte 366, 19, Tab. XXIX, Fig. 14, Tab. XXXI, Fig. 17—19.

Formed like a calyx on a long stalk. The skeleton consists in the stalk of a spicula-axis, in the calyx-wall of less regularly arranged spicules: on the outside of the calyx spicules project. Spicula: Megasclera of three forms, styli or subtylostyli in the axis and the calyx-wall 0·17—0·83^{mm}, styli with a very long, fine point, projecting on the outside of the calyx 0·44—0·6^{mm}, subtylostyli in the refolded edge of the calyx 0·149—0·22^{mm}: microsclera of two forms, the characteristic anisochelæ palmatæ 0·018—0·027^{mm}, forcipes 0·075^{mm}.

This species is formed like a calyx placed on a long, thin stalk. The calyx may be somewhat differently shaped; most frequently it has a regular form as a short funnel and with a wide round opening, but sometimes it is highly compressed, so that the two sides are closely joined, and the opening becomes a narrow slit. Of the specimens from the Ingolf-Expedition one is torn off, the other is attached to some sponge-spicules. From the Kara Sea we have it attached to tubes of *Pectinaria hyperborea.* The largest specimen in hand (from the Kara Sea) is 50^{mm} high, of which the stalk makes 42^{mm}; the compressed calyx is ca. 10^{mm} in diameter. The stalk is very thin, 0·5—1^{mm}, a little thicker below than above. The smallest specimen is 14^{mm} high, and has a very small calyx of a diameter of only 1·5^{mm}. The edge of the calyx looks as if it was thickened, but this is owing to the fact that the edge is refolded, and the fold fits closely to the inside. The calyx is of a rather soft consistency, the stalk firm, but flexible. The colour (in spirit) is a dirty cream-colour. The surface, both of the stalk and of the outside of the calyx, is shaggy from projecting spicules. There is a thin *dermal membrane*, which on the outside of the calyx is pierced by the projecting spicules. *Pores* and *oscula* have not been seen with certainty; on the outside were seen scattered openings of different sizes, and in one specimen there were a few openings in the bottom of the calyx; but in both cases the question is possibly only of damagings of the soft tissue.

The *skeleton*. The skeleton of the stalk consists of an axis of closely united needles parallel to each other, between which are interwoven other needles which jut out horizontally. Above the axis is divided more or less distinctly into fibres that pass into the skeleton of the calyx. In the calyx-wall the skeleton consists of needles which are not united into fibres, and a great part of which are placed chiefly in the longitudinal direction; they are not, however, parallel to each other, but intercross irregularly, and some are also found placed in other directions. Between these needles spicules and spicula-bundles are inserted on the outside, projecting through the surface and directed somewhat upwards; the inside of the calyx, on the other hand, is smooth without projecting spicules. In the upper part of the calyx-wall the spicules are closely packed and parallel to each other; in the refolded edge spicules are found of a special size, as will be more particularly mentioned below; moreover, this edge is highly filled with chelæ. Spongin is found, at all events in the stalk.

Spicula: a. *Megasclera.* These are styli or subtylostyli; they fall under several forms which also occur in different places of the sponge, but on account of the slight material, I have had some difficulty in examining this fact. The skeleton of the stalk and the greater part of that of the calyx consists of long, slender styli, which have sometimes a small head-swelling. They are fusiform, tapering a little towards the head-end, and they have an evenly tapering, middle-long point. Downward in the stalk they become shorter and also somewhat curved, and the spicules that are horizontally interwoven in the stalk and projecting are all short and curved. In most individuals these projecting, shorter, and a little curved needles deviate further by having a more or less distinct head, so that they become tylostyli. Taken as a whole these styli vary from ca. 0·17—0·83mm, but in the calyx and the upper part of the stalk they do not generally go below ca. 0·3mm; the thickness is 0·0057—0·011mm. Besides these styli, which form, accordingly, the principal part of the skeleton, still two other forms are found; the first of these are very slender styli, showing sometimes an almost imperceptible head-swelling; they are considerably finer than the preceding ones, and they have a very long, fine point, almost always with an even curve; their length is between 0·41—0·6mm; in their lower part they are slightly fusiform, and their thickness in the thickest part is at most 0·007mm. These spicules are found outermost in the calyx-wall and project from it; they seem mostly, but not exclusively, to form the projecting spicules. The third form of megascleres are short, straight tylostyli or subtylostyli; the head is tolerably well marked and placed a little below the rounded end, the point is short. Their length is 0·149—0·22mm, and the thickness is 0·006mm. These spicules are found in the refolded edge, and they form the spiculation of this edge. These three forms of spicules, of which only the first-mentioned form is very varying, while the two other forms are rather constant as to form and size, do not appear to be connected by transitional forms. b. *Microsclera.* These are anisochelæ palmatæ and forcipes. 1. The anisochelæ are *Asbestopluma*-chelæ of a structure characteristic of the subgenus. The alæ of the larger end do not reach so far down along the shaft as in the chelæ of the two other subgenera, only to about the middle of the shaft; they bend somewhat forward towards the tooth; together they form almost a triangle, and they go in to the shaft with a somewhat indented lower edge. The tooth is elliptical, of about the same length as the alæ, but much narrower; it has a long, narrow, downward pointed tuberculum. It is very difficult to get a clear view of the structure of the smaller end on account of the fineness and transparency of the parts. The structure of this end may best be compared with that in *A. cupressiformis*, but it is comparatively larger, and the parts are of a somewhat different form. When the chela is viewed from the side, two long, narrow, ridge-shaped bodies that are parallel to each other and run close together are seen at the lower end of the axis. If the chela is turned with the lower end directly towards the beholder, it is seen that the question, as usual, is of alæ and tooth, but the optical transverse section does not, as in *cupressiformis*, form a circle, but on the contrary an ellipsis placed transversely, alæ and tooth being nearer to each other and therefore less refolded on the side, where they are separated by a quite narrow slit (Pl. XI, fig. 9 h). When the chela is viewed from the front under sufficient magnifying powers, it is seen that the alæ form together an almost quadrangular plate, the upper corners are somewhat drawn out, and there is a round incision about to the middle of the ala, which gives to the plate formed by the alæ a shield-shaped appearance. The upper edges of the alæ continue inward to about the median line of the shaft and form two projections separated from the outdrawn corners by a curve. The tooth is of a similar form as the plate formed by the alæ, the upper edge has three teeth, and the upper half of the lateral edges is cut off obliquely. Thus, as in *cupressiformis*, only the lower half of the lateral edges of the alæ and tooth is refolded and meets on the side. The drawn-out upper corners of the alæ and the mentioned middle projections are directed forward, and when the chela is viewed from the side, they form the forward directed upper part of the hindmost of the two parallel ridges. The tooth has an oblong, somewhat club-shaped tuberculum which is broadest upward. The chela varies somewhat in size, not so much in one individual, but rather considerably in different individuals. Together with the variation as to size we find some variation as to form, as the dimensions of the different parts of the chela may change somewhat. Especially in the smaller chelæ the smaller end is comparatively longer and the middle part of the shaft a little shorter. The upper corners of the alæ are often more drawn out and together with the middle projections directed more forward. The whole smaller end is at the same time more narrow, and the larger chelæ are upon the whole comparatively more robust than the smaller ones. The chelæ occurring in the embryos show new differences, the larger end and especially the tooth being longer, so that the two ends of the chela almost meet. The length of the chelæ varies from 0·018—0·027^{mm} [1]), the greatest breadth varies proportionately from 0·010—0·014^{mm}, and the thickness of the shaft from ca. 0·001—0·004^{mm}. Developmental forms of the chela are found rather abundantly, in all stages, from quite fine ones to the fully developed ones. 2. Forcipes; these seem always to have the form figured by Levinsen l. c., with one leg crossing the other; they are a little thickened above in the curve, the legs are exceedingly fine, and end in a little knob. The length is about 0·075^{mm}, and the thickness of the legs in the middle is less than

1) When in one individual both large chelæ and quite small ones are found, and when chelæ are found considerably smaller than the given measures, this is owing to the fact that these chelæ belong to the embryos; see below under Embryos.

0·001^{mm}. The chelæ occur in large quantities, especially in the skin and also down on the stalk; they are found in enormous numbers in the refolded edge the spiculation of which they form together with the mentioned short tylostyli. Forcipes are very few.

Embryos. In most specimens of this sponge embryos were found; they are situated in the calyx-wall, rather close-lying, and in rather large numbers. They are globular, of somewhat different size up to 0·18^{mm} in diameter. Their spiculation is somewhat interesting. They have both megasclera and microsclera; the microsclera are chelæ of the same form as in the grown ones, but they are smaller, they were thus measured to 0·014^{mm}. That some difference is also seen in the dimensions of the single parts has already been mentioned under the chelæ. The megasclera show no likeness at all with those of the grown sponge; they are more or less irregularly, often highly curved, and they may be of different forms as strongyla, styli, or oxea, and they have swellings in different places; most frequently they are strongyla. In the largest of the embryos they were measured of a length of about 0·1^{mm} and a thickness of 0·007—0·008^{mm}, but in the smaller embryos they are considerably finer. In the examined embryos they were only present in small numbers, about ten needles in each embryo.

Remarks: After Carter's mentioning and figure l. c., there can scarcely be any doubt that the form mentioned there in the parenthesis is *infundibulum*; in the specimen before him the calyx must then have been in a compressed state. Also Armauer Hansen's figures cited above are surely *infundibulum*. As I have had Levinsen's type specimens from the Kara Sea for examination, I have been able to determine the species with certainty. Levinsen, by his mentioning of the chelæ, states that in a specimen of *cupressiformis* he has found the same chela as that occurring in *infundibulum*, only, however, to a number of five; therefore he thinks that this chela is identical with the one figured by Vosmaer (Niederl. Arch. für Zool. Suppl. Band I, Pl. I, figs. 109—110) as belonging to the species enumerated as *Cladorhiza bihamatifera*, as he supposes *cupressiformis* and *bihamatifera* to be one species. As will have been seen before under *bihamatifera*, this, however, is not the fact; Vosmaer's species is *pennatula*, and the large chela in this species as well as in *bihamatifera* is of a quite different type, and the five chelæ found by Levinsen in *cupressiformis* must have been extraneous bodies; extraneous microsclera are frequently found, especially microsclera from sponges growing in the same place. With regard to the description of the smaller part of the chela Levinsen has not interpreted the form of this part correctly. His figures are good, and show the occurring variations in an excellent manner; but by the magnifying powers he has used, he has not been able to get a view of the fact that the smaller end consists in the common way of alæ and tooth, but interprets this end as forming a cup, at the bottom of which the tuberculum is placed.

Locality: Station 116, 70° 05′ Lat. N., 8° 26′ Long. W., depth 371 fathoms (bottom temperature ÷ 0°·4 C.); station 126, 67° 19′ Lat. N., 15° 52′ Long. W., depth 293 fathoms (bottom temperature ÷ 0°·5 C.); station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms (bottom temperature ÷ 0°·4 C.). These three stations are situated north of the Faröe Islands, north of Iceland, and south of Jan Mayen, and they are all in the cold area.

Geogr. distr. With regard to the specimens of the Norwegian North Atlantic Expedition, the particular locality is not known; Carter's specimen was taken by the "Porcupine" south of the

Faröe Islands, depths 363 fathoms and bottom temperature ÷ 0·3 C. Levinsen's specimens are from the Kara Sea, depths 50–70 fathoms, the bottom temperature is also here negative. From these facts it is seen that the species is a native of a bottom with negative temperature.

8. **A. comata** n. sp.

Pl. II, Figs. 22–23. Pl. XII, Fig. 1 a–f.

Formed as a compressed calyx on a stalk; the upper end of the calyx with a fringe of exceedingly fine spicules. The skeleton consists in the stalk of a spicula axis, in the calyx-wall of needles, partly placed in the longitudinal direction; from stalk and calyx spicules project. Spicula: Megasclera of four forms, styli in the axis 0·44–0·51^{mm}, subtylostyli in the calyx-wall 0·238–0·476^{mm}, subtylostyli in the refolded calyx-edge 0·140–0·23^{mm}, and styli with a long, curved, very fine point, projecting from the stalk and the calyx and forming the upper fringe 0·7–1·4^{mm}, between them pearl-string-formed styli; microsclera of one form, anisocheloe palmatoe of the characteristic type 0·017–0·019^{mm}.

Of this species we have only one specimen, and the fact of this species being of a very slight size has somewhat hindered the examination. As to the exterior it is somewhat similar to *infundibulum*, and is formed as a calyx on a thin stalk; the calyx is highly compressed, and consequently flat. From the stalk and the calyx long, hair-like needles project and form round the edge of the calyx a fringe which is, however, little conspicuous to the naked eye. The stalk is below for some way attached to a sponge-spicule, which accordingly serves as a substratum for the sponge. The total height of the sponge is 10^{mm}, of which the stalk is fully 7^{mm}. The breadth of the calyx is 2^{mm}, and the thickness of the stalk only 0·10^{mm}. The colour (in spirit) is whitish. The *surface*, as before mentioned, is shaggy from long, hair-like spicules. With regard to *dermal membrane, pores* and *oscula* I can say nothing.

The *skeleton*. In the stalk the skeleton consists of an axis of closely united parallel spicules. From this axis fine, long-pointed spicules issue; with their head-end they are interwoven between the spicules of the axis, or otherwise attached to the axis, and they are very projecting; in the lower part of the stalk they project almost horizontally, but they become the more upwardly directed, the farther up the stalk we go. The stalk passes gradually into the calyx; in the lower part of the calyx-wall the spicules are not arranged in any observable order; some are lying in the longitudinal direction, but otherwise they are lying in all directions parallel to that in which the wall extends. In the upper half of the calyx-wall the spicules are arranged in such a manner as to be lying chiefly or exclusively in the longitudinal direction parallel to each other, and from here issue the spicules that form the mentioned fringe along the edge of the calyx. In the upper edge of the calyx, which is also refolded in this species, shorter spicules of a particular form are found. In the stalk spongin was observed.

Spicula: Megasclera: these are styli or subtylostyli, and they occur in several forms. The axis of the stalk is formed by styli which are straight or most frequently slightly curved; they are fusiform, tapering somewhat towards the head-end, the opposite end grows evenly thinner to a long point. Their size seems to be rather constant, their length was measured to 0·44–0·51^{mm}, the thickness is

0·011—0·012mm. The needles chiefly forming the skeleton of the calyx-wall are of a somewhat different form; they are straight or, more rarely, a little curved subtylostyli with a rather distinct, but small head-swelling, placed a little below the end; they are only a little thicker in the middle than at the upper end; the point is even, but not long. The length was measured from ca. 0·238—0·475mm, and the thickness is 0·007—0·008mm. Besides these two forms short subtylostyli occur abundantly in the mentioned refolded edge; they are of quite the same form as the preceding ones, the length is from 0·149mm to about 0·23mm, and the thickness is 0·005—0·007mm; as mentioned, they occur only in the refolded edge, but their size, which passes into the size of the other subtylostyli, seems to make it doubtful whether these two kinds of subtylostyli are really different. The fourth form of megasclera is the one most characteristic of the species; it is the long spicules projecting from stalk and calyx and forming the crown at the top. They are long, thin styli running out into a very long and very fine point. They are almost always evenly curved in the outer part; sometimes the curving is a little irregular. Their length is very varying, it may be given to between 0·7 and 1·4mm [1]). The thickness at the head-end is ca. 0·005mm. Down at the base of the stalk they seem to be shorter, and these short needles often have a head-swelling. Among the projecting needles some are found of a very characteristic appearance; in a shorter or longer portion of their outer part they have a series of ring-like swellings, so that they get an appearance like a string of pearls; together with this feature they have often a somewhat shorter point, and their length may then go down to 0·65mm, and they are likewise often somewhat more robust, of a thickness of up to 0·01mm. As these needles have otherwise the same form and occurrence as the other projecting ones, they are scarcely anything else than a variation of the same type. The needles projecting from the axis are partly interwoven between the parallel spicules of the axis, partly they are, a great deal of them, attached to its outside. b. *Microsclera:* these are only of one kind, anisochelæ palmatæ, and they are of quite the same structure as the chelæ in *infundibulum;* their length is 0·017—0·019mm and the breadth 0·008mm. They are present in great numbers and occur especially abundantly in the refolded edge of the calyx.

This species seems to be closely allied to *A. infundibulum*, both on account of the outer form and of the projecting, long pointed styli, but it differs from it among other things by other sizes of the different forms of needles, and by the occurrence of peculiar, pearl-string-shaped needles. These spicules recall to some degree those in *Meliiderma stipitata* described and figured by Ridley and Dendy, but these latter are much shorter and shorter pointed.

Locality: Station 78, 60° 37' Lat. N., 27° 52' Long. W., depth 799 fathoms; the station is situated on the eastern slope of the Reykjanes-ridge.

The genus *Asbestopluma* forms a well characterized genus, the species of which are also characteristic in their exterior by being all of erect and symmetrical form, and also the skeletal structure shows great conformity. Outside this genus a similar form occurs in *Chondrocladia*, and among the

[1]) Exact limits for the length of these spicules cannot be given, as the outermost point is wanting in almost all of them.

Esperiopsis-species one species is found, *E. symmetrica* R. and D. (Chall. Report. XX, 77, Pl. XXVI, figs. 4, 4 a), which shows, in its outer form and skeletal structure, very great conformity to several of the *Asbestopluma*-species. A conspicuous peculiarity common to the *Asbestopluma*-species is the fact, that embryos are so often found. Also in the mentioned *Esperiopsis*-species embryos were found occurring in the same way as in the *Asbestopluma*-species. The embryos, otherwise, show some difference in the different species with regard to the spicules occurring in them. Embryos were found in the species *pennatula*, *furcata*, *cupressiformis*, *lycopodium*, and *infundibulum*. The difference in their spiculation may be seen in the following table:

	Size of the embryo	Spiculation
pennatula	0·5—1^{mm}	No megasclera, only sigmata and the small chela. Sigmata seem to appear first.
furcata	0·3^{mm}	Megasclera small subtylostyli of an average length of 0·208^{mm}; microsclera sigmata and the small chela, both a little larger than in the grown sponge.
cupressiformis	0·05—0·27^{mm}	Megasclera small subtylostyli, often irregularly formed, and styli, strongyla, etc., arranged in a bundle. The length up to 0·12^{mm}; microsclera chelæ a little smaller than in the grown sponge.
lycopodium	0·05—0·23^{mm}	Megasclera small, straight or curved, styli arranged in a bundle, the length up to 0·16^{mm}; microsclera chelæ of the same size as in the grown sponge. Megasclera appear first.
infundibulum	up to 0·18^{mm}	Megasclera quite irregular styli, strongyla or oxea, the length up to 0·1^{mm}. Microsclera chelæ a little smaller than in the grown sponge.

Among the earlier described *Asbestopluma*-species embryos are mentioned in two, viz. in *biserialis* R. and D., in which, as in *pennatula* and *furcata*, they are found in the axis; the only thing said of them is that they have numerous spicules; further in *versatilis* Tops., of which it is stated that they have of megasclera oxea and strongyla, and of microsclera chelæ[1]).

Topsent, who, in 1901 (Résultats du Voy. du S. Y. Belgica, 23), takes up and diagnosticates the genus *Asbestopluma*, enumerates at the same time the six species which, in his opinion, belong to it, viz. *cupressiformis* Cart., *bihamatifera* Cart., *pennatula* Schmidt, *biserialis* R. and D., *Nordenskiöldii* Frstdt., and the new-established species *Belgica*. Of these species *Nordenskiöldii*, as above mentioned, is synonymous with *pennatula*. Some more species have been described, however, which Topsent has not noticed, but which belong here, viz. besides the already described *infundibulum* Levins., the species *versatilis*, established by Topsent himself in 1892 (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 100, Pl. VI, fig. 5, Pl. X, fig. 9), and by him referred to the genus *Forcepia*, as well as the *Esperella occidentalis* established in 1893 by Lambe (Transact. of the Roy. Soc. of Canada XI, Sect. IV, 28, Pl. II, figs. 6, 6 a—e), and the *E. minuta* established by Lambe in 1900 (ibid. Ser. 2, VI, Sect. IV, 23, Pl. I, figs. 3, 3 a—e). Thus besides the eight species taken by the Ingolf, the following ones belong to this genus: *biserialis* R. and D., *Belgica* Tops., *occidentalis* Lambe, *versatilis* Tops, and *minuta* Lambe.

[1]) According to the statement of Topsent, it was to be supposed that the embryos had the microsclera occurring in the species, viz. chelæ and forcipes; but to judge from the figure they have only chelæ, and this, I suppose, is the correct thing.

A. biserialis R. and D. is a penniform species provided with axial styli, reaching a length of 2^{mm}, and subtylostyli in the branches 0.44^{mm} long. Of microsclera are found palmate anisochelæ 0.012^{mm} long, and sigmata 0.025^{mm} long. Unfortunately no anisochelæ are figured, but they may certainly be taken to belong to the form peculiar to the subgenus *Asbestopluma*. Its combination of spicules places it nearest to *Belgica*, as sigmata and only one form of chelæ are found in it, but the arrangement of the lateral branches separates the two species sharply. Ridley and Dendy do not mention any stalk-coating, but there is some reason for believing that such a one is found; it may either have been overlooked or wanting in their two specimens both of which were broken off below.

A. Belgica Tops., as to its exterior, recalls *bihamatifera*; accordingly it has branches issuing all round, but the branches are arranged in groups of circles, and the groups are separated by naked intervals. The number of circles in the group varies from five to ten, but the number of branches in the circle is always six, and the branches are placed just over each other. The spiculation shows of megasclera axial styli 1.4^{mm} long, with a little tapering upper end, and in the branches tylostyli ca. 0.8^{mm} long, further in the stalk-coating curved, finely spinulous tylostrongyla of an average length of 0.2^{mm}. The microsclera are anisochelæ 0.012^{mm} long and sigmata 0.033^{mm} long. Topsent's figure shows that the anisochelæ are of the type characteristic of the subgenus *Asbestopluma*. This species, which is so interesting with regard to its exterior, is by the spicula-combination sharply separated from the other species, with the exception of *biserialis*, to which in this respect it is closely allied.

A. occidentalis Lambe is a species closely allied to *cupressiformis* and *lycopodium*, but separated from these not only by the sizes of the spicules, but also by the skeletal structure, as it has, besides a hollow middle axis of spicules, also an outer circle of spicula-fibres, while *lycopodium*, to which it is most closely allied, has no such outer circle. Megasclera are styli growing to a length of 1.30^{mm}; those found in the part of the branches inserted in the axis are given to a length of 0.41–0.08^{mm}; microsclera are anisochelæ 0.013^{mm} long, and forcipes 0.032^{mm} long. From Lambe's figure of the chela it cannot be decided with certainty that it is of the form typical of the subgenus *Lycopodina*, but this will certainly prove to be the fact. To judge from the figure, forcipes have a particular form.

A. versatilis Tops. Topsent referred this species to the genus *Forcepia*, partly on account of the fact that forcipes are found in it, and partly because he found embryos, in which he found diactinal spicules which he took to be the dermal spicules of the species, which did not later develop further, so that they were wanting in the grown sponge. The species is, however, surely an *Asbestopluma* of the subgenus *Cotylina*, and seems to be closely allied to *infundibulum*, with which species it shows some conformity both in its exterior and its spiculation. That it is an *Asbestopluma* is seen from its chelæ, which, as far as can be seen from Topsent's figure, seem to belong to the *Cotylina*-type, and as forcipes are also found in this genus, their occurring here cannot solely justify the referring to *Forcepia*. Also its anisochelæ tell against referring it to this genus, as all the other *Forcepia*-species have isochelæ. With regard, finally, to the embryonic spicules, I do not think that the forms figured by Topsent recall the dermal spicules of the *Myxillinæ*. Quite similar spicules, as will have been seen, are found in the embryos of *infundibulum*, they are only more irregular, and also monactinal spicules are found between them. To be sure, the question is here of embryonic spicules that cannot be interpreted as special dermal spicules. The species has of megasclera styli 0·58^{mm} long, of microsclera anisochelæ 0·027^{mm} long, and forcipes 0·076^{mm} long [1]).

A. minuta Lambe might, as to its exterior, remind of *infundibulum*, but its spiculation is different. According to Lambe the megasclera are of two kinds, styli or subtylostyli 0·327—0·543^{mm} long and 0·006—0·008^{mm} thick which form the principal part of the skeleton, and small tylostyli 0·196—0·204^{mm} long and 0·005—0·006^{mm} thick which project from the surface. The microsclera are anisochelæ 0·018—0·019^{mm} long, which, to judge from the figure, may be said with certainty to belong to the *Cotylina*-type.

The genus *Asbestopluma*, consequently, is chiefly characterized by its erect symmetrical form with the skeletal structure contingent upon this form, and by the occurrence of a small chela of peculiar type. As will have been seen in the preceding, it is, however, with regard to both these features, divided into three groups, and to this division contributes further the occurrence in one of these groups of sigmata and of a stalk-coating with special spicules. The subgenus *Asbestopluma* s. str., formed for the first of these three groups, is accordingly characterized as to its form by distinct, often rather long, well separated lateral branches, by a small chela, the larger alæ of which reach far down towards the smaller end, which latter is narrow, and by the occurrence of sigmata and of a stalk-coating with a spiculation of finely spinulous tylostyli or tylostrongyla. On the other hand, the occurrence of the large chela cannot be used, as this chela is wanting in two of the species. The second subgenus, *Lycopodina*, is characterized by its often shorter, sometimes less well separated branches, which also sometimes all issue from the top of the stalk, and by a small chela, the larger alæ of which pass quite down to the opposite end of the chela, which end is broad and of a peculiar form. Sigmata and stalk-coating are not found. The occurrence of forcipes cannot be used, as these spicules partly are wanting in one species, and partly may be found in the third subgenus. This third subgenus, *Cotylina*, is well characterized by its form, which is as a calyx (or a head) on a stalk; it has a small chela, the larger alæ of which pass to about the middle of the shaft, the smaller end of the chela is constructed about as in the preceding subgenus, showing, however, characteristic differences, and a transverse section of it shows an elliptic contour. Sigmata and stalk-coating are not found, but forcipes occur in two of the species. Thus the two first subgenera are especially separated by the form of the chela, and by having or wanting sigmata and stalk-coating, the two last genera by the form of the chela and by the outer form of the sponge. Whether the peculiar, long pointed, projecting spicules occurring in two of the described species of the subgenus *Cotylina* may possibly prove to be characteristic of the genus, cannot yet be decided.

According to the account rendered in the preceding of the species that have not been fully treated here, all the known *Asbestopluma*-species may, as far as the fact can be decided from the literature, be grouped in the following way in the established three subgenera:

[1]) In Topsent's work from 1904, which I have received later, the author himself draws the attention to the fact that *versatilis* is to be referred here.

Asbestopluma s. str.

pennatula O. S. — *biserialis* R. and D.
bihamatifera Cart. — *Belgica* Tops.
furcata mihi.

Lycopodina n.

cupressiformis Cart. — *occidentalis* Lambe
lycopodium Levins. — *hydra* mihi.

Cotylina n.

infundibulum Levins. — *comata* mihi
versatilis Tops. — *minuta* Lambe.

A systematic survey of all *Asbestopluma*-species may be given as follows:

a. Sigmata are found; stalk-coating also (*biserialis*?):
- *b.* Two forms of chelæ; besides the *Asbestopluma*-chela a larger chela of a different type:
  - *c.* The lateral branches arranged biserially; the spicules of the stalk-coating tylostrongyla . . . . *pennatula* O. S.
  - *c.c.* The lateral branches arranged pluriserially:
    - *d.* The spicules of the stalk-coating tylostyli . . . . *bihamatifera* Cart.
    - *d.d.* The spicules of the stalk-coating tylostrongyla; the lateral branches very small . . . . *furcata* n. sp.
- *b.b.* Only one form of chelæ:
  - *c.* The lateral branches arranged pluriserially . . . . *Belgica* Tops.
  - *c.c.* The lateral branches arranged biserially . . . . *biserialis* R. and D.

a.a. No sigmata; no stalk-coating:
- *b.* More or less marked lateral branches, or the branches all issuing from the top of the stalk. (Sometimes leaf-shaped without lateral branches):
  - *c.* Forcipes are found; the branches are lateral:
    - *d.* The fibres of the lateral branches do not go to the middle of the axis, chelæ 0·023—0·025mm, forcipes 0·038—0·048mm . . . . *cupressiformis* Cart.
    - *d.d.* The fibres of the lateral branches are going to the middle of the axis:
      - *e.* No spicula-fibres outside the axis; chelæ 0·014—0·017mm, forcipes 0·050—0·056mm . . . . *lycopodium* Levins.
      - *e.e.* Spicula-fibres outside the axis; chelæ 0·013mm, forcipes 0·032mm . . . . *occidentalis* Lambe
  - *c.c.* No forcipes; the branches issuing from the top of the stalk: chelæ 0·012—0·014mm . . . . *hydra* n. sp.

b.b. Formed as an open or compressed calyx (or head) on a stalk:

c. Forcipes are found:

d. Calyx-shaped; several forms of megasclera, among which projecting, long and finely pointed styli; chelæ 0·018—0·027^{mm}, forcipes 0·075^{mm} .... *infundibulum* Levins.

d.d. Not calyx-shaped; only one form of megasclera; chelæ 0·027^{mm}, forcipes 0·076^{mm} .... *versatilis* Tops.

c.c. No forcipes:

d. A fringe of spicules round the edge of the calyx; projecting spicules very long and fine styli, some of them pearl-string-shaped; chelæ 0·017—0·019^{mm} .... *comata* n. sp.

d.d. No fringe of spicules; projecting spicules short subtylostyli; chelæ 0·018—0·019^{mm} .... *minuta* Lambe.

Cladorhiza M. Sars.

Erect sponges of definite form; branched in different ways or unbranched; often consisting of a middle axis sending off branches to two sides or all round, more or less regularly, or branched from the base. Below the axis most frequently divides into a more or less richly branched root. The middle axis and the branches carry short branchlets issuing all round and close-set, or these branchlets are gathered at the top as a circle or a head, and then they are considerably longer. The skeleton is closely dependent on the form; it consists in axes and branches of a powerful, polyspicular fibre, often of great thickness; in this fibre are inserted the fibres supporting the branchlets. In the axial fibres spongin is found. Spicula: megasclera are oftenest styli, sometimes oxea; subtylostyli may occur; microsclera: the characteristic microsclera are anisancoræ unguiferæ with three to five teeth in either end, sometimes up to nine teeth in the larger end; the ancoræ may be found alone or together with sigmata of one or two forms.

With regard to the external form, as I have described it in the diagnosis, I shall remark that I entirely follow the opinion put forth by Topsent (Sur l'orientation des Crinorhiza, Compt. Rend. Acad. des Sc. 1902), and accordingly I am of opinion that Ridley and Dendy in Challeng. Report have turned their *C. longipinna, similis,* and *inversa,* as also their *Axoniderma mirabile* and *Chondrocladia crinita* upside down. There can scarcely be any doubt that what they have had before them is nothing but torn off upper parts of sponges.

The *Cladorhiza*-species seem, according to their form, to fall under two groups; one consists of slender, unbranched or, most frequently, branched forms the axes and branches of which carry everywhere short branchlets; the other group consists of forms with an unbranched stalk or axis carrying above branches gathered in a circle or a head. These branches reach a considerably greater length than the branchlets of the other group, but they are, however, surely to be regarded as formations of the same kind, and do not correspond to the branchings of the axis. The fact is that the branches of *C. morula* must be supposed to completely correspond to the branches in *longipinna, similis*, and *inversa*, and the figure of the skeletal structure in *morula* (l. c. 91) shows that the fibres of the branches are inserted in the same way as those of the branchlets of the species of the other group. The same fact is otherwise shown by the figure of the skeleton in *Axoniderma mirabile* (l. c. 97). The branchlets in the *Cladorhiza*-species must be regarded as corresponding to what I have called the lateral branches in the *Asbestopluma*-species, as they are inserted in the axis in a quite similar way. Also in the genus *Asbestopluma*, subgenus *Lycopodina*, a species is found, *A. hydra*, which, instead of having lateral branches along the axis, has the branches collected at the top.

1. C. abyssicola M. Sars.

Pl. XII, Fig. 2 a—f.

1872. *Cladorhiza abyssicola* M. Sars, On some remarkable forms of animal life I (by G. O. Sars), 65, Pl. VI, figs. 16—34.

1875. *Cladorhiza abyssicola* O. Schmidt, Jahresber. d. Comm. zur wissenschaftl. Unters. der deutsch. Meere in Kiel für 1872—73, 119, Taf. I, Fig. 13.

1878. *Cladorhiza abyssicola* v. Marenzeller, Coelent. etc. d. österreich-ungar. Nordpol-Exp., Denkschrift. d. Kais. Akad. d. Wissenschaft. Math. Nat. Cl. XXXV, 371.

1896. *Cladorhiza abyssicola* Lambe, Proc. of the Roy. Soc. of Canada, Ser. 2, II, Sect. IV, 188, Pl. I, figs. 8, 8 a—e.

Slender, unbranched (young specimens), or with rather long branches issuing from a central axis; below a richly branched root. The skeleton arranged in the way characteristic of the genus. Spicula: Megasclera styli 0·30—0·73^{mm}; microsclera of three forms, anisancoræ unguiferæ with five teeth 0·021—0·025^{mm}, sigmata of two forms, large ones 0·078—0·10^{mm}, small ones with compressed end parts 0·040—0·042^{mm}.

Of this species I have had only a slight material, and I therefore am only able to add little new to the very good and exhaustive description given by Sars. Of the specimens in hand the largest ones agree, as to their external form, with the description of Sars. They consist of a stalk, divided below into a great number of branches or fibres, so that a richly branched root is formed; to this root some bottom-material is still attached, among other things tubes of *Rhabdammina*. The stalk is straight and from it go off lateral branches issuing at about right angles, only directed a little upwards. The lateral branches may be of different lengths, but generally they are longest below. The distance between them is different. The branches may be directed to different sides, but upon the whole a certain bilaterality is prevailing. Besides the branched specimens we have a couple of smaller ones consisting only of a central stem without branches, but otherwise of the same structure. From the stalk and branches branchlets or filiform appendages issue everywhere and on all sides. They are thin, thickest at the base, and tapering a little outward; they may be of somewhat varying length, but reach at most a length of ca. 5^{mm}. The branchlets are directed upwards in a somewhat arcuate way. At the point of the stalk and the branches they become short, and at the outermost end they are placed close together as quite small projections, whereby the stalk and branches here show a little swelling, as described and figured by Sars. Sars says that the branchlets are generally arranged in a circular way, my material is too much damaged to enable me to decide this fact with certainty. The largest of my specimens is, inclusive of the root, 75^{mm} high, but the specimen is not quite entire above; the longest branch is 25^{mm}, and the thickness of the stalk is fully 2^{mm}. The small unbranched specimens are 33^{mm} high. Thus this species would seem not to reach any considerable size; Sars gives the height of his specimen to 60^{mm}, and the specimens from the North Sea and the Gulf of St. Lawrence, mentioned by Schmidt and Lambe l. c., were smaller[1]). The colour of the sponge (in spirit) is white or slightly yellowish, often a little transparent; Sars states the colour in fresh specimens to be transparently yellow. On account of the axial skeleton the sponge is rather stiff and not very flexible; the outer layer of tissue is soft, and the branchlets are flexible. The *surface* is smooth, and only at the end of the branchlets projects the supporting fibre. No distinct *dermal membrane* was seen. *Pores* were not observed with certainty; here and there on the surface small circular openings were seen, but on account of the bad state of the material I dare not with certainty regard them as pores. *Oscula* were not found either. Nor have, as it is well known, pores and oscula been mentioned before in this sponge[2]).

The *skeleton* consists, in the stalk and the branches, of a compact, polyspicular axis, the needles of which are parallel to each other and to the longitudinal direction; the axis of the stalk, however, is in the lower part somewhat spirally twisted. Below, the stalk, as mentioned, ends in a highly branched root, the branches of which taper more and more, till they end almost with only one spicule, or with a couple of spicules alongside each other. The branches on the stem are not inserted in the axis in the same way, as are the branchlets; it may rather be said that a cleaving takes place, some spicules by degrees bending to the side and forming the branch; in the angle between the stalk and the branches some spicules are found running evenly arcuately between the stalk and the branch, so that the angle is not seen sharply, but as a rounded curve. The skeleton of the branchlets is formed by a fibre passing through the branchlet to its end. It decreases in thickness outward, and accordingly it has here fewer spicules than farther in, most frequently it has here only a couple of spicules alongside. The fibres of the branchlets are inserted in the spicula-axis of the stalk or the branches, between the spicules of these axes, and they pass in to the centre, where, when several branchlets are placed at the same height, they meet. The part of the fibres of the branchlets that is inserted in the axis, is in

[1]) Wyville Thomson states (The Depths of the Sea, 112), in a general and, otherwise, somewhat vague mention of *Cladorhiza*-species or *Cladorhiza*-like forms, that they may reach to an extent of 50—80^{cm}. He says that at least three species occurred. It is not possible to decide, which species his statement refers to, but I suppose it is to the following ones. *C. abyssicola* is surely not among them, and we see also that the stations mentioned by Carter (Ann. Mag. Nat. Hist. Ser. 4, XVIII, 319), at which *Cladorhiza*-forms were taken, have, all of them, negative bottom temperatures, while *abyssicola* occurs on bottoms with positive temperatures.

[2]) Ridley and Dendy (Challeng. Report, 87) say, under the species mentioned by them as *C. abyssicola* var. *rectangularis*: "The anatomy of the soft parts of this remarkable species has always been a mystery". I do not see that this is to be said especially of this species. That pores, oscula, and canal-system have not been described is a fact that holds good of many sponge-species, and especially with regard to this sponge Sars has given several details beyond what is known of many other species. When he says that "in the layer of tissue absolutely no canals or cavities can be discerned", this of course, is only the expression of the fact that he has not seen them; in the comparatively thin layer of tissue, the canals, no doubt, are small, and scarcely to be observed without special preparation. Ridley and Dendy have not been able to examine their specimen (which otherwise assuredly does not belong to this species) anatomically, as their material was dried, but they have not taken the opportunity either of examining anatomically any of the other *Cladorhiza*-species they have described.

the common way spread in a fan-shaped manner in the longitudinal direction, so that in a transverse section it appears to have only the thickness of a couple of spicules. Accordingly the fibres pass from the middle of the axis through the layer of tissue surrounding the axis, and through the branchlet to its point. In the layer of tissue coating the stalk and the branches, as far as I have been able to see, only rather few, scattered spicules are found. In the stalk and the branches the spicules are cemented by a clear mass of spongin; it coats, no doubt, the whole fibre with a thin layer of spongin, but forms no visible sheath. In the lower part of the stalk it may become somewhat more copious, and then the otherwise white, transparent axis becomes here a little yellowish. In the branchlets no spongin was observed.

Spicula: a. *Megasclera* are styli; they are straight or quite slightly curved; they are fusiform, tapering more or less towards the head-end; not rarely their outer part has a special, but slight tapering. The opposite end tapers evenly; the point proper may be somewhat varying, but is always short or rather short, not rarely quite blunt or rounded. The spicules of the axis and the branchlets are of the same form and cannot be said to fall under two distinct groups, but upon the whole there is, however, some difference as to size between them, so that the axial spicules are averagely larger than those of the branchlets. The length of the axial spicules is about 0·5—0·73^{mm}, and the thickness from 0·013—0·019^{mm}. The spicules of the branchlets are generally 0·39—0·47^{mm} long and 0·007—ca. 0·013^{mm} thick. All kinds of transitional forms occur however. Thus upon the whole a variation is found in the spicules as to length from 0·39—0·73^{mm} and as to thickness from 0·007—0·019^{mm}. Besides by their size the styli of the branchlets deviate also from those of the axis by having a longer point, and moreover they show also a little curve at the head-end, about as figured and described by Sars. Sars says that such spicules only occur at the point of the branches; the fact is, however, that they form the fibres of the branchlets, and accordingly they are also found in the points of the branches, where the branchlets are close together; the mentioned curve may otherwise also be found in axial styli. b. *Microsclera:* three forms occur, anisancoræ unguiferæ and sigmata of two forms and sizes. 1. The ancoræ are of the structure typical of *Cladorhiza* with a regularly curved shaft and five distinct, narrow, lanceolate teeth in either end; a considerable difference is found between the sizes of the two ends. The larger end has on either side of the shaft a narrow ala somewhat longer than the teeth. A sure view of the number and form of the teeth is only to be obtained by regarding the ancoræ from the end. Sars, in the work quoted, says that the ancoræ have three teeth, but that some have five, and continues: Whether this applies to all or only to some the position of which happened to be more favorable, I am not able with certainty to decide [1]. The real fact is that the ancoræ have always five teeth in either end. The size of the ancoræ is only little varying, their length from 0·021—0·025^{mm}, and the thickness of the shaft is ca. 0·002^{mm}. A few developmental forms of the ancoræ were also seen, in the finest ones the ends are as yet only little developed, and they are equal or about so, but a difference in size appears very soon. 2. The large sigmata have a regular sigma-form; they are always plane or about plane. Their length is between

[1] It is evident that the opinion of Sars is that the ancoræ, what he has not been able to decide with certainty, may possibly always have five teeth, but that this fact is only to be seen, when the ancoræ are favourably situated. But his expression, to be sure, says really something different.

0·078mm and 0·10mm, and the thickness is proportionately 0·005—0·006mm. 3. The small sigmata are of a peculiar form not mentioned by Sars, about as the form known from sigmata in some of the *Asbestopluma*-species, but here much more sharply marked. Either end of the sigma from the middle and to the point of the recurved part is highly compressed and inwardly sharpened in an edge-like manner. The sigma is contort, and almost always rather exactly one fourth of a turning. The length is 0·040—0·042mm and the thickness in the middle ca. 0·0015mm. The small sigmata, as stated by Sars, occur in the points of the branches in somewhat greater numbers, but besides they occur also in other places of the tissue, but only in very small numbers. The large sigma is stated by Sars to occur scattered in the tissue, and in greater numbers in the points of the branches; this statement I have not found corroborated, but have found this sigma occurring equally frequently everywhere in the tissue, but not especially copiously. The ancoræ are present in great abundance, partly throughout the tissue, and especially in the skin or the outer layer; thus they are seen very abundantly in the thin layer of tissue on the branchlets.

Embryos. Embryos were found scattered in the tissue in rather great numbers. They are globular and reach a size of ca. 0·35mm in diameter. They contain no spicules. According to Sars the embryos seem to be developed in the ends of the branches; this fact I did not find corroborated by my material; later, at all events, they are found everywhere in the tissue in great numbers, as has also been observed by Sars. They were also found in the small, unbranched specimens.

Remarks: A sure determination of this species is no easy thing, as it is very closely allied to the succeeding ones, and has also constantly been confounded with them. I was long in doubt whether the present species and the following one were specifically different; there are, however, constant characters, especially in the size of the spicules, and it was found, moreover, that *C. abyssicola* occurs only on bottom with positive temperature, while the following species is a native of the cold area. I have not seen Sars's type specimen, but a specimen sent by Dr. Nordgaard, obtained on Sars's old locality, Skraaven, agreed exactly as well with the description by Sars as with my specimens. The species mentioned by Wyville Thomson in "The Depths of the Sea", and by Carter in his work on the "Porcupine"-sponges as *C. abyssicola* belong surely, as already mentioned, to some of the succeeding species. With regard to the *C. abyssicola* mentioned by Armauer Hansen in The Norwegian North-Atlantic Exp. XIII, the fact is most probably that he has not had this species before him at all; all the figures of the exterior show on the contrary that he has had the four following species, *gelida*, *tenuisigma*, *corticocancellata*, and *oxeata*, and those of the spicula-figures that can be interpreted at all show also that the question is not of *abyssicola*. I have examined two of his specimens which belonged respectively to the two following species, *gelida* and *oxeata*. All the enumerated localities are also seen to be situated in the cold area, with only one exception, and this one is found at the very border of this area. Of the *C. abyssicola* mentioned by Fristedt (Vega-Exp. vetensk. Iaktt. IV, 455) I have examined one specimen which proved to be *C. oxeata*. The specimen mentioned by Lambe l. c., on the other hand, is no doubt *C. abyssicola*, as is obvious from the description; when Lambe says that the ancoræ seem only to have three teeth in either end, this is no doubt only owing to the fact that he has not seen them from the end. Finally it must be noted that the two forms mentioned by Ridley and Dendy, *C. abyssicola* var. *rectangularis* with styli up to 2mm long, and *C. abyssicola* var. *linearis* with three-toothed ancoræ 0·032^{mm} long, may be said with certainty not to belong here, but they must be independent species.

Locality: The Ingolf-Expedition has only obtained a slight material of this species: station 32, the Davis Strait, 66° 35' Lat. N., 56° 38' Long. W., depth 318 fathoms (bottom temperature 3·9° C.), the two largest specimens; station 40, south of Iceland, 62° 00' Lat. N., 21° 36' Long. W., depth 845 fathoms (bottom temperature 3·3° C.), two small, unbranched specimens.

Geogr. distr. Skraaven at the Lofoten, depth 300 fathoms (Sars), and depth ca. 200 fathoms (one specimen sent by Dr. Nordgaard); the Saltenfjord, depth ca. 185 fathoms (Dr. Nordgaard); the Skager Rack, depth 294 fathoms (O. Schmidt l. c.); between Franz-Josef Land and Nova Zembla 79° 15' Lat. N., 59° 14' Long. E., depth ca. 130 fathoms (v. Marenzeller l. c.); the Gulf of St. Lawrence, depth 200 fathoms (Lambe l. c.). Thus the species is known distributed from ca. 60° Long. W. to ca. 60° Long. E., and between 60° and 80° Lat. N. It does not go to specially great depths, the bathymetrical range being between 130 and 845 fathoms, and it is exclusively a native of a bottom with positive temperature. On all the localities the species was taken on muddy bottom, and its richly branched root agrees also with this fact.

2. **C. gelida** n. sp.

Pl. III, Fig. 1. Pl. XII, Fig. 3 a—h.

1885. ? *Cladorhiza abyssicola* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII. Spongiadæ. partim, Pl. VII, figs. 7 b, 10, 12.

Slender, with branches issuing from a central axis; the branches arranged more or less distinctly in a plan or issuing quite irregularly; often very long and subdivided. The stem ending below either in a root or a little basal expansion. The skeleton of the type of the genus. Spicula: Megasclera styli 0·40—0·77^{mm}; microsclera of three forms, anisancoræ unguiferæ with five teeth 0·028—0·034^{mm}, sigmata of two forms, large ones 0·12—0·16^{mm}, small ones, with compressed terminal parts 0·044—0·052^{mm}.

Of this species we have a rather considerable material, but most of the specimens are rather much damaged. The species is chiefly of the same form and structure as *C. abyssicola*, but it grows to a considerably greater size, and is more irregular. It consists of a stem, from which lateral branches of varying length issue. The original principle seems to be that the branches issue in one plan to two opposite sides; but this principle is not carried through, and so the branches are frequently arranged irregularly and issue to more sides; the arrangement in one plan, however, is most frequently recognizable. The distance between the branches may be somewhat varying. They issue generally at about right angles, only a little directed upwards. Sometimes the branches are a little swollen towards the end, but often, however, such a swelling is not found. To judge from the material in hand, the stem may end below in different ways, either in the same way as in *abyssicola* with a branched root, or with a little expansion which then has been attached; this feature is probably to some degree dependent on the bottom. While in the form now described the sponge is tolerably regular, a high degree of irregularity is very frequent. This irregularity may be owing to several causes. Thus the stem, which in the more regular forms is tolerably erect, may become sometimes irregularly curved, sometimes twisted in such a way, that the branches are lying in all plans. Then the branches may also be bent in many different ways and be of very different lengths, and while in the more regular forms they are most frequently unbranched, they may here be subdivided. Finally anastomoses and coalescences may take place between the branches in the most irregular way, so that the whole thing gets a quite confused appearance; nay, even branches from different individuals seem to be able to coalesce. When such anastomoses takes place, it is always the spicula-axes of the stem and the branches, which touch each other and are coalesced, and the fact is evidently owing to the presence of spongin [1]). The stem and the branches are set with branchlets or filiform appendages. They issue rather closely to all sides, and no definite arrangement is to be seen. They are frequently directed somewhat upward or on the branches somewhat towards the point, and in different individuals they may be of somewhat different length. With regard to the size to which the sponge may grow it is impossible to say anything definite on the basis of the material in hand, as all the specimens are fragments more or less. In one of the largest fragments the stem has a height of ca. 110^{mm}; another specimen measures, on account of the very long branches, ca. 150^{mm}; one of the most irregular fragments, in which stem and branches could no longer be distinguished, has a greatest extent of 230^{mm}. The length of the branches, as mentioned, may vary very much. The stems and branches are of about equal thickness, the maximum of which may be given to ca. 5^{mm}, but it may be somewhat less. The branchlets or the filiform appendages are thin, filiform, and a little tapering outward; their length may be somewhat varying, the maximum is 5—6^{mm}, and the thickness at the base does not exceed $0{\cdot}5^{mm}$. In a few cases branchlets may be found as only exceedingly short, conical projections. On account of the firm axial skeleton the consistency of the sponge is hard, but, especially in the upper parts, somewhat flexible; the outer layer is soft, and the branchlets, in spite of the fibre in them, are soft and flexible. The colour (in spirit) is white to yellowish white. The *surface* is smooth, spicules project only at the ends of the branchlets. An inwardly distinctly bounded and consequently easily separable *dermal membrane* is not found; on the other hand the whole layer of tissue is easily separated from the axis. *Oscula* and *pores* I have not been able to find, and therefore I take them to be closed. In the layer of tissue nothing is seen of the canal system under slight magnifying powers, but the tissue is apparently of uniform structure, the canals being very small. It is only in thin sections and under higher magnifying powers, that the canals are seen.

The *skeleton* is constructed as in the preceding species, and consists in the stems and branches of a very strong polyspicular axis; the needles of this axis are closely united and connected by spongin. They are chiefly parallel to each other and to the longitudinal axis, the axis, however, is most frequently more or less spirally twisted, often so much, that the direction of the needles deviates considerably from the longitudinal one. Also in the superficial part of the axis the needles are often not quite parallelly arranged, but may intercross, owing to the fibres of the branchlets being inserted between them. The needles of the axis are turned in different ways, now the point is turned upward, now downward. As in the preceding species the branches are formed by a number of spicules bending to the side, and, at all events, only the middlemost spicules of the branches reach in towards the middle

[1]) Such irregular anastomoses (at all events in the same individual) seem to be frequent in the *Cladorhiza*-species, and they will thus be mentioned again in the following species. It seems also to be this same feature, which is found in the specimen of the socalled *C. abyssicola* var. *linearis*, figured by Ridley and Dendy (Challeng. Report, Monaxonida, Pl. XX, fig. 6).

of the axis. The central part of the axis may be somewhat looser, or a little cavity may be found here. The skeleton of the branchlets is formed by a fibre running through the middle of the branchlet; the fibre tapers outward, and has fewest spicules at the outer end. When the branchlets are short, the fibre seems to become thicker and have more spicules. The fibres of the branchlets are in the common way inserted in the spicula-axes of the stem and the branches, between the spicules of these axes; they reach to the middle of the axis, and are spread in the longitudinal direction in a fan-shaped way. In the layer of tissue, which coats the axis, and may be of somewhat varying thickness, only rather few, scattered spicules are found. In the stems and branches the needles are connected by a mass of spongin forming, however, no sheath; under the microscope it appears white and clear, but yet it gives to the axis a yellowish, hyaline appearance. The stem has most spongin and is, consequently, most yellowish at the base. In the fibres of the branchlets spongin was not observed.

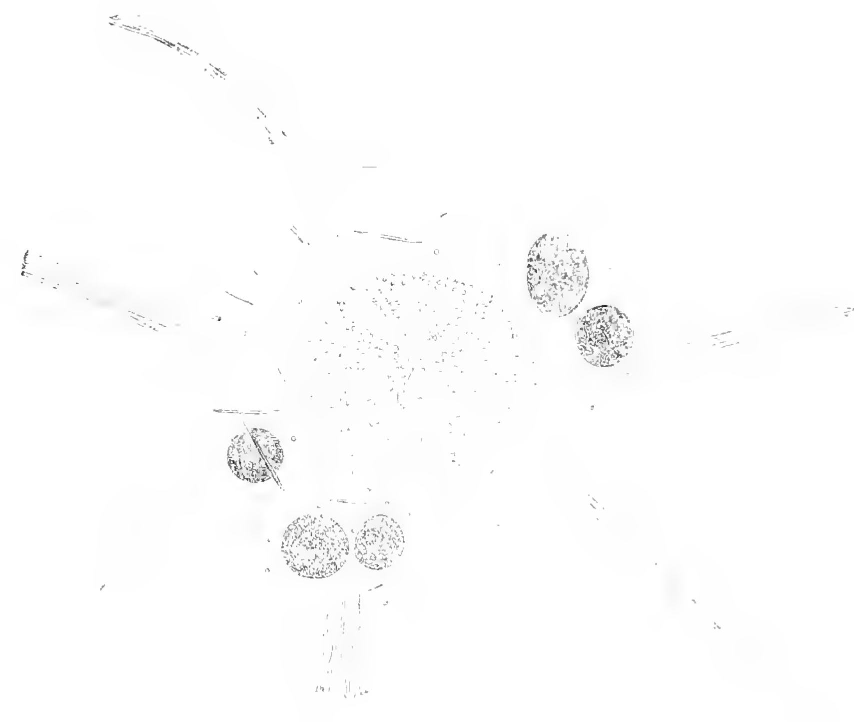


Fig. 2. *Cladorhiza* [illegible] n. sp.

Transverse section. The branchlets being directed a little upward, the fibres issuing from the centre are only seen a little way out in the tissue, where they are then cut away, while the fibres seen in the branchlets issue more downward, so that their bases are not seen. In the tissue embryos are seen. × ca. 32.

Spicula: a. *Megasclera* are styli, straight or quite slightly curved; they are more or less fusiform, but most frequently slightly so, only tapering a little towards the head-end; the point is somewhat varying, from short, sometimes somewhat blunt, to middle long. Their length varies from 0·40–0·77^{mm} and the thickness about from 0·022^{mm} down to 0·011^{mm}. The spicules are upon the whole larger and specially thicker in the axis than in the branchlets, but they cannot be said to form two groups. The styli of the branchlets have also a somewhat longer point. Otherwise the length and thickness are in no proportion to each other, and styli are rather frequently found in the axis of the smallest length, but of the greatest, or about the greatest thickness, while on the other hand long styli may be considerably fine. In the branchlets and the layer of tissue spicules may be found that are considerably finer than the others and must be developmental forms, they are long pointed. Among the styli, especially in the branchlets, irregular forms are often seen; thus, but more rarely, oxea; more frequently forms are seen with one or more swellings. b. *Microsclera:* three forms are found, anisancoræ unguiferæ and sigmata of two forms and sizes. 1. The ancoræ are of the typical *Cladorhiza*-structure, and have five distinct, lanceolate teeth in either end; one end is considerably larger than the other. The larger end has on either side of the shaft a narrow ala a little longer than the teeth, but comparatively somewhat shorter than in *abyssicola*. The size of the ancoræ varies between 0·028—0·034mm, by far the most frequent size is 0·031mm, the thickness in the middle of the shaft is ca. 0·003mm. Developmental forms of the ancoræ occur frequently in all stages, down to extremely fine ones, which are of about the same length as the fully developed ones; in the very youngest stages both ends are as yet equal[1]). These youngest stages show in either end apparently only a hook-like recurving (Pl. XII, fig. 3 d) which must, accordingly, be taken to correspond to the median tooth; but they are so fine and transparent, that the real form of the end cannot be seen with certainty; in the stages a little older the teeth are seen. 2. The large sigmata are of a regular sigma-shape, they are plane, or only slightly contort. Their outer part, the recurving and the hook, is not quite cylindrical, but somewhat compressed. They vary in length from 0·12—0·16mm, and in thickness from 0·006—0·009mm. Developmental forms in different stages of these sigmata were not rarely seen; the younger of these are more or less fine, evenly curved, and long pointed staves without recurved ends; the ends are only developed by and by. Also the developmental stages show the compression of the ends, and these are sharp inward. 3. The small sigmata are of the same peculiar form as in *abyssicola*, with compressed ends, inwardly sharpened as edges. They are likewise always contort to one fourth of a turning. Their length is 0·044—0·051mm, and the thickness in the middle is ca. 0·0015mm. The occurrence of this sigma is peculiar. It occurs always only very sparsely, so that pieces of the sponge may be examined without any being found; but sometimes this form of sigma seems to be quite wanting; thus in some specimens I have examined a great number of pieces without being able to find it. Otherwise it is found sparsely in the tissue without any such definite occurrence as in *abyssicola*. Neither does the large sigma occur in great numbers, but considerably more copiously than the small one; it occurs in the layer of tissue and especially in the skin. The ancoræ are present in exceedingly great numbers, partly throughout the layer of tissue, but especially in the skin or the outermost layer; they are especially closely packed in the thin layer of tissue on the branchlets.

Embryos. Round in the tissue embryos were found; they lie singly in the layer of tissue between the axis and the surface. They are all but globular and of an average size of ca. 0·3mm. No spicules were found in the specimens examined.

This species, as will have been seen, is very closely allied to *abyssicola*, and it is mainly separated from it by the constant difference in size of the three forms of microsclera. As mentioned under the preceding species, I have seen a specimen from the material of The Norwegian North-Atlantic Expedition of the species mentioned there by Armauer Hansen as *C. abyssicola*. It was a small fragment, very much damaged, but it seems doubtless to belong to the present species. The size of the ancoræ is generally 0·028mm, and that of the small sigmata 0·044mm. The specimen was from station 31 with a bottom temperature of ÷ 1·0 C. Of the figures of the exterior in The Norwegian North-Atlantic Expedition Pl. VII, figs. 7 b, 10, and 12 would seem to belong to the present species. An

[1]) Carter, as is well known, advanced the theory that the anisochelæ in their development pass through an isochelate stage, because in a few species he had found large anisochelæ and small isochelæ together. He got this view on account of his erroneous interpretation of the growth of the chelæ. The fact that forms as the anisancoræ of the *Cladorhiza* begin with a stage where both ends are equal cannot, of course, corroborate Carter's theory, as his opinion was that an isochelate stage fully developed as to form preceded the final, anisochelate one.

attempt to interpret the given spicula-figures, would, I suppose, show figs. 3, 7, 8, 9, 11, and 12 on Pl. IV to belong to the present species, but the interpretation is doubtful.

Locality: The Ingolf, station 112, 67° 57′ Lat. N., 6° 44′ Long. W., depth 1267 fathoms (bottom temperature ÷ 1°1 C.); station 113, 69° 31′ Lat. N., 7° 06′ Long. W., depth 1309 fathoms (bottom temperature ÷ 1°0 C.); and at 60° 19′ Lat. N., 5° 39′ Long. E., depth 620 fathoms (bottom temperature ca. ÷ 0°15 C. (Ad. Jensen, the cruise of the "Michael Sars" 1902). The two first localities are situated in the Norwegian Sea about between Jan Mayen and Iceland, the last one in the Faröe Channel.

Geogr. distr. Besides on the mentioned localities, the species, as before mentioned, has been taken by the Norwegian North-Atlantic Expedition at station 31, 63° 10′ Lat. N., 5° 00′ Long. E., depth 417 fathoms. Presumably it has been taken at more places by this expedition, but, at all events, always in the cold area. Accordingly the species is known from the Norwegian Sea and from the Faröe Channel with a bathymetrical range from 417—1309 fathoms, and it occurs only on cold bottom. I suppose that the species is also found among the *Cladorhiza*-forms from the Faröe Channel mentioned by W y v i l l e T h o m s o n in the Depths of the Sea 112—113.

3. **C. tenuisigma** n. sp.

Pl. III, Figs. 2—5. Pl. XII, Fig. 4 a—e.

1885. ?*Cladorhiza abyssicola* Armauer Hansen, The Norwegian North-Atlantic Exp., XIII, Spongiadæ, partim, Pl. IV, fig. 14, Pl. VII, fig. 11.

Slender, with branches issuing from a central stem, the branches oftenest distinctly in one plan to two sides, most frequently long and ending in a swelling. The branchlets more or less distinctly arranged in a ring-like manner. The stem ending below in a richly branched root. The skeleton of the generic type. Spicula: Megasclera styli 0·58—1·01^{mm}; microsclera of three forms, anisancoræ unguiferæ with five teeth 0·024—0·028^{mm}, sigmata of two forms, fine ones of the common form 0·038—0·048^{mm}, sigmata with compressed terminal parts 0·048—0·050^{mm}.

In the exterior and skeletal structure this species is very similar to the preceding one, but it is distinguished by characteristic differences as well in the exterior as in the spiculation. It is formed of an erect stem ending below in a densely and richly branched root. In the specimens in hand that are possessed of the root it is formed in such a way, that the stem continues quite down to the lower part of the root, and only here is divided into branches, while from the lower part of the stem thicker close-set branches continually pass of, and again subdivide to a high degree. The finest branches end with the thickness of one spicule. In the specimens in hand the radical branches issue only to one side, so that the whole radical tuft is turned to that side (Pl. III, fig. 3). To the radical branches, especially to their outer part, some bottom material, as pebbles and especially Foraminifera in great numbers, is attached. These bodies stick rather firmly, and seem to be kept by the spongin present in the root. Lateral branches issue in the common way from the stem. These branches issue with varying intervals, and may in this respect issue in a rather irregular manner; sometimes, however, they are placed in a tolerably regular way. They go off at about a right angle or are a little directed upward. The branches may be of varying length, but generally they are very long. In a few cases the branches may again carry some short branches, and irregularities caused by anastomoses and coalescing of branches may occur, but both these features seem to be found only rarely. The branches are generally arranged in a distinctly bilateral way, but here and there a branch may be placed in a different plan. The bilaterality is effaced in only one specimen, in which the branches are very close-set, but this specimen is upon the whole somewhat irregular. As in the preceding species, stems and branches carry branchlets. These branchlets are in this species more close-set than in the preceding one, and besides they are here arranged more or less distinctly in a ring-like way. This arrangement is not always marked, but is in all cases recognizable; sometimes the circles pass into each other, and then there is a beginning spiral arrangement. The number of the branchlets in the circle is generally some half-score. The branchlets pass off at right angles, or are, especially in the outer part of the branch, directed towards the point of the branch. Their length may be somewhat varying, from rather long, outwardly thread-fine ones, and to quite short, comparatively thick projections. The branchlets of the same circle are more or less coalesced at the base, and when they are quite short the branches get a peculiar jointed appearance, and may to some degree remind of the arm of an Ophiurid. In a few places of the stem or the branches the branchlets may be quite wanting, and these parts are then slightly shaggy. The branches end at the point in a globular or ovate swelling, below which the branches are a little constricted, by which means the swelling becomes more sharply marked off. The last branchlets before the swelling decrease a little in length. One of the tolerably whole specimens, which is, however, not quite undamaged above, has a height of ca. 170^{mm}, and most of the other specimens seem to have been of a somewhat similar height. The specimen which seems to have been the largest one is only a little higher, but it is broken off below, and a rather large piece is no doubt wanting. The length of the branches may, as mentioned, be somewhat varying, the greatest length measured was $80—90^{mm}$. The stem and the branches may be of somewhat varying thickness, but they are generally comparatively thin in proportion to their length, and so the species gets a more slender appearance than the preceding one; the thickness, which is about equal in stem and branches, or only a little greater in the stem, may be given to 2—5^{mm}. The branchlets vary from quite short projections to 8^{mm} long, threadfine appendages. The consistency is as in the preceding species. The colour (in spirit) is whitish to whitish yellow. The *surface* is upon the whole smooth; at the points of the branchlets the fibres project, and the terminal swelling of the branches as well as the parts of the branches that show no branchlets are slightly shaggy. Outermost a very thin *dermal membrane* is found, only distinct in the parts between the branchlets; it is supported by spicules underneath, but cannot be separated alone. *Pores* are found in the dermal membrane, especially in the parts between the branchlets; they are often very close-set. They were measured from quite fine openings to a diameter of ca. $0{\cdot}06^{mm}$. Pores are also found in the swollen terminal part of the branches[1]. *Oscula* have not been observed. In transverse sections of the sponge canals are seen in the layer of tissue between the fibres of the branchlets; these canals run chiefly as longitudinal ones, and being the widest canals seen it is an

[1] If pores have not hitherto been mentioned in the *Cladorhiza*-species, I suppose that it is only owing to the fact that they are only to be seen with difficulty. The fact is that the outermost layer consists of close-lying membrane-like parts separated by narrow cavities; the outermost membrane forms the dermal membrane. The pores in this membrane, accordingly, lead into a cavity inside, and the cavities are connected with each other by pores in the membranes. Now the dermal membrane proper cannot be separated except by special preparation, and if we cut off a piece of skin-layer ever so thin, we shall nevertheless get more than the outermost membrane, and so the pores are not seen by transmitted light.

obvious conclusion that they are excurrent canals; if so, we should expect to find oscula at the points of the branches. It may, however, also be possible that among the mentioned pores some may act as incurring openings, others as excurrent ones.

The *skeleton* is chiefly constructed as in the preceding species. It consists in stem and branches of a powerful axis which is also here somewhat spirally twisted, especially in its lower part. The lateral branches are formed in the common way. The skeleton of the branchlets is formed by a fibre more or less long according to the length of the branchlets; in the long branchlets the fibres are outwardly very fine, and outermost they have only quite few spicules. The fibres of the branchlets are inserted in the axis in the common way. As the branchlets are arranged more or less circularly, their fibres, in a transverse section passing through a circle of branchlets, are all seen to go to the middle of the axis like the spokes of a wheel. When the layer of tissue with the branchlets and their fibres is removed, so that only the axis is left, this is seen to be transversely striated on account of the circular arrangement of the branchlets, the part of their fibres that is inserted in the axis appearing as darker circles when the other part is removed. The axes of the branches continue through the middle of the swollen terminal part, and at the outer end they spread in a somewhat penicillate way. From the part of the axis running through the terminal knob rather regular, thin fibres issue to the surface, through which their outer ends project quite slightly (Woodcut fig. 3). Thus the whole terminal knob may be regarded as a collection of coalesced branchlets. Between the mentioned fibres in the terminal knob are moreover found some scattered spicules. In the above mentioned places of the stem and the branches where no branchlets are found, fibres are nevertheless found as in the other places, inserted in the axis in the same way, and these fibres continue into the layer of tissue, which is, besides, highly filled with spicules some of which are running chiefly longitudinally, while most of them are situated irregularly. Some of these spicules project a little through the surface. In these places the layer coating the axis is of greater thickness, so that it may more likely be regarded, as if the branchlets were coalesced to one layer. In the layer of tissue which coats the other part of the axis, spicules are found rather copiously of which some are running longitudinally, while a great part are irregularly scattered; the dermal membrane is supported by the outermost ones of these spicules. Where the branchlets are long there are the fewest spicules in the layer of tissue; the shorter the branchlets are, the more spicules are found in the layer of tissue, and the greatest number of spicules are found where the branchlets are quite wanting. In the stems and branches the needles of the axes are cemented by a clear mass of spongin, giving to the axes a slightly yellowish colour.

Fig. 3. *[illegible]* n. sp.
Longitudinal section through the end-swelling of a branch showing the skeleton. [illegible]

Spicula: a. *Megasclera* are styli, straight or almost straight; they are fusiform, tapering evenly towards the rounded end, and towards the point to about the same degree; therefore the point itself is short, but it may be more or less blunt and is sometimes rounded. There is no distinct difference between the styli of the axis and those of the branchlets and the layer of tissue, the styli of the axis being only upon the whole a little longer and especially a little thicker. With regard to the length styli may be found in the branchlets as long as the longest ones in the axis, but upon the whole they are shorter, and styli may be found here considerably shorter than are generally found in the axis; also are the styli of the branchlets almost always longer pointed. The length varies at most from ca. 0·58—1·01^{mm}, and the thickness from ca. 0·014—0·0257^{mm}. With regard to the axial styli the length rarely goes below 0·70^{mm}, and the greatest thickness attained by the styli of the branchlets is ca. 0·021^{mm}. In the branchlets long, fine styli with long points occur rather frequently, which are, no doubt, developmental forms. b. *Microsclera* are anisancoræ unguiferæ with five teeth and sigmata of two forms. 1. The ancoræ are of the common *Cladorhiza*-type, and are constructed quite as in the preceding species. Their length is 0·024—0·028^{mm}, and the thickness of the shaft in the middle 0·0028^{mm} or a little less. Developmental forms in different stages are rather frequent. 2. Sigmata of the first form are fine, of the common sigma-form; they have a somewhat curved shaft and regularly round-curved ends; they are contort up to the fourth part of a turning, most frequently, however, somewhat less. They have not the edge-like expansion occurring in the other form of sigma, but are not, otherwise, quite cylindric, but seem to be somewhat compressed through their whole length. Their length is 0·038—0·048^{mm}, and the thickness about 0·0014^{mm}. 3. Sigmata of the second form have a similar form as, and correspond to, the smaller sigmata of the two preceding species; they have an almost straight shaft, and their ends are somewhat compressed, but to a far smaller degree than in the preceding species. They are contort and always one fourth, or about one fourth, part of a turning. Their length is 0·048—0·056^{mm}, most frequently nearest to the smaller size. The thickness is about 0·0025^{mm}. The two forms of sigmata are easily distinguished; the former is especially distinguished from the latter by being finer and having no expansions towards the ends, by its curved shaft, and by its being generally twisted less than one fourth of a turning. It can only be confounded with developmental forms of the second kind. The two forms occur in distinctly limited parts of the sponge; sigmata of the first form occur in the tissue of the whole sponge, except in the end-knobs; in these, on the other hand, sigmata of the second form are exclusively found, and in copious numbers; but none of the sigma-forms occur in anything like the number of the ancoræ, which are present in great abundance throughout the tissue, especially in the dermal layer.

Embryos. Embryos were found in most specimens of this sponge. They are lying in the tissue outside the axis, often rather closely, but each in a cavity of its own, and each embryo is surrounded by a membrane. They are globular or somewhat oval, and of a diameter of up to 0·5^{mm}. The spiculation is different in the different stages; some have no spicules, others only ancoræ, and others again have both ancoræ and styli. The ancoræ are smaller than in the developed sponge, most frequently of a length of 0·017—0·021^{mm}, and also rather fine. The styli are likewise small and very fine. The styli are arranged in a bundle about in the middle of the embryo, while most of the ancoræ seem to be chiefly placed in the circumference. None of the two forms of sigmata were seen in the embryos.

This species is very similar and closely allied to the preceding one; in its outer form it is especially distinguished from the former by the more or less marked circular arrangement of the branchlets. With regard to the spiculation sure distinguishing characters are found in the sigmata, especially in the presence of the fine, contort sigma, and in the size of the ancoræ. Among the figures of the exterior, given in the Norwegian North-Atlantic Expedition, those quoted above may with great probability be referred here, especially on account of the distinctly figured end-knobs. Of the figures of spicula, fig. 6 on Pl. IV may with some probability be referred to the present species. Among the *Cladorhiza*-forms taken by the "Porcupine"-Expedition, I suppose that the "peculiar form in jar 65" mentioned by Carter (Ann. Mag. Nat. Hist. Ser. 5, XVIII, 320) belongs here; according to the description it might very well be a specimen with small or wanting branchlets.

Locality: Ingolf station 105, 65° 34' Lat. N., 7° 31' Long. W., depth 762 fathoms (bottom temperature ÷ 0.8 C.); station 117, 69° 13' Lat. N., 8° 23' Long. W., depth 1003 fathoms (bottom temperature ÷ 1.0 C.), seven more or less damaged specimens in all. Station 105 is situated to the east of Iceland, and station 117 south of Jan Mayen.

Geogr. distr. The species is hitherto with certainty only known from the Norwegian Sea, where, besides by the "Ingolf", it has been taken by the Norwegian North-Atlantic Expedition. If the form mentioned by Carter l. c. belongs here, it has also been taken in the Faröe-Channel at a depth of 345 fathoms with a bottom temperature of ÷ 1.1 C. Accordingly, the species is, at all events, a native of the cold bottom.

4. C. iniquidentata n. sp.

Pl. III, Fig. 6. Pl. XII, Fig. 5 a—e.

Slender, with branches issuing from a central axis; the branches rather long, not arranged in one plan, swollen in the ends in a somewhat club-shaped way. The skeleton of the generic type. Spicula. Megasclera styli 0.50—0.68^mm; microsclera of only one form, anisancoræ unguiferæ with six to nine teeth in the larger end, five teeth in the smaller end, 0.022—0.024^mm.

In the exterior this species is very similar to *C. abyssicola*. We have only one specimen consisting of a slender stem carrying a number of thin lateral branches issuing irregularly with different intervals. The specimen is broken as well above as below, so that nothing can be said of its mode of attachment. The stem and branches carry in the common way close-set branchlets issuing all round. These branchlets are a little directed upward, but in contradistinction to those of the preceding species they are quite straight. They are thickest at the base and become quite thin outward. A distinct circular arrangement was not to be observed; but they are to some degree arranged in groups, and this arrangement gets more marked by the fact that the branchlets are often coalesced at the base, so that irregular circular thickenings are found, from which the branchlets issue. Towards the point of the lateral branches the branchlets become shorter, and the points of the branches are slightly swollen in a club-shaped way. The specimen in its damaged stage has a height of 50^mm, the only entire lateral branch measures 27^mm, and the branchlets, which may be of somewhat different lengths, are at most 3.5^mm long. The stem is fully 1^mm thick, the lateral branches are a little thinner. The colour (in spirit) is whitish, somewhat transparent. The sponge is rather stiff, and the branchlets scarcely so flexible as in the preceding species. The *surface* is smooth, spicules are only projecting in the points of the branchlets. A thin *dermal membrane* may be observed. *Pores* are seen in the dermal membrane in the intervals between the branchlets[1]; they were measured to a size of at most 0·1mm; the largest ones seemed especially to occur in the parts of the skin that cover the upward turned parts of the coalesced bases of the branchlets. *Oscula* have not been seen, but the larger of the mentioned pores may possibly be excurrent openings.

The *skeleton* is constructed as in the preceding species; it consists in the stem and branches of rather strong, polyspicular axes. The fibres of the branchlets are in the common way inserted in the axes, and continue to the middle; they grow thinner and have fewer spicules outward, and they end, when the branchlet is long and thin, with a few spicules or a single one. In the layer of tissue coating the axis only a few, scattered spicules are found partly lying in the longitudinal direction, by which spicules the dermal membrane is supported. In the axis the spicules are cemented by a distinct mass of spongin.

Fig. 4. *Cladorhiza iniquidentata* n. sp. One of the branchlets with three embryos. × 20.

Spicula: a. *Megasclera* are straight, or quite slightly, sometimes a little irregularly curved styli; they are markedly fusiform, tapering somewhat, not only towards the point, but also towards the rounded end. The point itself is short and bounded by straight lines; it may be of somewhat varying length, and in a few cases it is rounded. There is no difference between the styli of the branchlets and those of the axes, only may the latter as a whole be a trifle thicker, that is to say: some of them may be a little thicker, and there are between them scarcely so thin styli as outside the axes. Their length is from ca. 0·50—0·68mm, and the thickness varies from 0·014—0·026mm. Finer to quite fine developmental forms occur in small numbers. b. *Microsclera* are only of one form, a n i s a n c o r æ u n g u i f e r æ; they are typical *Cladorhiza*-ancoræ of the common form with a regularly curved shaft and a narrow ala on either side of the shaft at the upper end. They are, however, peculiar by their number of teeth. In the large end the number of teeth is not constant; most frequently the number is seven, not rarely, however, eight; in a few cases it was six, in some others nine. The teeth are close-set and narrow. The small end, on the other hand, has only five very small teeth. With regard to both ends it is impossible to decide the number of teeth, unless the ancoræ are seen from the ends. The length of the ancoræ is 0·022—0·024mm, and the thickness of the shaft is ca. 0·002mm. Developmental forms of the ancoræ occurred in different stages. The ancoræ occur in the tissue and in the skin; as usual they are especially copious in the branchlets.

Embryos. Embryos were found scattered in the sponge; they are roundish or oval, and averagely of a diameter of ca. 0·24mm. They occur both in the stem and branches in the tissue outside the axis. They were often seen at the base of the branchlets or even a little way out in the branchlets (Woodcut fig. 4). If the larger of the pores mentioned before act as excurrent openings, it may easily be understood that the embryos are found near them[2]. The spiculation of the embryos is very interesting. They were either

[1] They were only seen in dried preparations.

[2] When the embryos are found in the lower part of the branchlets themselves, it is seen that this part is hollow, and the spicules of its fibre surround the embryos on all sides; farther out the spicules unite and form a fibre in the common way. According to this the fact is not precluded that the embryos leave the sponge through the branchlets, and by this

without spicules, or they had microscleres, or else both microscleres and megascleres. The megascleres are small, rather fine and straight styli, arranged like a bundle through the middle of the embryo along its longer axis. The microscleres are very peculiar: they are ancoræ, but of a type different from that of the grown sponge. They are smaller and finer, and their teeth are considerably longer than is commonly the case in the *Cladorhiza*-ancoræ; these teeth, which are very narrow, reach to about the middle of the ancora, or at all events, more than a third of the length. At the larger end there is on either side of the shaft a narrow ala of about the same length as the teeth. Nor is the number of teeth in the larger end constant in these ancoræ, but it may be five or six, while in the smaller end the number is always five. The length of these ancoræ varies from 0·017—0·021^{mm}, the thickness of the shaft is ca. 0·0011^{mm}. I do not venture to decide, whether the final form of ancoræ is formed, while the embryo is still in the sponge; ancoræ of the final form and size were certainly found in a single case; but as the embryos are only isolated with difficulty they may have belonged to the surrounding membrane. — That embryonic microscleres of a special type occur is a quite peculiar fact, and has not hitherto been observed; the microscleres of the embryos, as has repeatedly been pointed out in the preceding descriptions, are often smaller than in the grown sponge, but they are generally of quite the same form.

This species is easily recognizable from the other *Cladorhiza*-species by its ancoræ. Hitherto no *Cladorhiza*-species has been described with ancoræ with more than five teeth, while here seven or eight teeth are found. A peculiar fact is also that the number of teeth is not constant. When seven teeth are found, one is consequently the median one, but when eight teeth are present, the feature seems to be different, as also then one tooth may be the median one, and then there are consequently four teeth on one side, of which a pair then seems to be a little smaller than the others, as if a cleaving had taken place. In other cases no median tooth is found, but there are four teeth on each side of the median line. In the embryonic ancora there seems always to be a pair in the middle when six teeth are found. A remarkable fact is finally the different number of teeth in either end, as it would seem that the smaller end, without regard to the greater number of teeth in the larger end, has constantly five teeth; while, on the other hand, to judge from the species with three-toothed ancoræ described by Ridley and Dendy, it has only three teeth, when the large end has this number.

Locality: 63° 13′ Lat. N., 6° 32′ Long. W., depth 975 fathoms (bottom temperature ÷ 0·51 C.) (Ad. Jensen, the cruise of the "Michael Sars" 1902). According to this the species is a native of the cold area.

5. C. corticocancellata Cart.

Pl. III, Figs. 7—9. Pl. XII, Fig. 6 a—1.

1876. *Cladorhiza abyssicola* var. *corticocancellata* Carter, Ann. Mag. Nat. Hist. ser. 4. XVIII, 316, Pl. XIII, figs. 16, 16 a.

1885. *Cladorhiza abyssicola* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ. partim, Pl. IV, fig. 10, Pl. VII, fig. 7 a.

Erect, set with a number of short, almost wart-like processes [illegible] *or divided into branches from the base. The surface* [illegible]

possibility we are again led to reflect on a connection between oscula and [illegible], as has been [illegible] *Asbestopluma pennatula* and the following *Asbestopluma*-species.

branchlets are found. The skeleton is of the typical Cladorhiza-structure, and consists of a central axis with lateral axes and fibres for branchlets; but all these features are covered by the tissue, which thus forms a coating layer, from which only the short wart-like ends of the branches project. Spicula: Megasclera styli 0·50—0·71^{mm}; microsclera of three forms, anisancoræ unguiferæ with five teeth 0·033—0·037^{mm}, sigmata of two forms, large ones with slightly curved shaft and the ends prolonged in a flagelliform manner 0·15—0·18^{mm}, small ones with compressed terminal parts 0·057—0·074^{mm}.

This species has a peculiar appearance, quite deviating from the other *Cladorhiza*-species. It is ot erect form; whether it is fixed below by an expansion or attached by a root is not known, as my specimens are broken below, and Carter's description is based on fragments. The species may be described as a stem, set closely and all round with short, thick, more or less coalescing branches. Most frequently the branches are so short, that they may better be described as wart-like projections, only rarely they are a litte longer. As they are placed closely and irregularly, the sponge gets a more or less tuberous or round-lobed surface. The specimens in hand have, otherwise, an erect form, and are straight or a little curved, and besides the mentioned branches they have no ramifications; some skeletal parts, however, indicate that the sponge may also divide into larger branches each of which is then of the described form. The largest specimen has a height of ca. 280^{mm}, and the others are a little smaller. The thickness, which, on account of the close-set, round-lobed projections, can only be given approximately, is 10—20^{mm}. The length of the branches is at most 13^{mm}, and their thickness at the base up to 9^{mm}. On account of the powerful axes the sponge is stiff, also the consistency of the tissue is rather firm, but brittle. The colour (in spirit) is yellowish white. The *surface* is of a peculiar structure; as ends of fibres are projecting everywhere it is shaggy or prickly. Deep grooves or canal-shaped cavities going into the sponge are found between the ends of the fibres, so that the surface gets a reticulate-grooved appearance, what has been expressed by Carter in the name *corticocancellata*. The points of the branches are generally rounded, and they have no grooves, but show an even surface, shaggy from slightly projecting spicules. All the part of the sponge that coats the axes is penetrated by a system of canals and cavities connected with each other, but separated by parts and beams of tissue, and these canals and cavities must be supposed not to belong to the canal system proper. As this structure is closely connected with the skeletal structure, a more particular account of it will be rendered under the description of the skeleton. The *dermal membrane* is a thin film covering the parts of tissue that separate the mentioned cavities, and supported by some spicules. *Pores* and *oscula:* As the mentioned canals and cavities must be supposed not to belong to the canal system, their outer openings cannot be oscula. Pores are found everywhere in the dermal membrane in the mentioned cavities; they seem to be small, as I have not with certainty measured any of them to a greater size than 0·065^{mm}; I suppose that these openings act both as incurrent and excurrent ones. Of course, it is possible that some of the openings on the surface may be openings of real, excurrent canals; but this fact is scarcely to be decided by an anatomical examination only.

The *skeleton.* In spite of the deviating exterior form, the skeleton is constructed after quite the same principle as in the other *Cladorhiza*-species. A thick, powerful, polyspicular axis of closely united, parallel needles stretches through the middle of the sponge. This axis has below a thickness of 4^{mm}. It is more or less spirally twisted, especially in its lower part. Lateral axes a little upward directed issue from this axis in the same way as in the preceding species. These axes run through the middle of the short lateral branches before mentioned, and accordingly they attain only a rather small length. Fibres issue from the axes of the stem and the branches, quite corresponding to the fibres of the branchlets in the preceding species. They issue all round, and most frequently they are arranged in a more or less circular way, and they are inserted in the axes in the common manner, so that in a transverse section they are seen to meet in the middle (Woodcut fig. 5). The circular arrangement cannot be seen in the exterior, but when the layer of tissue is separated from the axes, a ringlike structure is seen in these, owing to the basal parts of the small axes, which are inserted into the axis (Pl. III, fig. 8). Now the only difference between this species and the preceding ones is that while in these the fibres inserted in the axes support free branchlets, they support in the present species the coherent part of tissue on the stems and branches, continuing from the axis out through this tissue, and their ends projecting a little. These fibres are in this species of about the same thickness throughout their length; sometimes they are a little curved. They may be somewhat branched, especially in their outer part, so that the number of projecting ends is greater than the number of fibres inserted in the axis. The part of the sponge coating the stem and the lateral branches and supported by the mentioned small fibres is not solid, but is, as before mentioned, pierced by a coherent system of cavities. A row of cavities is especially found inmost, round the axis, arranged like stories above each other, separated by the almost plate-shaped parts of tissue in which the small fibres run, but still connected with each other. Accordingly, a longitudinal section of the sponge reminds strikingly of the chambered root-stock of *Cicuta virosa* (Pl. III, fig. 9). In the outer part of the layer of tissue the cavities are more canal-shaped, and they open everywhere on the outside with round or roundish openings between the projecting ends of the fibres; their being at the same time connected with each other gives rise to the mentioned netlike structure. A comparison with the other species of the genus and especially the correspondence in the skeletal structure imparts the impression that the sponge-body coating the axes must be regarded as having arisen by a coalescing of branchlets, or must, at all events, be corresponding to coalesced branchlets, and that the mentioned system of cavities and canals, therefore, does not belong to the canal system proper, but is a secondary formation. This is also indicated by the fact that the cavities are abundantly connected with each other, so that one cavity in the sponge opens on the surface by several ways and to different sides. Whether free branchlets are found at any time during the growth of the sponge, and whether a real coalescing takes place, or the mentioned structure appears from the beginning, I am not able to decide, as I have had no young individuals[1]. The described regular

Fig. 5. *[illegible]* Cart.
A piece of a transverse section showing the axis and the small fibres. In the tissue embryos are seen. × 7.

[1] I have later seen a specimen which was surely a rather young one, and as it showed partly free branchlets which were chiefly connected only near the axis, this seems to indicate that the above described condition develops during the growth of the individual.

formation and arrangement of the skeletal axes may in certain places be somewhat modified by coalescings between the axes and the small fibres of the stem and the branches in near the axis of the stem, so that in these places a quite irregular network of fibres is formed (Pl. III, fig. 8). These coalescings, which are evidently secondary ones, seem to me to corroborate the view advanced above by showing that coalescings easily take place. Outside the axes and the small fibres a great number of scattered spicules is found in the tissue; they may here and there gather into bundles or short fibres, and they support also the dermal membrane as a rather dense, but irregular network of scattered needles. In the axes a tolerably copious, slightly yellowish mass of spongin is found imparting to the axes a yellowish, hyaline appearance.

Spicula: a. *Megasclera* are styli, almost always quite straight; they taper somewhat towards either end, and are therefore markedly fusiform; the rounded end may be more or less thin, sometimes it shows outmost a more abrupt tapering. The point may vary somewhat in length, but is always short or rather short, a more abrupt, distinct point being found besides the even decreasing in thickness from the middle; sometimes the outermost point is especially marked off. There is no difference between the styli of the axis and those of the other parts of the body. The length is rather constant and varies from ca. 0·56–0·71^{mm}, and the thickness from ca. 0·015—0·024^{mm}. Finer developmental forms are only seen quite singly. b. *Microsclera* are of three forms, anisancoræ unguiferæ and sigmata of two forms, larger and smaller ones. 1. The ancoræ are of the common *Cladorhiza*-form and have five teeth at either end; at the larger end rather broad alæ are found somewhat longer than the teeth. Sometimes six teeth are found at the larger end. The length varies from 0·033—0·037^{mm}, and the thickness of the shaft is about 0·0028^{mm}. Developmental forms in different stages are also found. 2. The large sigmata are of a quite peculiar form, the shaft is only slightly curved, the recurved ends are prolonged in a flagelliform way to a fine point. The surface of the sigma is a little uneven, so that the contour appears somewhat undulated, especially in the middle. The ends are not cylindric, but a little compressed. The sigma is contort to a somewhat different degree, most frequently up to about one fourth of a turning. The length is between 0·15 and 0·18^{mm}, and the thickness in the middle of the shaft is ca. 0·007^{mm}. Of this sigma a few developmental forms were seen, the youngest ones only representing the shaft without curves, those a little older having short curves; in the latter the compressed form of the ends is distinctly seen. 3. The small sigma occurs only in the ends of the branches, and has from this fact, I think, been overlooked by Carter. It is of a quite similar form as the sigma occurring in the same way in the preceding species, for instance *tenuisigma*, and evidently corresponds to this sigma. The shaft is about straight, the ends are recurved and a trifle compressed about from the middle of the sigma. The sigma is contort, most frequently one fourth of a turning. The length is 0·057—0·074^{mm}, and the thickness in the middle is ca. 0·002^{mm}. The ancoræ and the large sigma occur everywhere in the sponge, especially in the dermal membrane everywhere in the cavities; the small sigma, as mentioned, occurs only in the points of the branches and in rather small numbers.

Embryos. Embryos are found in great numbers everywhere in the sponge. They are more or less oval and a little flattened. Their longest diameter is on an average ca. 0·42^{mm}. They were found partly without spicules, partly with microscleres. These were ancoræ, and as in the preceding species we have again here the peculiar fact that these ancoræ are of a different type from those of the grown sponge. They are very small and fine, with five teeth in either end; those of the larger end are narrow and long, they are thus more than one third of the length of the shaft, while in the ancoræ of the grown sponge the teeth are only about one fifth of the whole length. At the larger end a narrow ala is found on either side. This ancora is very small, of a length of only about 0·018. In the embryos where it is found, it occurs abundantly.

This species agrees so exactly with Carter's description and figures, that there can be no doubt of the identity. The figure of the characteristic sigma agrees completely, and the measure given by Carter (39 by 1—6000th. inch), which is about corresponding to the length 0·161^mm and the thickness 0·004^mm, corresponds also. Finally, the locality is the same. As before mentioned, it may easily be explained that Carter has not found the small sigma, as it occurs only in the points of the branches. Two of Carter's statements do not agree with what I have found; in the first place he states that the styli are larger in the fibres of the stems than in the small fibres, while I have found no difference in size; this fact, however, is scarcely of any importance; but then he gives the size of the styli as (100 by 1—1800th inch.), which is about corresponding to a length of 1·4^mm and a thickness of 0·014^mm; this is a little thinner than, and twice the length of, the measures I have found. I cannot but think, however, that an error has slipped in in the measuring; the mentioned styli would also be uncommonly long and thin. Carter established the species as *abyssicola* var. *corticocancellata*, it is, however, a very distinct species; Ridley and Dendy, in Chall. Monaxonida, also call the attention to the fact that it must surely be an independent species.

The figures by Armauer Hansen quoted above may surely be referred to this species.

Locality: The Ingolf, station 143, 62° 58' Lat. N., 7° 09' Long. W., depth 388 fathoms (bottom temperature ÷ 0°·4 C.); 60° 19' Lat. N., 5° 39' Long. W., depth 620 fathoms (bottom temperature ÷ 0·15 C.) (Ad. Jensen, the cruise of the "Michael Sars", 1902). Of the stations the former is situated a little to the north, the latter a little to the south, of the Faröe Islands.

Geogr. distr. The specimen described by Carter from the "Porcupine" has also been taken near the Faröe Islands, at 60° 14' Lat. N., 6° 17' Long. W., depth 632 fathoms (bottom temperature ÷ 0·8 C.). The species is thus only known with certainty from this limited locality. As mentioned above, it has also been taken by the Norwegian North-Atlantic Expedition; as among the enumerated stations one is also found situated north of the Faröe Islands, it may possibly have been taken there. The bathymetrical range is 388—632 fathoms, and the species is only known from the cold area.

6. C. oxeata n. sp.

Pl. I, Fig. 1. Pl. III, Fig. 10. Pl. XIII, Fig. 1 a—f.

1885. *Cladorhiza abyssicola* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, partim, Pl. VII, Fig. 9.

1887. *Cladorhiza abyssicola* Fristedt, Vega Exp. vetensk. Iaktt. IV, 455.

Irregularly dendritically branched from the base; the branchlets, especially [illegible] sometimes coalesced to more or less wing-shaped parts. The sponge attached [illegible]

the common structure, in the principal axes it is enormously powerful. Spicula: Megasclera oxea 0·417
—[illegible]^{mm}; microsclera of three forms, anisancoræ unguiferæ with five teeth, sometimes with six teeth in the larger end, 0·020—0·034^{mm}, sigmata of two forms, large ones 0·09—0·12^{mm}, small ones, with compressed terminal parts, 0·047—0·054^{mm}.

This species is more robust than the other *Cladorhiza*-species, and it seems also to be the one that may grow to the largest size. It may be described as a bush with few stems. To judge from a basal part in hand it is attached below to a hard substratum with an irregular base formed by more stems. From this base thicker stems arise, dividing immediately and continuing upward with irregular ramifications, growing thinner as they rise. From the principal stems and their ramifications thinner, often branched lateral branches issue again, but there is otherwise no definite difference between stems and lateral branches. In a couple of fragments in hand a tendency to a bilateral arrangement of the branches is seen in the outermost ramifications. Branchlets issue in the common way from stems and branches; they issue all round and are close-set, but they show no circular arrangement. They are broadest at the base, and are slightly conical outward. The stems and branches are less cylindrical than in the preceding species, as the branchlets are somewhat coalesced at their base, which is most frequently somewhat compressed, and branchlets that are placed above each other are then connected by low keels. In the stems this feature may be very prominent, so that the branchlets are arranged more or less in rows on keel-shaped parts, while the intervening parts are smooth without branchlets; by this means the stems get an angular or winged appearance. At the ends of the branches the branchlets often become short and close-set, and the ends of the branches are rounded and sometimes slightly swollen. The layer of tissue on the axes is down on the stems rather thin, but becomes thicker in the outer ramifications. The largest specimen in hand, which is broken both above and below and only consists of the skeleton, has a height of 260^{mm} and a breadth at the base of 30^{mm}, and divides here into two principal stems which immediately subdivide. The mentioned basal part, which consists below of several interwoven stems, has in this place a breadth of 50^{mm}. As before mentioned the stems taper evenly upwards in the ramifications. The branchlets have an average length of towards 5^{mm}, they are a little more robust than in the preceding species, and have in the middle a thickness of ca. 0·5^{mm}. The colour (in spirit) is yellow or yellowish white. The consistency is firm on account of the strong skeleton; but in the upper branchings the sponge is rather flexible, and the branchlets are very flexible. The layer of tissue coating the axes is soft and brittle. The *surface* is smooth, and slightly projecting spicules are found only at the ends of the branchlets. The outermost layer of the tissue is not differentiated as a distinct or removable *dermal membrane*. *Oscula* and *pores* were not observed. In one of the specimens in hand of this sponge worm-tubes and Bryozoa are sitting on branches that are denuded of tissue; as the other branches of the specimen are sound, the branches in question must accordingly have been denuded of the tissue while the sponge was living.

The *skeleton* consists in the stems and branches of strong polyspicular fibres. These fibres compose by far the greatest part of the mass of the sponge, and attain an enormous thickness. At the lower end of the mentioned largest specimen, which is probably broken off a little above the base, the axis is 30^{mm} thick, a little up on the thickest stem the thickness was measured to 18^{mm}, and farther up on one of the branches it was still 10^{mm}. In the outermost ramifications the axes grow thinner, and are here 1^{mm} thick or a little less. The fibres consist of closely united spicules, but they are not here all of them parallel to the longitudinal direction, a great part being arranged in other ways. If we regard a transverse section of a stem a rather marked stratification is seen; this stratification arises from the fact that layers in which the spicules are more or less parallel to the longitudinal direction, and which are, therefore, in the transverse section seen to be cut, alternate with layers in which the spicules are scattered but parallel to the surface. In the layers in which the spicules are placed in the longitudinal direction, they are to some degree arranged in bundles. The described construction of the axial skeleton is also distinctly seen in a longitudinal section. In the thinner branches no stratification is seen. The axes most frequently show a slight spiral twisting, which is, however, often very indistinct, or has quite disappeared, the spicules of the outer layer being scattered. In this species the axes are most frequently not cylindrical, but of an irregular contour, often with edges and keels; and irregular coalescings of various kinds may take place. The skeleton of the branchlets consists, as usually, of a fibre which is inserted in the axis and continues to the middle of the axis where most frequently several fibres meet. In this species these fibres have rather many spicules alongside; to be sure, they become a little thinner towards the point, but even there they consist of several spicules. The spicules of the part of these fibres that is inserted in the axis, are as usually spread in a fan-shaped way in the longitudinal direction; in the thinner branches the inserted part of the fibres of the branchlets is of about the length of a spicule, but in the thicker branches and stems also the branchlets continue to the middle, and then the part inserted in the axis gets a considerable length. In this case only the innermost part of the fibres of the branchlets, about to the length of one spicule, is spread in a fan-shaped way. It must also be supposed that the spicula-layers of the thicker axes mentioned before are layers of growth, and that the inserted fibres of the branchlets, with the exception of the innermost part, were at an earlier time outside the axis. In the layer of tissue outside the axes some scattered spicules are found, some of which are situated just under the skin, partly between the branchlets, partly reaching a little into their basal parts. In the axes spongin is found cementing the spicules; it is most abundant downwards, and therefore the yellowish colour of the axes deepens downward, and at the base it becomes brownish. The axes have the common, somewhat hyaline appearance.

Spicula: a. *Megasclera:* these, as already indicated in the name of the species, are diactinal; they are typical oxea with equal ends, without any discernible tendency towards styli. They are straight or slightly, often a little irregularly, curved, or they have in the middle a sharp, but slight bend. From the middle they taper a little towards the ends, but the point itself is rather short, or at most of middle length; an especially marked off outermost point is often found. They have not rarely a swelling in the middle. These oxea, as mentioned, show no tendency to become styli; on the other hand, forms are found with one rounded end, but only singly; forms with both ends more or less rounded are, however, also seen, and I am, in both cases, most inclined to regard these forms as secondary or irregular ones. Between the needles in the axes and those in the branchlets the only difference is that the former are generally shorter and thicker than the latter; besides, needles with the mentioned sharp bend occur far more frequently in the tissue and branchlets than in the axes

When all sizes are included, the length is between $0{\cdot}417-0{\cdot}80^{mm}$, and the thickness is $0{\cdot}014-0{\cdot}025^{mm}$ For the needles of the axes the length may be given as being generally $0{\cdot}417-0{\cdot}6^{mm}$, and for the needles in tissue and branchlets ca. $0{\cdot}55-0{\cdot}80^{mm}$, and the thickness is rarely more than $0{\cdot}021^{mm}$. Sometimes this difference is less marked, and it is especially found in the upper and outer ramifications, while down in the sponge and in the stems and the thicker branches it is more effaced. In the tissue fine, long pointed developmental forms are seen singly. b. *Microsclera;* these are anisancoræ unguiferæ and sigmata of two forms, larger ones and smaller ones. 1. The ancoræ are of the common *Cladorhiza*-form; they have a curved shaft and rather broad alæ at the larger end. They have five teeth at either end, but forms with six teeth at the larger end are also found. The length varies from $0{\cdot}026-0{\cdot}034^{mm}$, and the thickness of the shaft from $0{\cdot}0028-0{\cdot}0035^{mm}$. Developmental forms of the ancoræ are found in small numbers. 2. The large sigma has a regular sigma-form; these sigmata are plane or almost plane; the length is $0{\cdot}09-0{\cdot}12^{mm}$, in by far most cases nearest to the latter length, the thickness is $0{\cdot}0057-0{\cdot}007^{mm}$. Developmental forms in different stages were seen in no small numbers. These developmental forms are distinctly seen not to be cylindrical, but sharpened inward from a little over the middle and to the ends; this feature, on the other hand, is not to be seen in the fully developed sigmata. 3. The small sigma is only found in the end of the branches, and is of the same form, with inwardly sharpened terminal parts, as the sigma occurring in the same way in the preceding species. It is likewise contort, almost always a fourth part of a turning. The length is $0{\cdot}047-0{\cdot}054^{mm}$, and the thickness in the middle of the shaft about $0{\cdot}002^{mm}$. The ancoræ and the large sigma occur partly throughout the tissue and partly in the dermal layer, especially the ancoræ are abundantly present in the outermost layer of the branchlets. The small sigma only occurs in the point of the branches and not in all of them, but only in those that are distinctly swollen; here it is found abundantly. On the other hand, the large sigma is here only seen quite singly.

Embryos. Embryos were also in this species found rather copiously in the tissue. They are roundish or most frequently oval, and they are surrounded by a thin membrane. Their size is about 1^{mm}. By the examination they proved to be either without spicules, or only provided with developmental forms of the ancoræ, but these were found rather copiously. The developmental forms were mostly rather young stages, they had a length of $0{\cdot}024-0{\cdot}027^{mm}$, or about the same length as the ancoræ of the grown sponge. The embryos are situated in the tissue outside the axes, they are frequently found at the base of the branchlets, or in this base itself; in a few cases they are seen out in the middle of the branchlets (Woodcut, Fig. 6). According to this I suppose that they leave the sponge by this way, and so we are again led to regard the branchlets as oscula. I have, however, not been able to find any canal, and accordingly, if such a one is found, it must be supposed to be closed. The fibre of the branchlet is almost always found in one side, and the canal must be supposed to run alongside of it. Also the embryo is placed in one side of the branchlet beside the fibre; it distends the branchlets in the middle, and on the sides where the fibre is not found, it is surrounded by a thin membrane only filled with microsclera. It is to be remembered, however, that the occurrence of the embryos in the branchlets may also be supposed to be owing to the fact that they develop here as in other places in the sponge.

The figure presented by a branchlet with an embryo in it, involuntarily directs the thought to the figure given by Wyville Thomson, in "The Depths of the Sea" 187, of *Chondrocladia virgata*. In this sponge all the branchlets show a swelling in the middle mentioned by the author as "a dark greenish oval mass of granular sponge matter", a description that might very well be used of an embryo situated in the branchlet. Wyville Thomson says that the branchlets end with a very narrow osculum. Carter also mentions the swelling, but has found no osculum; it may perhaps have been distinct, when the sponge in its fresh state was examined by Wyville Thomson, and have been closed later. If the mentioned swellings in the branchlets are owing to embryos, there is the curious peculiarity that an embryo is found in each branchlet.

The quoted one of Armauer Hansen's figures of the exterior may with certainty be referred to this species; also one of the specimens of his *C. abyssicola* which I have examined proved to be the present species. Of the spicula-figures those on Pl. IV, figs. 4—5 belong with some probability to this species. Also Fristedt's *C. abyssicola* proved, by my examining a fragment sent to me, to be the present species.

Fig. 6. *C. [illegible]* n. sp.
Branchlet with embryo. The fibre is running in the right side. × 20.

Locality: Station 15, 66° 18′ Lat. N., 25° 29′ Long. W., depth 330 fathoms (bottom temperature ÷ 0·75 C.), station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms (bottom temperature ÷ 0·4 C.); further 65° 57′ Lat. N., 27° 00′ Long. W., depth 336 fathoms (bottom temperature 0°) (Wandel). The mentioned stations are situated in the Denmark Strait and north of the Faröe Islands. The species appears to be a native of the cold bottom, or the border of it. From station 3 with a bottom temperature of 0·5 C. we have a fragment consisting of denuded skeletal parts. This fragment has surely been dead long, as a Suberitid, and other forms are growing on it, and it has moreover lost something of its original firmness. Therefore it must be supposed to have been removed from its native place.

Geogr. distr. As mentioned the species has been taken by the Norwegian North-Atlantic Expedition and in the Baffin Bay, depth 116—215 fathoms (Fristedt l. c.).

The *Cladorhiza*-species are forms all of which are natives of rather deep or very deep water. The bathymetrical range of the genus is from 116 to 3000 fathoms. The genus is widely distributed, from ca. 80° Lat. N. to ca. 54° Lat. S. The arctic species live generally at considerably smaller depths than those of the Mediterranean and the Pacific. The species treated here, which represent all the arctic species, thus have a bathymetrical range from 116 to 1300 fathoms; with the exception of *abyssicola* they are all of them natives of cold water. The species from the Atlantic and the Pacific have a bathymetrical range from 700—3000 fathoms; with regard to these species the bottom temperature of the localities at which they have been obtained varies from ca. 0° to 1·4° C. (32·1°—[illegible] Fahrenheit). The bottom temperature 0° C. (32·1 Fahrenheit) applies to the southernmost species *C. [illegible]* R. and D. obtained at 53° 55′ Lat. S., 138° 35′ Long. E. at a depth of 1950 fathoms.

The *Cladorhiza*-species described at present are the following ones:

1872. *C. abyssicola* O. Sars.
1876. - *corticocancellata* Cart. (as a variety of *abyssicola*).
1887. - *abyssicola* var. *rectangularis* R. and D. The Pacific.
1887. - — - *linearis* R. and D. The southern Pacific.
1887. - *moruliformis* R. and D. Southwest of Australia.
1887. - *longipinna* R. and D. The northern Pacific.
1887. - *similis* R. and D. The southern Pacific.
1887. - *tridentata* R. and D. Between Prince Edward Island and Crozet Island.
1887. - *pentacrinus* Dendy. Northeast of New Zealand.
1902. - *flos abyssi* Tops. Off the Cape Verde Islands.
- *gelida* mihi.
- *tenuisigma* mihi.
- *iniquidentata* mihi.
- *oxeata* mihi.

The two varieties *rectangularis* and *linearis* established by Ridley and Dendy are surely independent species.

In Zool. Anzeig. XIX, 532, Kieschnick has established a species *C. depressa*. As it is from a littoral locality it is scarcely a *Cladorhiza*, and as Thiele, in his account of Kieschnick's species (Abhandl. Senckenberg. Nat. Gesell. XXV, 1903) has been unable to find anything whatever that might correspond to it, the species must be regarded as non-existing.

With regard to the *Asbestopluma*-species described under the generic name of *Cladorhiza* see under the genus *Asbestopluma*.

Chondrocladia Wyv. Thomson.

Erect, branched in different ways: often a central axis with lateral branches which may be papillose, or the branches gathered at the top: sometimes branched like a tree, or finally of a more irregular form. The skeleton is in close accordance with the form, and consists in the axis or axes of powerful spicula-fibres, and of similar, but thinner ones in the branches. Spongin is found in the fibres. Spicula: Megasclera styli, and sometimes finely spinulous styli in a special layer coating the stalk: microsclera: the characteristic microsclera are isancoræ unguiferæ of one, two, or three sizes with from three to nine teeth at either end, to which forms sigmata are (always) joined.

1. **C. gigantea** Arm. Hans.

Pl. IV, Fig. 1. Pl. XIII, Fig. 2 a—l.

1880? *Cladorhiza grandis* Verrill, Proceed. of the U. S. Nat. Mus. II, 1879, 204.
1885. *Desmacidon clavatum* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 14, Pl. II, fig. 11.

1885. *Desmacidon nucleus* Armauer Hansen, ibid. Pl. III, fig. 1, Pl. VI, fig. 17.

1885. *Desmacidon giganteum* Armauer Hansen, ibid. Pl. II, figs. 12, 13, Pl. VII, fig. 8.

1885. *Desmacidon arcticum* Armauer Hansen, ibid. 15, Pl. VI, fig. 16.

1887. *Cladorhiza nobilis* Fristedt, Vega-Exp. vetensk. lakttag. IV, 456, Pl. 25, figs. 60–65, Pl. 31, fig. 26.

Erect, club-shaped, on the upper part with a number of short, papillose branches swollen towards the point; below the axis is dissolved to a branched root. A layer coating the stalk and root and provided with special spicules present. The skeleton of the generic type, consisting of a powerful, below spirally twisted spicula-axis through the middle of the sponge, and thin spicula-axes in the papillæ. Spicula: Megasclera styli of two sizes, long ones in the axes, 1·2—2^{mm}, shorter ones in the other parts of the body 0·50—1·2^{mm}; finely spinulous styli in the layer coating the stalk 0·118—0·34^{mm}; microsclera of three forms, isancoræ unguiferæ of two forms, large ones with six teeth 0·057—0·077^{mm}, small ones with six to nine teeth 0·018—0·03^{mm}, sigmata with compressed terminal parts 0·037—0·045^{mm}.

This beautiful and interesting species reaches a considerable size, as has already been expressed by Armauer Hansen in the specific name, although his specimen had only half the length of the largest specimen before me. The species consists of a stem, dividing below, first into rather thick branches, then by and by into thinner ones, so that a rather richly branched root is formed. The stem continues upwards, and increases in thickness in its upper half, so that the sponge becomes about club-shaped. The upper, thicker part is set with a great number of papillæ, not regularly arranged. The papillæ have a broadly conical base passing into a thinner stalk which again ends in a more or less swollen head. The papillæ may otherwise be somewhat different in length and form, the length of the stalk may be different, and the end may have a more or less marked head-like swelling. The papillæ may also be somewhat differently directed; in the specimens in hand most of them are more or less turned downwards, only the uppermost ones are directed upwards. Up to where the lowermost papillæ begin, the root and stalk is coated with a layer provided with special spicules and of the same character as that found in several *Asbestopluma*-species; the layer is here very thin, and it is highly filled with mud, so that it must be supposed that the sponge has been sunk in the bottom so far as the layer reaches. The largest specimen in hand has a height of 43^{cm}, of which the stalk and root make about the half part; the stalk is ca. 21^{mm} thick, and the greatest thickness above is 55^{mm}. The length of the papillæ inclusive of the conical base cannot be given exactly, but it does not exceed 25^{mm}, and in their thinnest stalk-shaped part they have a thickness of 3–5^{mm}. Armauer Hansen's specimen was 22^{cm} high, and two smaller specimens before me are ca. 15^{cm} high, the other measures being in proportion to this. The colour (in spirit) is yellowish white; the lower part, which is covered by the coating layer, is, on account of the mud in it, dark gray, which colour ceases with a sharp boundary line. On account of the axial skeleton the sponge is firm and stiff, and the layer has outermost a rather hard, crusty consistency, but it is inelastic and somewhat brittle. The outer crusty tissue is not sharply bounded inward, but passes more or less evenly into the inner, softer tissue. The *surface* is apparently smooth, but under a magnifying glass it is seen to be finely shaggy. The outer crusty layer may rather easily be peeled off, while the outermost membrane, the *dermal membrane* proper, may be distinguished, but cannot, or only with difficulty, be isolated. *Pores* may be seen in the dermal membrane, and were measured to a size of ca. $0{\cdot}02^{mm}$. They are only observed with difficulty, the outer layer of tissue having the character of very small subdermal cavities situated within each other and separated by membranes, and the pores piercing only the very outermost membrane. From the subdermal cavities cylindric canals continue inward which canals may be observed, when a piece cut off parallel to the surface is regarded from the inside. *Oscula:* Separate great oscular apertures are not to be found, but it is likely that the papillæ carry the excurrent openings, as the inner tissue between the central axis and the outer layer is lacunous, and canals are running longitudinally in the papillæ, partly in the tissue between the axis and the outer layer, partly as sharply and distinctly bounded canals in the outer layer. Outermost in the terminal part of the papilla a cavity is found, or the middle part of the head of the papilla consists of a somewhat lacunous tissue without spicules. Now the end of the papilla is copiously provided with poreshaped openings, and as I suppose the said canals, at all events those running in the inner tissue, to be excurrent canals, I suppose the openings in the terminal part of the papilla to be excurrent ones.

The *skeleton* consists of a strong axis running through the middle of the sponge, and also continuing into the branches of the root. The axis is not quite compact, but is composed of a number of close-lying, strong fibres. In its lower part the axis is spirally twisted; this twisting is here very distinct to the naked eye, as it is not the spicules of the single fibres which are spirally arranged, but it is the whole, of fibres composed stalk that is twisted, so that it gets some resemblance to a rope. In the single fibres, on the contrary, the spicules are placed in the longitudinal direction of the fibres without any twisting. The twisting is most marked in the lower part of the stalk, but upward it becomes less marked, and at last it is lost; it disappears also in the root-branches. In the largest specimen the thickness of the spicula-axis is ca. 14^{mm}. Through the middle of each papilla runs a fibre, which is formed by one of the fibres composing the axis bending off and passing through the papilla. Where the fibre bends off from the stem it is supported by some spicules placed in the angle and reaching to the middle of the stem. The papillæ evidently correspond to the branches of the *Cladorhiza*-species. The skeleton of the other parts of the sponge supports the layer of tissue that coats the axis and its branches, i. e the papillæ. In the crusty outer layer this skeleton consists of a very dense layer of needles lying irregularly in all directions. Part of the spicules project through the surface and makes it shaggy. Down on the stalk the layer of tissue consists only of this outer, firm part, and it is easily separated from the stalk. In the thicker part of the body, on the other hand, the crusty layer passes inwardly, with a more or less indistinct bordering, into the soft, more lacunous layer of tissue nearest the axis which layer is provided with fewer spicules, partly scattered, partly gathered in bundles or shorter fibres. Also here the whole layer may be easily separated from the axis. Down on the stalk the crusty layer is about 2^{mm} thick, higher up in the expanded part it reaches a thickness of $3—5^{mm}$. In the papillæ the construction of the skeleton is the same; in a transverse or longitudinal section the fibre is seen in the middle, then a soft layer with fewer spicules, and outermost the crusty layer (Woodcut fig. 7). The soft tissue between the crust and the fibre is here rather thin. The fibre continues to the point of the papilla, where it ends at the outer end of the cavity there; it has an average thickness of about 1^{mm}. The coating layer of the stalk and root is thin, and does not exceed 1^{mm} in thickness. It is of a character somewhat different from what it is in the *Asbestopluma*-species, consisting of closely and irregularly arranged spicules of a special form, besides being interwoven with the common axial styli. It might be said that it was the outer part of the crusty layer, which was interwoven with the special spicules, but then it must be remembered that the coating layer may easily be removed as a separate layer. In the axis a rather copious, yellowish mass of spongin is found cementing the needles of the single fibres and coating these fibres with a thin layer; on the other hand, the fibres are not, or only to a slight degree, united by spongin, and they seem chiefly to be held together by anastomoses passing very obliquely from one fibre to another. In the skeleton outside the axes no spongin was observed.

Spicula: a. *Megasclera* are styli, dividing into two forms, which, however, are not sharply separated: long, straight styli chiefly forming the axes, both the central one and those of the papillæ, and shorter, most frequently evenly curved styli found in the other parts of the body. The long styli are straight or sometimes slightly and a little irregularly curved; they taper a trifle from the middle outward; at the rounded end there is a more sudden tapering, the point is short and oftenest stubby. The length reaches 2^{mm}, and may go down to ca. $1{\cdot}2^{mm}$, and the thickness is $0{\cdot}03$ down to ca. $0{\cdot}017^{mm}$. The short styli are almost always slightly and regularly curved; they have likewise a sudden tapering at the upper end; the point is somewhat longer than in the long ones, and it is generally sharp. The length is $0{\cdot}56^{mm}$ up to ca. $1{\cdot}2^{mm}$, and the thickness is in proportion $0{\cdot}011$—$0{\cdot}024^{mm}$. Thus the short styli, while having a length like the shortest ones of the long styli, are of greater thickness; as before mentioned, however, the two groups are not sharply separated; neither are they so with regard to their occurrence, some of the shorter needles being found in the axis, while long needles may be found in the other parts of the body, only, however, in rather small numbers. Of both forms quite fine developmental forms are found, but only in small numbers. The spicules of the coating layer of the stalk are curved, often somewhat irregularly curved, styli; the head-end shows often an inconsiderable, scarcely perceptible swelling which is often placed a little below the end; they taper more or less towards the opposite end, which is more or less broadly rounded. They are finely spinulous, so finely that it is seen at most as a slight granulation, when the needle is not seen under very high magnifying powers. The length varies from $0{\cdot}118$—$0{\cdot}31^{mm}$, and the thickness at the upper end is about $0{\cdot}0015$—$0{\cdot}004^{mm}$; there is no fixed proportion between the length and thickness. b. *Microsclera:* these are isancoræ unguiferæ of two forms and sigmata. 1. The ancoræ of the large form have an evenly curved shaft and six lanceolate teeth at either end. At either end are also found two narrow

Fig. 7. *Chondrocladia gigantea* (Hans.) Longitudinal section through the end of a papilla with a cavity in the outer end. Outermost the crusty layer is found, then the softer tissue with fewer spicules and in the middle the axis. A few canals are seen. × 10.

alæ continuing down along the shaft and being a little longer than the teeth. The length of this ancora varies from 0·057—0·077^{mm}, and the thickness of the shaft is about 0·004^{mm}. Younger forms in different degrees of development are also found. 2. The small ancoræ have a rather highly curved shaft, but there may be some difference in the degree of curving; the number of teeth may be different, from six to nine, it seems most frequently to be seven or eight. Some irregularity is not rarely seen, so that some teeth are larger than others, or that more teeth are found on one side of the median line than on the other. Some instances are also found, in which the number of teeth at each end is different, for instance six and seven. At either end of the shaft two small alæ are found. The direction of the teeth is somewhat varying in this ancora, so that they are either directed almost horizontally outward, or more or less downward, i. e. towards the middle. The length is rather varying and is between 0·018 and 0·03^{mm}, and the thickness of the shaft is ca. 0·0028^{mm}. Developmental forms of this ancora were seen quite singly. 3. Sigmata; these are of a form quite similar to those occurring in most *Cladorhiza*-species, with compressed, inwardly edged terminal parts; they are also contort, almost always one fourth of a turning. Their length varies from 0·037—0·045^{mm}, and the thickness in the middle is ca. 0·002^{mm}. The ancoræ occur everywhere in the sponge in tissue and in dermal layer; they occur also in the axis in the tissue between the single fibres of which it consists; at the point of the papillæ the small ancora is wanting, or is only present in small numbers. Sigmata occur only in the papillæ, especially at the point, and they are not of equally frequent occurrence, being more scarce at the point of some papillæ, while in others they are found more copiously.

Embryos. Embryos were found in one of the two smaller specimens; they were rather conspicuous, as they are very large, and shine through the surface on account of their deeper yellow colour. They are uncommonly large, reaching a diameter of 5^{mm}; they are round, most frequently much flattened so as to become almost discoid or lenticular. They are placed in the body of the sponge between the skin and the axis, often in such a way as to be lying partly in the soft tissue, partly in the hard outer layer, sometimes also entirely in the outer layer in lenticular cavities; in the latter case the surface may be bulged out by them, and the layer separating them from the surface may be rather thin. Of spicules they have both megascleres and microscleres. The megascleres are thin and fine styli, quite reminding of developmental forms of the styli of the grown sponge; their greatest measured length was 0·89^{mm}. Of microscleres the large ancora occurred rather abundantly, and a few developmental forms of this ancora. These ancoræ are somewhat deviating from those of the grown sponge, their shaft being thinner and their teeth somewhat longer. Also the small ancora occurs, but only in very small numbers. Then forms occur, also in very slight number, that are, as to size, transitions between the two kind of ancoræ, so that we must suppose the possibility that the cells forming the ancoræ are not from the beginning distinctly separated into two kinds; it is, to be sure, to be supposed that later, when the ancoræ are found as two distinctly separated forms, each of these is formed by a distinct kind of cell. The large ancoræ in the embryos are of full length, they were even measured to be a little longer than has been observed in the grown sponge, viz. to 0·084^{mm}.

As I have had type specimens of all the four species established by Armauer Hansen, I have been able to decide with certainty that they belong all to one species. Three of the species, *ovata*, *nucleus*, and *arctica*, are only loose papillæ of *gigantea*, and it is a singular thing that

Armauer Hansen has not recognized this fact, as their exterior shows it plainly enough, and the spicules are the same. In *arctica* he has found sigmata, which shows that he has examined a piece of the terminal part of the papilla. When he also mentions "anc. 3" for this species it is not correct, such ancoræ are not found. Armauer Hansen does not in any of his descriptions render any account of the fact that there are two forms of ancoræ. Although *clavata* is the one first described I have thought it correct to use the name *gigantea*, as this name has been given to a whole specimen of the sponge, and to this belongs also a recognizable figure, while the other species have been established on small fragments. I have likewise examined the type specimen of Fristedt's *Cladorhiza nobilis*, so that the identification is sure; otherwise his description and figures show plainly enough that the question is of the present species. Fristedt draws himself the attention to the resemblance, and the only distinguishing character he mentions is that his species, in contradistinction to that of Armauer Hansen, is hollow; the case is, as might be supposed, that the body is torn from the axis, the consequence of which is that the species apparently is hollow; as the body and the axis are easily separated, a tearing out of the axis is an easy thing. Fristedt gives the greatest length of the needles to $0{\cdot}9^{mm}$; that he has not found any longer needles corresponds with the fact that he has not had the axis, in which the longest needles occur; otherwise I have in his specimen found needles up to $1{\cdot}7^{mm}$ long. In contradistinction to Armauer Hansen, Fristedt has found the spicules of the coating of the stalk; he does not mention, however, in what manner they occur. As to the occurrence of the skeletal spicules he expresses himself in a very obscure way saying: "These spicules are placed both in the body and in the arms nearest the central cavities". As he does not mention the way of occurrence of the spicules of the stalk-coating, I suppose it to be this expression that has led Topsent to suppose (Résultats du Voyage du S. Y. Belgica, Spongiaires, 26) that these spicules occur through the whole height of the sponge. That they only form a stalk-coating also in Fristedt's specimen is seen from the figure, which shows a dark-coloured layer on the small part of the stalk that is present, and also the examination proved it to be the fact. As mentioned by Fristedt, some of the papillæ anastomose; it is an interesting fact that this feature is also found here as in several *Cladorhiza*-species; it has not been observed in the specimens before me. Fristedt says that the large ancoræ have more teeth than the small ones; this statement must be due to an error, neither is it seen in the figure; otherwise he does not mention the number of teeth. The *Cladorhiza grandis* established by Verrill would seem, according to the description of its outer form, to be identical with *gigantea*, but this fact cannot be decided, as Verrill does not mention the spicules at all; if they prove to be identical Verrill's name has the priority.

The species *Cladorhiza concrescens* from the West Indies established by Schmidt (Spong. des Meerbusen von Mexiko, II, 1880, 83, Tab. X, Fig. 8, 9) must be a very closely allied species. Its form is quite similar, and it has also two forms of ancora; the large ancora has six teeth, but of the small ancora it is said that its teeth are so long as almost to touch each other in the middle. Schmidt's expression ".... den Schlammbeleg des Stieles ...." shows with rather great certainty that this species has a layer coating the stalk, which fact is not known to be found in other *Cladorhiza*-species than *gigantea*.

Locality: Station 4, 64° 07' Lat. N., 11° 12' Long. W., depth 237 fathoms, bottom temperature

2°5 C.); station 64, 62° 06′ Lat. N., 19° 00′ Long. W., depth 1041 fathoms (bottom temperature 3°1 C.); station 101, 66° 23′ Lat. N., 12° 05′ Long. W., depth 537 fathoms (bottom temperature ÷ 0°7 C.); station 138, 63° 26′ Lat. N., 7° 56′ Long. W., depth 471 fathoms (bottom temperature ÷ 0°6 C.); further it has been taken at 62° 53′ Lat. N., 4° 14′ Long. E., depth 450 fathoms (bottom temperature negative), and 62° 38′ Lat. N., 4° 40′ Long. E., depth 350 fathoms (bottom temperature ÷ 0°5 C.) (Ad. Jensen, the cruise of the "Michael Sars" 1902). The first four localities are situated between Iceland and the Faröe Islands, with the exception of station 64, which is situated south of Iceland; the two localities from the cruise of the "Michael Sars" are in the Faröe-channel. At the first four localities only fragments and loose papillæ were obtained, at the last ones on the other hand three specimens. As appears from the above the bottom temperature is negative at most localities, and only positive at stations 4 and 64. From station 64 we have only a quite damaged fragment, which may very well have been dragged in the trawl from an earlier station. From station 4, on the other hand, we have a fresh fragment; this station with a depth of 237 fathoms, is situated on the ridge between the northern, cold depth and the southern depth, so it may well be understood that the species may occur here. I suppose that the specimen in question is a fragment, but it might also be a quite young individual, in which latter case there might be the possibility that the specimen would not have attained its full development on this locality.

Geogr. distr. The species has been taken by the Norwegian North-Atlantic Expedition, partly between Iceland and the Faröe Islands or a little farther north, partly off the Norwegian coast, at the two first places at depths of 299 and 1163 fathoms, at the latter place at a depth of 452 fathoms; the bottom temperatures were ÷ 0°3, ÷ 1°1, and ÷ 1°0 C. (Armauer Hansen mentions further station 58, but this station being no zoological one, the statement is presumably erroneous). It has further been taken at East-Greenland, depth 130 fathoms (Fristedt). If *C. grandis* Verrill proves to be identical with the present species, it has accordingly also been taken off Nova Scotia, among other localities at 43° 17′ Lat. N., 60° 58′ Long. W., depth 180 fathoms. The species is now known with certainty from different localities in the whole northern depth between Greenland and Norway with a bathymetrical range from 130—1163 fathoms. The species seems chiefly to be a native of the cold bottom, although it scarcely exclusively belongs to the cold area; the fact proves to be that almost all the localities, to be sure, are negative, but they are situated at the very border of the cold area, and the Ingolf-station 4 forms an exception being situated quite up on the ridge between the cold area and the warm depth and having a bottom temperature of 2°5 C. An exception to the other side is formed by station 51 of the Norwegian North-Atlantic Expedition, which is situated in the cold area proper with a depth of 1163 fathoms and a bottom temperature of ÷ 1°1 C. The fragment from Ingolf-station 64 must be regarded as uncertain. If *C. grandis* Verrill proves to be identical with the present species, it accordingly occurs at the eastern coast of America much farther south and at localities with positive bottom temperature, and this does not seem to be improbable.

Note. Carter, in the "Porcupine"-sponges (Ann. Mag. Nat. Hist. 1874, 4, XIV, 218), mentions a *Cladorhiza*-species, *C. virgata*, from station 52, 1869, a locality south of the Faröe Islands with cold bottom. According to Wyville Thomson (The Depths of the Sea, 188), however, this species has not been taken here, but at the entrance to the Strait of Gibraltar. According to these facts Carter has surely been mistaken, and the species belongs to the latter locality. The branched forms of sponges, which are mentioned by Wyville Thomson (Proceed. of the Roy. Soc. XVIII, 443) from station 52, 1869, and which led Carter to refer *C. virgata*, for which he found no locality, to this locality, are surely the *Cladorhiza*-forms taken here.

The genera *Chondrocladia* and *Cladorhiza* are closely allied to each other, and the distinction between them is exclusively founded on the difference between the inequi-ended ancoræ and the equi-ended ones. As in the *Asbestopluma*-species, embryos are, as will have been seen, almost always found in the species of these two genera. Of *C. abyssicola* Sars has stated that the embryos are formed in the point of the branches, and in *C. tenuisigma* I have found that the spermatozoids are formed in the swollen ends of the branches. My examinations, however, are too insufficient to decide whether the sexual products are always and exclusively formed in the ends of the branches, but it seems probable. In this connection it is to be remembered that in almost all the species a particular sigma occurs, exclusively or chiefly belonging to the swollen ends of the branches. Whether there is any connection between these two things, whether this sigma here may possibly have a special function, I dare not, however, to decide, but it seems only to be formed in the swollen ends of the branches, that is to say, in the place where also the sexual products are formed. In *C. iniquidentata* no such sigma was found. — That embryos are always found in these forms, which all are deep-sea species, may perhaps be accounted for by the fact that the embryos are not developed during any definite time of the year, but all the year round.

The *Chondrocladia*-species, like the *Cladorhiza*-species, are forms that live in rather deep water, but upon the whole they do not seem to reach so great a depth as the *Cladorhizæ*. The vertical distribution of the species reaches from 130 fathoms, at East-Greenland, to 2000 fathoms, in the northern Pacific, but of the nine known species only three live in depths of 200 fathoms or more. The genus is distributed from about 66° Lat. N. to 19° 06′ Lat. S.

The species of the genus are the following:

1873. *C. virgata* Wyv. Thoms. The Strait of Gibraltar.
1880. - *(Cladorhiza) concrescens* O. S. The West Indies.
1880. - *(Crinorhiza) amphactis* O. S. Barbados.
1885. - *(Desmacidon) gigantea* Arm. Hans.
1887. - *concrescens?* O. S., R. and D. The northern Pacific
1887. - *clavata* R. and D. The Fiji Islands.
1887. - *crinata* R. and D. North of Guinea.

1894. *C. alaskensis* Lambe. The Bering Strait, The northern Pacific.
1894. - *pulchra* Lambe. The Aleutian Islands.
1903. - *Guiteli* Tops. North-west of Cape Finisterre.

The *C. concrescens* O. S.? enumerated by R. and D., which has only one form of ancoræ and is taken at a depth of 2900 fathoms, is, no doubt, an independent species.

Kieschnick (Zool. Anz. XIX, 526) has established a *C. ramosa*, which Thiele (Abhandl. der Senckenberg. nat. Gesellsch. XXV, 947) states to be an *Iotrochota*-species. In Semon: Zool. Forschungsreise in Austr. V, 571, Taf. XLIV, Fig. 11, the same author has again a *C. ramosa*, also here designated as n. sp., and *C. dura* and *sessilis*. Thiele, however, has informed me in a letter that all three species belong to *Iotrochota*.

The two species established by Lambe, *alaskensis* and *pulchra*, are somewhat deviating, partly in their outer form, and to no slight degree in the skeletal structure, which shows longitudinal and transverse fibres; besides they have a dermal skeleton of projecting bundles of spicules, and further the spicules of these bundles are smaller than those of the skeleton. Therefore I think it to be doubtful whether these two species belong to *Chondrocladia* sens. strict.

Two more species may possibly belong to *Chondrocladia* viz. the *Monanchora clathrata* established by Carter (Ann. Mag. Nat. Hist. Ser. 5, XI, 369, Pl. XV, fig. 10 a—e), which seems to have had a massive form, and the spiculation of which consists of subtylostyli and ancoræ with five teeth; and the *Esperiopsis viridis* established by Kieschnick in the work quoted above (V, 572, Taf. XLIV, Fig. 12, Taf. XLV, Fig. 51—52), which is erect, somewhat finger-shaped, and has a spiculation of tylostyli and, according to statement, ancoræ of two kinds, with six and with five teeth. — It is possible that these two species together with the two above mentioned *Chondrocladia*-species established by Lambe will form a separate genus.

Artemisina Vosmaer.

The form as a flat cushion, or higher and more massive or roundish, or, finally, erect, stalked, cylindrical or branched. The skeleton of irregular, halichondroid structure, consisting chiefly of scattered spicules, between which irregular, polyspicular fibres may be found; regular fibres passing to the surface occur most frequently towards the periphery. The dermal skeleton consists either of erect, projecting bundles, or of a reticulation of more or less horizontal spicules. Spongin present or wanting. Spicula: Megasclera styli or subtylostyli, most frequently of two forms, one forming the main skeleton, the other the dermal skeleton; the styli all quite smooth, or all slightly spinulous at the head-end, or only the dermal spicules spinulous in this way. Microsclera small isochelæ palmatæ and toxa smooth or somewhat spinulous; to these forms may be added sigmata.

1. A. arcigera O. Schmidt.

Pl. I, Figs. 9—11. Pl. XIII, Fig. 3 a—i.

1870. *Suberites arciger* O. Schmidt, Grundzüge einer Spongienfauna des atlant. Gebiet., 47, Taf. V, Fig. 6.

1885. *Artemisina suberitoides* Vosmaer, Bijdrag. tot de Dierk., 12. Aflev., 3. Gedeelte, 25, Pl. I, fig. 16, Pl. V, figs. 51—55.

1887. *Artemisina suberitoides* Fristedt, Vega Exp. vetensk. Iakttag. IV, 430, Pl. 24, figs. 15—17.

1887. — — Ridley and Dendy, Chall. Rep. XX, Monaxonida, 112.

Cushion-shaped, roundish, or higher, so that the form becomes irregular, often somewhat compressed cylindrical. The consistency like that of a Suberites. The surface very finely and densely shaggy. The dermal membrane a thin film supported by close-set, somewhat penicillate bundles of dermal-spicules. Oscula a little spout-shaped, placed especially on the upper surface, but also scattered singly round on the sponge. The skeleton in the interior of irregular halichondroid structure, at the surface forming fibres that pass towards the surface and end in the penicillate, projecting bundles of dermal spicules. Spicula: Megasclera subtylostyli of two forms, larger ones 0·45—0·65^{mm} *in the main skeleton, smaller fusiform ones 0·20—0·4 in the dermal bundles; microsclera of two forms, isochela palmata 0·007—0·0128*^{mm}*, toxa with spined ends 0·07—0·32*^{mm}*.*

This species, which in its exterior form reminds somewhat of a *Suberites*, is formed as a more or less high cushion, and has a roundish, more or less oblong contour. One specimen in hand is rather high in proportion to its size, and therefore somewhat irregularly cylindrical. The sponge seems always to grow on a firm underlayer, and we have specimens growing on stones, on Brachiopoda, on shells of muscles and snails, and on *Hornera lichenoides*. The largest specimen, which is longish, is 55^{mm} long and about 25^{mm} high; other more roundish specimens are of a similar or smaller size, but often of the same height, so that they become more globular. The smallest specimen has at the base an extent of 11^{mm} and is ca. 8^{mm} high; the mentioned, somewhat cylindrical specimen has a breadth of 12^{mm} and a height of 17^{mm}. The consistency is firm, about as in *Suberites*. The colour (in spirit) is yellowish white to gray. The *surface* is very finely and densely shaggy, almost velvety, from projecting spicules. Seen under a magnifying glass the surface presents a finely reticulate appearance on account of the many small close-set subdermal cavities, which shine through and are separated by the projecting spicula-bundles. The *dermal membrane* is a thin film; it has no special skeleton, but is supported by the close-standing spicula-bundles, which are spread in a somewhat penicillate way and it is pierced by these bundles. It is not, therefore, to be separated by itself. *Oscula* are circular or somewhat irregular openings surrounded by a more or less projecting, spout-shaped margin formed by the skin. It is not, however, the thin film that has been designated as dermal membrane, which forms this spout by itself alone, but the skin is here thicker, and the fibres supporting the dermal membrane bend into the oscular rim and form a close spiculation of parallel spicules, all with their point towards the oscular aperture. The greatest oscular diameter may be 3^{mm}; the oscula are generally found about at the top or middle of the sponge in a number of ca. three to seven, but besides these some, often smaller ones, are frequently found scattered round on the sponge; sometimes also a few groups of oscula may be found; in one of the largest individuals thus eleven oscula are found altogether; on the smallest specimen only one osculum is found. The *pores* are found in the areas of the skin; they are circular and small; they were measured to a diameter of 0·017—0·048^{mm}.

The *skeleton*. In the inner part of the sponge the skeleton has an irregular, somewhat halichondroid structure; some polyspicular fibres are found, running without any regularity, and otherwise the tissue is filled with irregularly scattered spicules. At a little distance from the surface the skeleton by degrees gets a different character, fibres occurring here that run more or less perpendicularly to the surface; in their outer part these fibres divide, and the outermost fibres formed in that way pierce the surface in bundles spread in a somewhat penicillate way, and support the skin like pillars. Below the skin, therefore, is found a great number of small subdermal cavities. or more exactly, one large such cavity. The height of the pillars, which is the same as that of the subdermal cavity, is on an average 0.4^{mm}. Between the fibres no transversal fibres or transversal spicules are found. The mentioned pillars are by no means always perpendicular on the surface; they may be placed more or less obliquely on it, and thus be somewhat recumbent. When the surface of the sponge is seen under a magnifying glass, this fact is distinctly seen, as also, that in one part of the sponge the pillars are all directed to one side, in another part to another side, and in other places again they are directed perpendicularly upward; by this means a certain configuration of the many small areas in the skin may appear, only, however, to be seen by means of a magnifying glass. The outermost spicula-bundles of the pillars, which pierce the dermal membrane, consist entirely or to some degree of spicules shorter and thicker than the other spicules of the skeleton. These dermal spicules may occur somewhat differently in different individuals. In some individuals the projecting spicula-bundles consist almost exclusively of these shorter needles, in others, on the other hand, they are found in smaller numbers, and many of the long spicules are found in the projecting bundles. According to this it would seem, as if in this feature some difference was found between different individuals. If, however, thin sections perpendicular on the surface are examined, the fact seems to be that when an abundance of the long spicules is found in the projecting bundles, many of the shorter dermal spicules are also found, and the bundles are larger, while they are smaller, when consisting almost exclusively of dermal spicules. It may be possible, therefore, that the mentioned difference is owing to a contraction, by which the dermal spicules are drawn back between the spicules inside. With this view agrees the fact that those of the specimens in hand in which the dermal spicules are less prominent and mingled with the longer ones, are low and very densely shaggy, while the higher individuals are less densely shaggy, and in them the projecting bundles consist almost entirely of dermal spicules. Vosmaer says l. c.: "The spicules are kept together by a very slightly developed keratode or pseudokeratode; I have not been able to find spongin in the skeleton, and I suppose that none is present.

Spicula: a. *Megasclera* are subtylostyli; they are divided into two forms, not, however, sharply separated from each other; one form, as before mentioned, forms the whole skeleton and is also found, in larger or smaller numbers, between the spicules piercing the dermal membrane; the other form, more or less mingled with the preceding one, forms these projecting spicula-bundles. The skeletal spicules proper are slender, straight, or slightly, somewhat irregularly curved; they taper evenly to a long point that may be a little shorter pointed at the extremity. The opposite end is slightly swollen to a head passing evenly, without any marking, into the shaft of the needle. They are quite slightly fusiform, being a little thinner below the head-end than in the middle. The length varies from about 0.45–0.65^{mm}, and the thickness is 0.006–0.009^{mm}. The shorter and thicker spicules in the projecting bundles are somewhat fusiform, being thickest in the middle, and the point is not so long. Their length is generally 0·29—0·4mm, but, as before mentioned, transitions to the skeletal spicules are found, especially among the spicules that are placed immediately below the dermal bundles. The thickness is 0·009—0·018mm, but in some individuals it does not exceed 0·014mm. Of the skeletal spicules developmental forms were seen, down to quite fine ones, but in very small numbers. b. *Microsclera:* these are of two forms, isocheke palmatæ and toxa with spined ends. 1. The chelæ are of the common form; their shaft is about straight or quite slightly curved, the middle part between the two terminal parts is straight or a little curved inward; the length of this middle part is generally somewhat less than one third of the whole length. The tooth is about as long and broad as the alæ. The chelæ vary somewhat as to size, and this may again to some degree influence the dimensions of the different parts. The length is 0·007—0·0128mm, most frequently near the latter size; the breadth is ca. 0·002mm. Developmental forms were seen singly as quite thin, recurved staves. 2. Toxa. The general form of these is one that has in the middle a strong curve while the ends are evenly curved to the opposite side, and their outer part is most frequently straight. They are generally more or less twisted in the middle, and most so, it would seem, in the smallest bows. From the mentioned and by far most common form they may vary in different ways, especially so, that the curve in the middle becomes more open and the legs more straight, so that we may get a bow with a very great angle and only one curve. The outer ends of the bow are spined for a quite short way; the spinosity may be a little varying, but generally there are comparatively few, rather coarse spines. These bows are exceedingly varying as to size; thus the length, which is somewhat dependent on the curve, varies from 0·07mm quite up to 0·32mm; the thickness, which is the same through almost the whole length of the bow, varies in proportion to the size from about 0·001—0·004mm. All these sizes must be regarded as fully developed bows; neither would the small ones by a continued apposition grow to the form of the large ones, and they have likewise all, also the smallest ones, spined ends. On the other hand small bows occur, thinner than the fully developed ones of the same size, and almost not at all spined, or only with small spines; these, no doubt, are developmental forms. Thus the spines are not found from the beginning, but only formed by and by. Of the microsclera the chelæ are found in exceedingly large numbers both in the dermal membrane and throughout the tissue, the bows are found in the tissue in somewhat smaller numbers.

As I have examined the type-specimen described by Schmidt l. c., I have been able with certainty to establish the specific identity between Schmidt's *Suberites arciger* and Vosmaer's *Artemisina suberitoides*. Already Fristedt l. c. draws the attention to the probability of the identity. It may easily be understood that Schmidt has overlooked the chelæ, as they are exceedingly small, their smallest size being perhaps the smallest chelæ occurring at all. Schmidt further states that besides the common needles a form occurs which "variirt von der Kugelform bis zur Gestalt einer kurzen, an beiden Enden stumpfen Nadel", and he figures two such bodies; this fact, together with the chelæ, has for Vosmaer been the reason why he has not united the two species. The bodies mentioned by Schmidt are, however, only monstrosities of the kind that is upon the whole not rarely found in sponges. It seems especially to be the dermal spicules, which are sometimes transformed in a monstrous manner.

Locality: Station 28, 65° 14' Lat. N., 55° 42' Long. W., depth 420 fathoms; Station 127, 66° 33'

Lat. N., 20° 05' Long. W., depth 44 fathoms; Greenland, Pröven (Bolbroe, Schmidt's type specimen); the Davis Strait 65° 27' Lat. N., 54° 45' Long. W. (Wandel); East-Greenland (the East-Greenland Expedition 1891—92); Forsblad's Fjord, depth 50—90 fathoms, Hurry Inlet depth 50 fathoms (the Amdrup Expedition 1900); twenty miles east of Seydisfjord, depth 135 fathoms (Wandel); 64° 27' Lat. N., 13° 27' Long. W., depth 84 fathoms, 64° 58' Lat. N., 11° 12' Long. W., depth 300 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). The mentioned localities are situated in the Davis Strait, off East-Greenland, North and East of Iceland, and between the Faröe Islands and Iceland.

Geogr. distr. Besides at the localities mentioned above, the species has been taken between Norway and Spitzbergen, 72° 36·5' Lat. N., 24° 57·5' Long. E., depth 140 fathoms ("Willem Barents"); Spitzbergen, depth 40 fathoms, Kola Bay depth 95—100 fathoms (Fristedt); Nova Scotia, 43° 03' Lat. N., 63° 39' Long. W., depth 85 fathoms (Challenger). Thus the species is exclusively a northern one, its southernmost boundary being 43° 03' Lat. N., and, as usual, it goes only so far south at the eastern coast of America. Its longitudinal distribution is from the Davis Strait to Spitzbergen. It has been taken at depths from 40 fathoms (Spitzbergen) to 420 fathoms (the Davis Strait, 65° 14' Lat. N.).

2. **A. apollinis** Ridley and Dendy.

Pl. XIII, Fig. 4 a—g.

1887. *Amphilectus apollinis* Ridley and Dendy, Challenger Report, Monaxonida, XX, 124, Pl. XIX, figs. 3, 3 a—c.

Formed as a thick incrustation or flat cushion. The dermal membrane a thin film with a reticulation of spicules. The skeleton a halichondroid reticulation of polyspicular fibres, spicula-bundles and single spicules. Spicula: Megasclera styli of two forms, larger ones, smooth, or with a slight crenulation at the head-end, 0·53—0·8mm, in the main skeleton; smaller ones, with very slightly spined head-end, 0·20—0·30mm, in the dermal skeleton; microsclera of two forms, small isochelæ palmatæ 0·014—0·018mm, toxa, large, spined ones 0·40mm, smaller, smooth ones 0·085—0·28mm.

Of this species we have only two fragments with a greatest extent of 35mm. Ridley and Dendy describe their species as "massive, amorphous, cavernous. The largest specimen is oval, cake-shaped; about 50mm long by 38mm wide and 19mm thick". The fragments in hand agree entirely with this description and convey also the impression of having belonged to a flat, thick crust-shaped sponge. The colour (in spirit) is light yellowish gray. The consistency is loose and soft. As the fragments in hand are much damaged, the original *surface* has only been preserved to a slight degree; I take it, however, to be certain that it is sparingly shaggy from projecting spicules. The *dermal membrane* is a thin film pierced by the mentioned spicules, and it seems to be provided with a somewhat irregular reticulation of styli of the smaller form. Of *pores* a few were seen in the undamaged parts of the dermal membrane; *oscula*, on the contrary, were not found. Ridley and Dendy describe the dermal membrane in a similar way, nor have they seen any oscula.

The *skeleton* is an irregular and somewhat halichondroid reticulation of polyspicular, but loose and little marked fibres, spicula-bundles, and scattered spicules. In the nodes a very distinct, clear, and white mass of spongin is found.

Spicula: a. *Megasclera* are styli of two forms, larger ones forming the skeleton, and smaller ones forming the dermal reticulation. The skeletal styli are more or less curved, often a little irregularly, the curve is generally found nearest to the rounded end; the opposite end tapers to a point of middle length the outer end of which may be a little shorter pointed. The upper end of the styli is either quite smooth, or they have, on the very uppermost surface only, a few exceedingly small spines appearing as a slight crenulation. The length varies from 0·53—0·8mm, and the thickness is 0·013—0·020mm; the longest ones are far from being always the thickest ones; finer developmental forms occur, but in small numbers. The dermal styli are straight, the head-end is often quite slightly swollen, so that they approach subtylostyli, but they cannot, however, be designated as such; the opposite end tapers more or less, but always rather little, and therefore the point is short. The most particular fact about them is that the head-end is generally or always slightly spined; some difference may be found in the spinosity, but it is only the very uppermost part that is provided with more or fewer slight spines. The length of these needles is between 0·29 and 0·39mm, the thickness is 0·005—0·008mm; the shortest ones are often the thickest ones. b. *Microsclera.* These are of two forms, isochelæ palmatæ and toxa. 1. The isochelæ are of a quite similar form as those of the preceding species; the shaft is quite slightly curved, the middle part, making about one third, is straight, the tooth is a little narrower but of the same length as the alæ, the tuberculum is rather long and most distinctly conspicuous in its lower end. The length of the chela is 0·014—0·018mm, and the breadth about 0·004mm. 2. Toxa; the largest of the bows have a similar form as in the preceding species, only the spinosity is, perhaps, a little finer, and it reaches a little farther up the legs, and the outer part of the legs is generally not straight. The bows have a length of up to 0·40mm with a thickness of 0·004mm. Of the bows thinner forms with slighter spinosity may be found, but I have seen no younger developmental forms. There is almost no variation in the form of these bows. On the other hand smaller and finer bows occur in rather large numbers; some of them are of a similar form, but the greater part have a considerably flatter curve; and rather frequently a form is seen having a rather strong bend in the middle, but a little way from the bend their legs turn horizontally and become straight or almost straight. The length of these bows was measured to 0·085—0·28mm, and the thickness is in proportion from exceedingly fine, ca. 0·0007mm, to 0·002mm. None of all these bows are spined; to judge from their form, they do not appear to be developmental forms of the bows before mentioned; the largest of them, which are of a similar form as the preceding ones, may, however, be developmental forms of these. All the bows are frequently somewhat twisted.

Of the bows a few specimens were seen of a quite colossal size, viz. 0·56mm long, and 0·014mm thick. These bows had no spines or only a few quite rudimentary ones. The question is here evidently of monstrous forms arisen by a continued, abnormal silicious deposition, and by this continued deposition the thorns have by and by become effaced. The same feature may be found in other forms, thus in *Cladorhiza*-species I have found abnormal silicious deposition in the ancoræ, so that they became exceedingly thick, and the teeth were partly or almost entirely effaced.

Of the microsclera the chelæ occur very abundantly both in the dermal membrane and in the body itself; the bows are not numerous, and were not seen in the dermal membrane.

Remarks: On account of the localities from which Ridley and Dendy and I have the species, respectively East-Greenland and Kerguelen, some suspicions might be aroused with regard to the certainty of the identification. I have had, however, a fragment of the type specimen for examination, and I regard the identification as quite sure. First also the type specimen shows that a slight crenulation of the upper end of the skeletal styli is most frequently found. Next the type specimen, besides the spined bows, has also smooth ones, as mentioned in my description. Ridley and Dendy do not mention any smooth bows; but when giving the size of the bows they say: size of full-grown spicule , accordingly they must have seen some bodies which they have taken to be younger forms, and these bodies have, no doubt, been the smooth bows. A little difference is found between the type specimen and my specimen, but it is only a slight difference of size in the spicules, which is of no importance and would, no doubt, be effaced, if a richer material was at hand. Thus the styli of the type specimen do not exceed 0·536^{mm}, and this is about the lower limit for the styli of my specimen; and the toxa attain only a length of 0·3^{mm}, while in my specimen they may be 0·4^{mm} long; also the dermal styli are upon the whole a little smaller, whereas the chelæ are of equal size.

Locality: East-Greenland, the depth not stated (The East-Greenland Expedition 1891—92). Two fragments.

Geogr. distr. The species was before only known from Kerguelen, depth 20—60 fathoms (Challenger). The distribution of the species is accordingly very peculiar, as it seems to be bipolar; it is, however, to be remembered that we have hitherto so slight a material of this species, only two specimens having been obtained by the Challenger Expedition.

The genus *Artemisina* was established in 1885 by Vosmaer with the species *suberitoides*, which has now proved to be identical with the *Suberites arciger* established by O. Schmidt in 1870. When the quite heterogenous genus *Amphilectus* is dissolved, the species *apollinis* established under this genus by Ridley and Dendy in 1887 must be referred to the genus *Artemisina*, as has been done by Topsent. Then in 1892 Topsent has established a third species, *A. transiens*, and in 1904 a fourth species, *A. erecta*. A fifth *Artemisina*-species seems to be found in the *Desmacidon rimosa* established by Ridley (Zool. Collec. of the Alert , 609, Pl. LIII, fig. F., Pl. LIV, fig. mm); it is provided with larger and smaller styli, the latter often with spined head-end, and it has of microsclera small isochelæ palmatæ and smooth bows. Thus at present these five species make up the genus. By the establishing of the genus some stress was laid upon the suberites-like consistency; this character, however, is not found in the species *apollinis* and *erecta*, whose consistency is different from that of the other species. With regard to the spiculation the species agree in having small palmate isochelæ and toxa. In the megascleres, on the other hand, some difference is found; thus *arcigera* has subtylostyli, of which those piercing the dermal membrane are of a special form, *apollinis*, *erecta*, and *rimosa* have styli and as dermal spicules a special form of styli with slightly spined head-end[1]), *transiens* finally has only one form of styli, all with spined head-ends. Of bows *arcigera* and *erecta* have spined bows,

[1]) The description of the distribution of the two forms of styli in *rimosa* is somewhat obscure, but it is at all event stated that the small ones occur in the dermis.

transiens and *rimosa* smooth ones, and in *apollinis* both kinds seem to be found. Therefore it is perhaps doubtful whether the genus in future will prove to be a natural one; but at present it must be maintained. If it were to be dissolved, the species, on account of their spiculation, might best be referred to *Esperiopsis*, in which genus we have already species with the same combination of microscleres, but not, however, with spined bows. What is also to be noticed is the great resemblance with regard to spiculation which most species of the genus show with *Hymeraphia* and *Rhaphidophlus*, of which genera styli, dermal styli with slightly spined head-end, isocheke palmatæ of quite the same form as in *Artemisina*, and toxa are characteristic.

Homœodictya Ehlers (emend.).

The form very varying, from thick incrustations through more massive sponges to erect ones of various forms, sometimes plate-shaped, or digitately branched of a Chalina-like appearance. The skeleton also very variously developed, diffuse, irregularly polyspicular, or forming a regular reticulation with primary fibres bending towards the surface in a fan-shaped way, and secondary fibres. Spongin present in varying degree, sometimes, in the most Chalina-like species, in rather great amount, forming sheaths round the fibres. Spicula: Megasclera diactinal, oxea or strongyla; microsclera isochelæ palmatæ or arcuatæ, to which may be added rhaphides (and perhaps sigmata).

Ehlers, who recognized that Bowerbank's genus *Isodictya*, in which the species *palmata* was found, was too heterogeneous, established for *palmata* the genus *Homœodictya* (Die Esperschen Spong. Program zum Eintritt in dem Senat...., Erlangen 1870, 17 et 32), attaching special importance to the equi-ended chelæ[1]. On the other hand he laid no stress on the special form of the chela, which he described, however, in the specific description. Ridley and Dendy, in Challeng. Report, regard *Homœodictya* as a subgenus of *Desmacidon*, but they use as a diagnostic character the peculiar bending in of the axis in the chela, and they refer to the subgenus only three species all of which show this character. As mentioned in the introduction, such genera containing species with ancoræ and species with chelæ must be divided, and this is exactly the case with the genus *Desmacidon*. The species of this genus must be divided in two groups, one with ancoræ, the other with chelæ. As the type of the genus *Desmacidon*, *D. fruticosus* Bow. has ancoræ, the generic name of *Desmacidon* must be kept for the species with ancoræ. The question might then be of forming a new genus for the other group. I think, however, that it will be more correct, at all events at present, not to understand *Homœodictya* in the restricted sense in which it was understood by Ridley and Dendy, but to enlarge it to comprise all species of the old genus *Desmacidon* with chelæ. I think that these species are naturally connected; to be sure there is, as shown by the diagnosis, some difference as to form and skeletal structure, but the species seem here, as in several other genera, to form a continuous series; *H. conulosa* R. and D. occupies, as already stated by the authors, an intermediate position. As to the microsclera, the genus will comprise forms with arcuate chelæ, with common palmate chelæ,

[1] Ridley and Dendy say that Ehlers established the genus without giving any diagnosis; this, however, is not the case, as Ehlers, on p. 32, gives a diagnosis of the genus rather good for its time.

and with the peculiar palmate chelæ that were characteristic of *Homœodictya* in the sense of Ridley and Dendy. Thus the genus is divided in three groups, which groups, however, can scarcely be of generic importance, as arcuate and palmate chelæ may occur in the same species (for inst. *Esperiopsis forcipula* Ldbk.), and the peculiarity of the *Homœodictya*-chela is also found elsewhere, for instance in several *Esperiopsis*-species (see p. 15).

At present it is not possible to decide, which of the described species are to be referred to *Desmacidon*, and which to *Homœodictya*. The case is that when no figures are given, it cannot be seen from the commonly used expression tridentate isochelæ whether the question is of arcuate chelæ or ancoræ; and even if figures are given, they must be good ones to give sure information. I shall here therefore only enumerate some species, which with certainty belong to *Homœodictya*:

		Microsclera.
	H. palmata Johnst.	Homœodictya-chelæ.
1885.	- *(Myxilla) flabelliformis* Arm. Hans.	Chelæ arcuatæ.
1887.	- *(Desmacidon) conulosa* R. and D.	Chelæ palmatæ.
1887.	- *(—) ramosa* R. and D.	Chelæ arcuatæ.
1887.	- *kerguelenensis* R. and D.	Homœodictya-chelæ.
1887.	- *grandis* R. and D.	Homœodictya-chelæ.
1889.	- *(Fibularia) raphidifera* Tops.	Chelæ arcuatæ, rhaphides.
1903.	- *(Desmacidon) setifera* Tops.	Chelæ palmatæ.
1904.	- *(—) peltata* Tops.	Chelæ arcuatæ, rhaphides.

None of these species have sigmata, and it may be doubtful, whether such are found in the genus.

1. **H. flabelliformis** Arm. Hans.

Pl. IV, Figs. 2—3. Pl. XIII, Fig. 5a—e.

1885. *Myxilla flabelliformis* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 12, Pl. II, fig. 14, Pl. VI, fig. 6.

1903. *Desmacidon clavellata* Arnesen, Bergens Mus. Aarsberet. 1903, Nr. 1, 13, Taf. II, Fig. 2, Taf. IV, Fig. 4.

Erect, stalked, broadly leaf-shaped (grown specimens) or club-shaped (young specimens). The dermal membrane a thin film with scattered spicules. The skeleton consists of polyspicular primary fibres passing from the stalk into the leaf and bending in a sheaf-like way to all sides towards the surface; they are connected by transverse spicules most frequently placed singly. Spicula: Megasclera oxea of two sizes, large ones in the skeleton, 0·41—0·55^{mm}*, smaller ones in the skin, 0·268—0·35*^{mm}*; microsclera chelæ arcuatæ, highly curved, 0·030—0·04*^{mm}.

Of this species we have two larger, somewhat damaged specimens, and two small ones. The species has below a stalk attached by a somewhat expanded basal part, but the specimens in hand are torn off, with the exception of the smallest one, which is attached to a stone. Arnesen l. c.

says that it sits on serpula-tubes, muscles, stones etc. The stalk passes into a rather thick, more or less fan-shaped leaf; this leaf is thickest in the middle, but becomes thinner towards the edge. The largest specimen has a height of ca. 90^{mm}, and the leaf has a similar breadth. The greatest thickness of the leaf in the middle is ca. 17^{mm}, the stalk has a height of 20^{mm} and a thickness of fully 10^{mm}. The other specimen is a little smaller, and the leaf especially is less broad. Of the small specimens one has a height of 24^{mm}, half of which is a stalk scarcely 2^{mm} thick; this specimen may more properly be called club-shaped than leaf-shaped, its upper part having a breadth of 9^{mm} and a thickness of 6^{mm}. The smallest specimen is only 12^{mm} high, of which the stalk makes about the half. This specimen is quite club-shaped and has a greatest breadth of 3^{mm}. The consistency is rather loose, but the stalk is considerably harder. The colour (in spirit) may be given as light brownish gray. Of the *surface* I dare, on account of the condition of the specimens, say nothing with certainty, but doubtless the ends of the fibres project making it sparingly shaggy. The *dermal membrane*, to judge from the few places of the sponge where it is kept, is a thin film provided with scattered oxea and with very close-lying chelæ. *Oscula* and *pores* I have not been able to observe on my specimens, but on a young club-shaped specimen, kindly sent me by Miss E. Arnesen, an osculum was found at the top, as has been figured by the authoress l. c. Rather close-standing canals run through the sponge continuing from the surface horizontally inward or somewhat downward; these canals convey an impression of being larger on one side than on the other, and perhaps therefore, in the grown, leaf-shaped sponge pores and oscula have been localized each on their side of the sponge.

The *skeleton* consists in the stalk of close-lying, strong, polyspicular fibres connected by powerful spicula-bundles, so that a solid network is formed. This skeleton forms the greater part of the stalk, only a little network of thinner fibres being found on the outside. From the stalk the fibres continue into the leaf and bend to the sides in a fan-shaped way, branching and by degrees becoming thinner; thus the outer branchings form the edge of the sponge. The fibres, however, bend also and ramify in a fan-shaped manner towards the two surfaces of the sponge, where accordingly their outer ends projects everywhere. Thus these primary fibres have a rather regular course, and the distance between them is also rather equal, ca. 0·29—$0·4^{mm}$. The fibres are thickest in the middle of the sponge and may here reach a thickness of $0·2^{mm}$; then they consist of many spicules alongside, but through their outward course they become thinner and go down to a thickness of only a few spicules, in a few places even they consist of only two spicules alongside. In the stalk the fibres may reach a thickness of $0·27^{mm}$. The primary fibres are connected by transverse spicules most frequently single, only sometimes two or three together; the transverse spicules are placed perpendicularly on the primary fibres, but otherwise without regular intervals, they do not form continuous fibres. In the skeleton a distinct but clear and white mass of spongin is found, especially distinct in the nodes. It may in some places be rather copious and entirely coat the fibres, but this does not seem to be the common case. In the stalk it is more copious, here it coats the fibres entirely, and is of a yellowish colour.

Spicula: a. *Megasclera* are oxea, divided in two rather distinctly separated sizes, of which the larger ones form the main skeleton, while the smaller ones are found in the dermal membrane. The larger oxea are evenly curved, sometimes the bend is somewhat sharper and localized to the middle of the spicule. The points are evenly pointed and of middle length. The length varies from ca. 0·41—$0·55^{mm}$, and the thickness is ca. 0·017—0·025^{mm}. Besides a great many much finer, very long pointed forms are found, which pass evenly into the thicker ones, and are, no doubt, developmental forms. The smaller oxea are of a quite similar form as the large ones, they are evenly, rather slightly curved, and have also evenly tapering points of middle length. Their length varies from 0·268—0·35^{mm}, and the thickness from 0·013—0·018^{mm}. A few intermediate sizes between the two groups may be found. Fine developmental forms are also found of the small oxea.[1]) b. *Microsclera:* these are of only one form, isochelæ arcuatæ; they are of a quite characteristic form, the shaft is highly bent, but the curve may otherwise be somewhat varying; the tooth forms such an angle with the shaft, that a straight line drawn from one end of the shaft to the other will pass through or along the teeth. The tooth is narrowly elliptical, and there is a longish tuberculum broadest downward; the alæ are of the same length as the tooth or reach a little farther down, and when the chela is viewed from the side, they end in a round lobe. Sometimes the chela is so highly bent, that the teeth and alæ of the two ends meet, and the bend may be so strong, that the teeth and alæ overlap each other. This fact leads then to some irregularity, the teeth are bent each to its own side, and they get a more or less wry form; on the other hand I have seen no coalescing, neither between alæ nor teeth; a coalescing may often appear to have taken place, but by a sufficiently exact examination it is seen that the parts only pass over each other, but are not coalesced. Together with the strong bend an alteration of the dimensions of the single parts of the chela takes place; both alæ and tooth become longer, and from the tuberculum a continuation reaches farther down the tooth. This irregularity of the chelæ may in some individuals be of frequent occurrence, so that by far most of the chelæ are irregular, while in other individuals it is far more scarce. The length, which is a little dependent on the curve, varies between 0·030 and 0·04^{mm}, and the thickness of the shaft is 0·0033—0·004^{mm}. Developmental forms of the chelæ are rather frequently found, the youngest forms are fine and have rather short recurved ends; at this stage they may to some degree remind of sigmata; by and by tooth and alæ are developed. The chelæ are found throughout the tissue, but are specially numerous and very close-lying in the dermal membrane.

Embryos. In one of the specimens embryos were found abundantly. They are scattered in the tissue, and each of them is surrounded by a thin membrane. They are about globular, and have an average diameter of about 0·47^{mm}. The examined ones showed no spicules.

As I have had one of Armauer Hansen's type specimens, I have been able to identify the species with certainty; otherwise the determination would have been impossible. The *D. clavellata* established by Arnesen l. c. I have, likewise by examination of a type specimen, been able with certainty to identify as *flabelliformis*. Arnesen evidently has only had young specimens; to be sure she states the size to be 25^{cm}, but the specimen sent to me is only 25^{mm}, and the figure of the stalk on Taf. IV, Fig. 4 shows that it is at most a few millimetres thick, so that there can scarcely be any doubt that 25^{cm} is a misprint for 25^{mm}.

Locality: The Ingolf, station 7, southeast of Iceland, 63° 13′ Lat. N., 15° 41′ Long. W., depth 600 fathoms, two large specimens; station 85, southwest of Iceland, 63° 21′ Lat. N., 25° 21′ Long. W., depth

[1]) In the mentioned smallest specimen the spicules were a little smaller, the skeletal spicules measuring at most 0·41^{mm}, and the length of the dermal spicules keeping near the lower limit. The microsclera, on the other hand, were of full size.

170 fathoms, the smallest specimen; it was attached to a stone together with a great many sponges of the genera *Myxilla*, *Hymedesmia*, *Grayella*, *Hymeraphia*, *Plocamia*, *Bubaris*, and *Latrunculia*. It has further been taken northeast of the Faröe Islands, 62° 29' Lat. N., 5° 17' Long. W., depth 160 fathoms, a small specimen (Ad. Jensen, the cruise of the "Michael Sars" 1902).

Geogr. distr. By the Norwegian North-Atlantic Expedition the species was taken west of Spitzbergen, depth 416 fathoms. Arnesen l. c. mentions it from Bergen, at depths of 50—60 fathoms.

2. **H. palmata** Johnst.

Pl. XIII, Fig. 6 a—e.

?1767. *Spongia bacillaris* Linné, Syst. Nat. Ed. XII, I, 1299, 13.

?1776. — — Müller, Zool. Dan. Prodr. 256, 3086.

?1786. *Spongia palmata* Ellis and Solander, Nat. Hist. of many cur. and uncom. Zoophytes, 189, Pl. 58, fig. 6.

1797. *Spongia digitata* Esper, Fortsetz. der Pflanzenthiere I, 190, Spong. Tab. L.

1842. *Halichondria palmata* Johnston, A History of Br. Spong. and Lithophyt. 92, 1, Pl. II, figs. 1—5.

1866. *Isodictya palmata* Bowerbank, Mon. Brit. Spong. II, 311, 25.

1870. *Pachychalina compressa* O. Schmidt, Grundzüge einer Spongienf. des atlant. Gebiet. 37.

1870. *Homœodictya digitata* Ehlers, Die Esperschen Spongien, Erlangen, 16, 32.

1874. *Isodictya palmata* Bowerbank, l. c., III, 133, Pl. LII, figs. 1—7.

1879. — — Verrill, Preliminary check-List of the Marine Invert. of the atl. Coast fr. Cape Cod to the Gulf of St. Lawrence, 31.

1882. *Chalina palmata* Carter, Ann. Mag. Nat. Hist. Ser. 5, X, 109, fig. 1, a, b.

1896. *Homœodictya palmata* Lambe, Trans. of the Roy. Soc. of Canada, Ser. 2, II, Sect. 4, 190, Pl. II, figs. 1, 1 a—f.

Of Chalina-like appearance: erect, more or less regularly digitately branched, the branches more or less, often highly, compressed, frequently to a larger or smaller extent coalesced to plate-shaped parts. The surface finely and densely shaggy from the projecting ends of the fibres. The dermal membrane a thin film resting on the skeleton below and pierced by the ends of the fibres. Oscula partly scattered, partly placed along the edges of the compressed branches or chiefly on one side of them. The skeleton constructed as in Chalinins, forming a regular reticulation of polyspicular primary fibres bending towards the surface in a sheaf-like way, and secondary fibres perpendicular on the primary ones, the meshes quadratic or rectangular. The fibres provided with a distinct sheath of spongin. Spicula: Megasclera oxea 0·15—0·220^{mm}*; microsclera of one form, isochelæ palmatæ with the axis bending out as a projection from the inside of the tooth 0·024—0·03*^{mm}*.*

The common exterior form of this species is well known, and it has often been figured, especially, however, in earlier works. It has attracted the attention at an early period, and its exterior has given rise to the name of "Mermaid's glove", by which it is said to be designated by the fishermen of the Orkneys and the Shetland Islands; however, it certainly shares this name with the digitately branched forms of *Pachychalina*. In its exterior and otherwise also in its skeletal structure it shows great resemblance to *Chalininæ*, especially to such forms of *Pachychalina* as the mentioned ones. This resemblance is very great and is also found in the form of the megascleres, so that, properly speaking, it is only by the occurrence of the characteristic chela that it can be decided, whether a specimen belongs to a *Homœodictya*-species, and confoundings have certainly now and then taken place. In the form a frequent feature seems to be that a compression of the branches takes place, and that larger or smaller portions of the lower part of the sponge form flat parts only branching above or in the edge. This form seems to be rather constant in the species, and to stand somewhat opposed to the common form of the *Pachychalina*-species most resembling it. This difference is especially found as a rule, but not always, between the present species and the *Pachychalina*-species (*P. excelsa* Schmidt) most common in the North-Sea. Of the species we have a rather considerable material showing the variations of the form. A few specimens have a regular digitate form with only a slight compression of the branches, especially in their lower part, while their upper end is cylindric or almost cylindric. Several other specimens are less regular, with more compressed branches and more expanded parts below, or the expanded parts become larger, and prevail almost over the in this case shorter branches; finally we have one specimen, the branches of which are exceedingly flattened and are lying in one plane, so that this specimen gets a very great breadth. The smallest and youngest specimens are quite unbranched; and these small specimens are most frequently formed as a single compressed branch or about oar-shaped, but irregularities may also occur at an early stage, so that the smaller specimens form broad, flat, somewhat lobate bodies. The smallest one of all the specimens, which is attached to a stalk of a Hydroid, is almost globular. Sometimes the lower part is more or less marked off as a stalk, but the branching may also begin directly at the base. Most of the specimens are torn off from the underlayer, of the others one is attached to the shell of a *Modiola modiolus*, a few others partly to worm-tubes, partly to stalks of Laminaria. The number of branches is very varying; the most richly branched specimen is above divided into about a dozen branches, but generally the number is smaller. The largest specimens are 34^{cm} high, and the regular, digitate branches have an average breadth of about 25^{mm}; then follows a series of specimens of decreasing sizes. The largest of the smaller, unbranched specimens has a height of 13^{cm}, and the smallest one is $7{\cdot}5^{cm}$ high. The mentioned, still smaller, globular specimen has an extent of only 8^{mm}. The consistency is very elastic, quite as in the *Chalinæ*. The colour (in spirit) is generally light yellowish gray. The *surface* is finely and densely, but quite short shaggy from the projecting ends of the fibres. The *dermal membrane* is a thin and transparent film; it has no spicules, but rests on the skeleton beneath and is pierced by the ends of the fibres. The *pores* are found in the dermal membrane, often so closely placed that the membrane is reduced to a network; they are round or a little irregular and were measured to a diameter of $0{\cdot}03$–$0{\cdot}12^{mm}$. *Oscula* are circular or, more rarely, somewhat oval openings; they are surrounded by a projecting, more or less pronounced, conical edge. They are directed somewhat upward, and consequently the projecting edge is higher on the lower side of the osculum. The principal canal runs obliquely downward, but larger canals may frequently be seen to lead into the principal one from different sides. Oscula vary in size from 6^{mm} quite down to 1^{mm}. They occur in rather large numbers and are found from the very base of the sponge to the top of the branches. Sometimes they may be said to be scattered, but most frequently their occurrence is limited to definite places. Thus they are often found on the edges of the compressed branches, but most frequently some of them are then found scattered on the surfaces. In the highly flattened specimen mentioned before they are found, partly on the edges, partly rather abundantly scattered over one surface, while on the other surface only quite few are found; and they may, in the regularly digitate specimens, be found almost exclusively on one surface.

The *skeleton* is constructed quite as in a *Pachychalina*. It consists of polyspicular fibres passing upward from the base and the middle, branching and bending to all sides in a sheaf-like way, and going to the surface. These primary fibres are connected by transverse fibres that are placed perpendicularly on them but form no coherent fibres. Thus a regular net of meshes is formed, which is only less regular in the middle part of the body. The meshes formed by the fibres are quadratic or rectangular; towards the surface the transverse fibres are placed considerably more closely than farther in. The distance between the primary fibres may be somewhat varying, and was measured to ca. 0·18—0·4^{mm}. The thickness of the primary fibres is generally about 0·09^{mm}. A distinct and most frequently rather thick sheath of spongin is always found round the needles both in the primary fibres and in the transverse ones. In the points of the fibres the mass of spongin is slight, and forms no sheath; this fact is especially distinct in the points of the branches, where the growth more particularly takes place. Quite as in the *Chalininæ*, layers are also here found in the branches, which layers are more or less parallel to the surface, and quite recall the structure of the outer skeletal layer, and these layers have presumably during the growth of the sponge marked the close of a period of growth. The layer arises by the fact that transverse fibres are here placed opposite to each other through the whole extent of the layer, while these fibres on both sides of the layer, as well outside it as inside it, are placed more scattered, often with rather long intervals. Then small short, primary fibres are found reaching from the layer of transverse fibres a little outward between the primary ones, but continuing no farther. Thus it looks, as if, by the beginning of a new period of growth, only some of the primary fibres that project through the surface continue the growth. Both the mentioned structural features cause the mentioned layers to appear as layers of more dense consistency, when a dried specimen of the sponge is seen towards the light. Already Bowerbank mentions this feature, l. c. II, 312. Scattered spicules are found rather copiously outside the fibres.

Spicula: a. *Megasclera* are oxea; they are straight or slightly curved, and evenly, middle long or rather long pointed. The spicules are very varying, both in length and thickness; the length varies from about 0·15—0·229^{mm}, and the thickness from about 0·008—0·017^{mm}. The largest spicules are of most frequent occurrence. It is, however, difficult to give the lower limit of the thickness, as some developmental forms are found passing evenly into the fully developed needles. With regard to the size of the needles, especially the thickness, some slight difference may be found between different individuals. Styli are not rarely found between the needles; they are always shorter than oxea, and they must surely be regarded as monstrous forms; in some individuals they are found more frequently than in others. b. *Microsclera*; these are only of one form, isochelæ palmatæ of the peculiar type before mentioned. When the chela is seen in profile, it looks as if the end of the tooth was split into two branches, one of which continues towards the axis. The inner branch is the end of the axis of the chela, which bends out from the tooth and in towards the axis. When the chela is seen from the front, therefore, a little below the oblong tuberculum proper another oblong, tubercle-shaped body is seen, which is the translucent, recurved end of the axis. The alæ form together an oval plate, and their edges are a little refolded. The plates formed by the alæ of both ends continue along the axis as a most frequently quite narrow ridge, and this part arches somewhat out from the axis behind, so that the back side of the chela is somewhat curved, although the axis is straight. When the chela is seen in profile under strong light, the axis may distinctly be followed, as it is more transparent than the tooth and alæ, which are seen from the edge. Then, in the first place, the inward-turned terminal part of the axis is distinctly seen, next a part appearing as a hump on the outside of the tooth, and finally the middle, straight part of the axis (Pl. XIII Fig. 6 b). These features are not always easily seen in the fully developed chela, especially as the different parts of the axis are differently developed; thus the falx is rather broad, and the inward-turned terminal part grows often very thick. Otherwise, with regard to length and form of this part, the chela may be rather varying; sometimes, also, the axis, and consequently the whole chela, is somewhat curved. The thin ridge in the middle of the chela may vary to some degree in breadth. The length of the chela varies from 0.024—0.03^{mm}, and its greatest breadth is ca. 0.007—0.008^{mm}. Developmental forms of the chela in all stages occur rather frequently; the finest ones consist only of the axis, which, according to what has been stated above, is straight and recurved at either end in such a way as to form an eye turning to one side; then the alæ and the plate of the tooth are formed by and by. The chelæ occur both scattered in the tissue of the sponge and in the dermal membrane, but upon the whole in no large numbers.

Bowerbank's description and figures of this chela are quite incomplete; thus his figure of the profile does not show the peculiar continuation of the axis, but the chela is, however, tolerably recognisable, especially from the figure showing it from the front. His description, on the other hand, is quite erroneous. Carter l. c. gives a good figure of the chela seen as well from the side as from the front, but in his description there are several misconceptions. Ridley and Dendy (Challeng. Report, 168) say, in their description of the chela in the generic diagnosis, from the median line of the posterior surface of each anterior palm there projects backwards, i. e. towards the shaft, a delicate, flat fimbria ; according to this expression these authors do not seem to have seen that the question is of the axis of the chela; neither is it correct, when they term the inwardly-directed process delicate, flat , although, to be sure, it is frequently somewhat compressed. Also their figures of the chela, especially in the species *grandis*, show that the process is here quite cylindrical.

Locality: From Iceland and the Faröe Islands we have a rather considerable material. From Iceland: Skagen (Grönlund), off Rödsands Bay (Hj. Jensen), Önundarfjord, depth 10 fathoms (the author); Iceland, no more particular locality stated (Jap. Steenstrup, Halberg). From the Faröe Islands: 6 miles N.W. of Kalsö, depth 60 fathoms, Vestmansund, depth ca. 70 fathoms, 9 miles east of Nolsö, depth 30 fathoms (Th. Mortensen); the Faröe Islands, no more particular locality stated (Nees, Rostrup, Müller). Seventeen larger and smaller specimens in all.

Geogr. distr. North-England, Scotland, the Shetland Islands and the Orkneys (Johnston, Bowerbank); Norway (Esper, Ehlers l. c.); New Scotland, Sable Island, and the Bay of Fundy (Lambe); between Cape Cod and the Gulf of St. Lawrence (Verrill). Thus the species is distributed between ca. 66° and

44 Lat. N., but on the eastern side of the ocean it is known no farther south than to the coasts of England. It is not found in deep water, the greatest depth known being ca. 70 fathoms.

Remarks to the synonymy. This species is generally enumerated as *palmata* Johnst., and Carter (l. c.) having examined Johnston's type specimen and found the characteristic chela, the identification may also be regarded as sure. The species may, however, with certainty be traced farther back, Ehlers (l. c.) having shown by examination of Esper's type specimen of *Spongia digitata* that this species is identical with Johnston's *palmata*, what was also indicated by Esper's figure. Therefore there might be some reason for taking up Esper's name of *digitata*, which dates from 1797. I have not done so, however, as there is great probability that *Spongia palmata* Ellis and Solander, 1786, is the same species. The description, to be sure, gives no hold, but the figure of the exterior, showing the characteristic compression, seems to show, even if not quite certainly, that the question is of the present species. Linné's name of *Spongia bacillaris*, on the other hand, cannot be taken up, as it is impossible to decide, whether he has had before him the present species or some *Pachychalina*-form. — By the examination of Schmidt's type specimen of *Pachychalina compressa* I have been able to decide that this species is identical with *H. palmata*, as already mentioned in part I of the Porifera of the Ingolf-Expedition, p. 6.

Group 2. Myxilleæ.

Megasclera generally divided into two forms, those forming the dermal skeleton, and those forming the main-skeleton. Typically the skeletal spicules are monactinal and the dermal spicules diactinal, but exceptions from this rule occur.

It seems to be a rather important character of the group *Myxilleæ* that the skeletal spicules are of one form and almost always monactinal, the dermal spicules of a different form and most frequently diactinal. The reach of this character, however, cannot yet be decided. In the group *Mycaleæ*, to be sure, instances may be found where the spicules that in some way or other belong to the dermal membrane are smaller or of a form somewhat different from those of the principal skeleton, for instance *M. placoides*, some *Esperiopsis*-species, *Artemisina*, *Homœodictya flabelliformis*, but they are generally of the same type. In the following subfamily, *Ectyoninæ*, which is closely allied to *Myxilleæ*, on the other hand, some genera are still found showing the difference, characteristic of *Myxilleæ*, between the dermal spicules and the skeletal ones, and still here the system is scarcely a natural one.

The dermal spicules in *Myxilleæ* are generally briefly stated to be diactinal; this statement, however, is not quite correct. As will be mentioned in the following under the single species the equi-ended dermal spicules, whether they be strongyla, tornota, or tylota, are only secondarily diactinal, but really monactinal, as they are begun as monactinal and grow as such to about their full length, and then the final form only occurs by degrees, contemporaneously with the growth in thickness. In the not quite developed spicules this development may still be traced, the ends being not quite equal, and it is no rare fact that the ends upon the whole never become quite equal, but it may still be decided in the fully developed spicules, which end has been the original point. The general fact is, accordingly, that the finer, i. e. the younger, the dermal spicules are, the greater is the difference between their ends, and the more they approach the monactinal form. This rule seems to be a general one; it is to be noted, however, that in the new genus *Dendoricella* established below, the dermal spicules are really diactinal. I have not yet been able to decide, whether these features may get any systematic importance.

It is, accordingly, to be remembered that when in the following the dermal spicules in diagnosis and description are called diactinal, this term is a purely descriptive one and means only that in their final form the spicules are more or less equi-ended.

Dendoricella n. g.

(Damiria Topsent).

The form massive, lobate or erect, club-shaped. The skeleton polyspicular, irregular or dendritic: the dermal skeleton consists of more or less erect bundles of dermal spicules. Spongin present or wanting. Spicula: Megasclera: the skeletal spicules diactinal, oxea (or strongyla), the dermal spicules oxea, tornota, or tylota: microsclera chelæ arcuatæ solely, or chelæ arcuatæ and sigmata.

Topsent (Archiv de Zool. exp. et gén. Sér. 2, X, XXI) mentions the genus *Damiria* Keller, and characterizes it as being distinguished from *Dendoryx* (in Topsent's sense) by its diactinal skeletal spicules. Later has for instance Lindgren followed Topsent in this view. Weltner, however, (Zool. Anzeig. XXI, 1898, 429) has shown that *Damiria* Keller has by its author been correctly referred to the Renierids, and has nothing to do with the Myxillæ, and after having examined a fragment of the type specimen kindly sent me by Dr. Weltner I can only corroborate this view. For the generic conception which Topsent in the quoted place calls *Damiria* we must thus have a new name. Ridley has referred a species belonging here to the genus *Crella* Gray (*Cribrella* O. S.), but Thiele (Kieselschwämme v. Ternate II, Abhandl. d. Senckenberg. nat. Gesell. XXV, 953) has correctly rendered an account of the fact that the type of this genus, *C. elegans* O. S., is a quite different sponge. Thiele means, in the place quoted, that the species belonging here may be kept in the genus *Myxilla*, whereas my opinion is that it is necessary to place them in a separate genus with the diagnosis given above, and I call this genus *Dendoricella*. Its most important character is that the skeletal spicules are plainly and really diactinal.

The eldest species of the genus is *D. Schmidtii* Ridley (Zool. Coll. of Alert, 432, Pl. XLI, fig. aa). Dendy has later (Proc. of the Royal Soc. of Vict. VIII, 28) established a species, *D. australiensis*, which is, however, according to Topsent (Rev. Suis. de Zool. IV, 455) identical with *Schmidtii*. Topsent, in 1892, (Archiv de zool. exp. et gén. 2, X, XXII) has established two species (under *Damiria*), *cavernosa* and *Prouhoi*: of these species the latter has certainly not really diactinal spicules, but is, no doubt, a *Myxilla* (see below under *M. brunnea*); the former species, *cavernosa*, I think to be a *Dendoricella*. Finally Topsent (Résultats de Campagn. scient. du Prince de Monaco, Fasc. XXV, 240, Pl. III, fig. 3, Pl. XIV, fig. 12) has established a species, *abyssi*, which, remarkably enough, he refers to *Desmacidon*, although it is a sure *Dendoricella*. Of Carter's *Halichondria infrequens* (Ann. Mag. Nat. Hist.

Ser. 5, VII, 309, Pl. XVIII, fig. 9 a—d) nothing can be said at present, and it is very doubtful whether it belongs here.

Thus the species of the genus *Dendoricella* will be as follows:

1884. *D. (Crella) Schmidtii* Ridley, with oxea, tylota, chelæ, and sigmata.

1892. - *(Damiria) cavernosa* Tops. with strongyla, tylota, chelæ. (Of what kind these chelæ are cannot be decided from the description, in which it is said »à bouts pectinés.»)

1903. - *(Desmacidon) abyssi* Tops. with oxea, tornota, chelæ.

- *rhopalum* n. sp. with oxea, tornota, chelæ.
- *obesichela* n. sp. with oxea, oxea, chelæ, and sigmata.

The *Myxilla grata* established by Thiele l. c. has evidently, to judge from the figure, not really diactinal skeletal spicules, but styli with rounded end, and is either a *Myxilla* or perhaps a *Lissodendoryx* in the sense in which I take this genus; the fact is that it cannot be seen from the figure, whether the species has chelæ or ancoræ.

When Ridley referred the species *Schmidtii* to *Cribrella* = *Crella*, the more particular reason was, I suppose, the arrangement of the pores in sieves. Characteristic as this feature may be, it is a character that is found in many sponges, and cannot be used for an establishing of genera; it is only a further development of the feature found in a great many sponges in which the pores are especially placed over the subdermal cavities. Of Schmidt's four *Cribrella*-species *hamigera* is now the type of the genus *Hamigera*; *elegans*, which has smooth oxea in the principal skeleton, spined oxea in the dermal membrane, and further spined styli, I suppose to be identical with Topsent's genus *Pytheas*, in which case this genus may be called *Crella*; *hospitalis* and *papillosa*, as mentioned by Topsent, belong to the genus *Yvesia* Tops., which genus, what Thiele has drawn my attention to, must be called *Grayella* Cart. with the typical species *cyatophora* Cart. — Of the *Dendoricella*-species *rhopalum* shows the mentioned character of sharply limited pore-grooves to a strongly marked degree; the structure seems to be rather similar in *abyssi* and *Schmidtii*, but it is not mentioned with regard to *cavernosa*.

The two species described here, and *abyssi* are natives of deep waters, from 799—2506 fathoms; *Schmidtii* and *cavernosa*, on the other hand, are from shallow water.

The genus *Dendoricella* must among *Myxilleæ* be the one most closely allied to the preceding group, as it approaches *Homœodictya*; among the *Homœodictya*-species a few are found, in which the spicules of the dermal membrane are smaller than those of the skeleton, but they are of one form; in *Dendoricella*, on the other hand, two forms are found.

1. D. rhopalum n. sp.

Pl. IV, Figs. 4—5. Pl. XIV, Fig. 1 a—e.

Club-shaped, often somewhat compressed, sometimes a little lobate above. The surface with close-set, more or less deep grooves, separated by ridges arranged in a net-like way, slightly shaggy. The dermal membrane a thin film, supported by bundles of dermal spicules. Oscula more or less spout-shaped, one or several, on the upper part of the sponge. The skeleton dendritic, polyspiculous. Spicules: Mega-

sclera: the skeletal spicules oxea 0·68—0·98mm, the dermal spicules tornota approaching oxea 0·45—0·65mm; microsclera of one form, isochelæ arcuatæ 0·034—0·0420mm.

This species is most frequently markedly club-shaped. The specimens in hand that are not torn off from the under-layer are attached to larger or smaller stones. At the place of attachment they have a quite slight basal expansion, from which they rise increasing more or less evenly in thickness; thus no real stalk is formed, but the thinnest part is always found just above the basal expansion. Sometimes the upper part is more or less regularly cylindric like the lower part, but most frequently it is more or less compressed, sometimes in such a way that one side is convex, the other flat or concave. Most frequently the club-shape is rather slender, but it may be shorter and thicker. In a few cases the form is a little modified, the upper part being a little lobate; thus we have one specimen, which is, almost through its whole length, divided into three wing-like lobes. In one case the club is divided above into four quite short processes provided with oscula. The largest specimen is ca. 90mm high; it is compressed, and has a breadth of ca. 50mm, and a thickness of ca. 12mm, just above the basal expansion the thickness is ca. 10mm. The smallest specimen, which is more cylindrical, is 24mm high and 7mm thick. The consistency is rather firm and, on account of the skeleton, rather solid, and it is also somewhat elastic. The degree of contraction of the sponge causes, however, a considerable difference with regard to the consistency, the most contracted ones being considerably harder than those not contracted. The colour (in spirit) is in most specimens light gray (stations 20 and 36); in some specimens it is a little darker with a brownish tint, so that it becomes light grayish brown (station 18). The *surface* is very characteristic, but it has a rather different appearance, according as the sponge is contracted or not. Its appearance is most characteristic in the highly contracted individuals; in these it is closely set with rather deep grooves separated by narrow, ridge-shaped walls; these walls form a peculiar net all over the sponge, imparting to it an appearance highly recalling that of *Nardoa reticulum.* The less contracted the sponge is, the flatter these grooves become, and they may also quite disappear. The grooves are nothing else than those occurring in so many sponges, for instance in *M. incrustans,* which are formed by the dermal membrane being sunk between the parts of tissue separating the subdermal cavities, but they are here more regular and always sharply bounded from each other. The less contracted the sponge is, the larger and more shallow are the grooves, while they become smaller and deeper in the contracted sponge, and in this latter they are often oval. Their size is between about 0·4 and 3mm. The grooves, especially in the contracted sponge, have a rather sharp edge. The surface is so far shaggy, as the dermal spicules project a little everywhere between the grooves. The *dermal membrane* is an exceedingly thin, transparent film, resting on the bundles of dermal spicules projecting from the ridge-shaped walls, and stretched over the interjacent subdermal cavities. The *pores* are situated in the parts of the membrane stretched over the subdermal cavities, and these parts are accordingly pore areas; in these areas they are found in large numbers and very close-set, so that the membrane becomes a sieve. Their size was measured to 0·03—0·40mm. *Oscula* are found to a number of from one to ca. ten, evidently in proportion to the size of the sponge. They are found on the top of the sponge or a little down on the side; the largest specimen shows ten oscula, but it is somewhat damaged, and has perhaps had more than ten; they are all placed rather close together along the upper edge. In the above mentioned specimen which divides above into four processes, three of these processes have each an osculum, while the fourth one has two oscula. Oscula are spout-shaped, a pointed, conical spout rising to a greater or smaller height round the opening, which spout is formed by the dermal membrane; it is most frequently somewhat twisted. In the membrane forming the spout dermal spicules are found, arranged parallelly to the longitudinal axis of the spout, more or less gathered into fibres; these fibres arise from the fibres supporting the dermal membrane, which continue into the membrane forming the spout. From the oscular opening a rather wide canal continues far down in the sponge, running chiefly in the longitudinal direction, but frequently irregularly curved.

The *skeleton*. The *dermal skeleton*. The outermost branchings of the main skeleton towards the surface are continued by short fibres of dermal spicules. The outermost spicula-bundles of these fibres are spread in a penicillate or fan-shaped way, and they extend everywhere into the ridges between the pore grooves, and project a little over the surface; horizontal spicules are not found, and the fibres are arranged in such a way as only to be found in the ridges. In different places of the sponge these fibres may be differently directed, perpendicular to the surface or more or less recumbent; thus they are frequently directed towards the upper end of the sponge, and accordingly recumbent, when a piece of the membrane is seen from above. The fibres formed by the dermal spicules are most frequently about 1mm long. The arrangement of the dermal skeleton reminds much of the structure in *Artemisina arcigera*. The *main skeleton* is of dendritic type. From the base a few thick fibres rise, branching gradually up through the sponge, frequently coalescing and connected by more or less strong anastomoses in different ways, so that a chiefly dendritic, tolerably regular and rather densely branched skeleton is formed. The outermost ramifications of the skeleton bend towards the surface at right or more or less acute angles. Then these outermost ramifications of the skeleton, as mentioned above, continue to the surface as fibres formed by dermal spicules. All the fibres are polyspicular, towards the base they may be very thick, up to 0·5mm, and they are here interwoven with a network of more or less strong anastomoses. The outermost ramifications, just before the beginning of the dermal spicules, have a thickness of ca. 0·09mm. Spongin is found in the fibres, which are, therefore, very solid, but the spongin is white and clear, and so it is only to be observed with difficulty. In the lower part of the sponge it coats the fibres entirely, but only with a very thin layer; farther up the spongin is more scarce, and it is not seen in the dermal fibres.

Spicula: a. *Megasclera.* 1. The skeletal spicules are long oxea; they are slightly, rarely a little more, curved; the curve is most frequently even, sometimes it is a sharper bend and localized in the middle. The spicules are of about equal thickness throughout the length, and the point is middle-long, frequently bounded by straight lines. The length is 0·68–0·98mm, most frequently nearer to the latter limit than to the former; the thickness is 0·014–0·022mm. A few developmental forms are seen, all of which are long pointed. 2. The dermal spicules may be best described as tornota, but they approach the form of oxea; they taper a little from the middle outward, the point may be somewhat varying, but most frequently it is short. They are generally straight, sometimes a little curved. Their length is 0·45–0·65mm, their thickness ca. 0·007–0·011mm. Of this spicule very few developmental forms were seen, and no quite young ones. But to judge, both from the quite equally formed ends of the fully developed forms and from the few developmental forms, this spicule seems to be really diactinal b. *Microsclera:* these are only of one form, isochelæ arcuatæ. The chelæ are elegantly formed, the shaft is evenly and rather highly curved, the terminal parts are comparatively small in proportion to the length of the chela. The alæ are drawn out to a pointed corner, and are somewhat tooth-like; the tooth is narrowly lanceolate, pointed downwards, and there is a small, oblong tuberculum. The shaft is not quite cylindrical, but a little compressed; this compression may be more or less pronounced, and the dorsal side of the shaft may thin to a more or less broad brim. In this respect there may be great difference in different individuals. In some individuals the shaft is only little compressed, and only very few chelæ show a slight brim; in others chelæ with brim and without brim are about equally frequent, and in one specimen almost all the chelæ have a brim, and only few are found without brim. The more frequent the chelæ with brim are, the broader is the brim. In the specimen in which almost all the chelæ are provided with a brim, this brim has frequently one or two incisions, so that it is divided into two or three lobes. In by far most individuals the brim is narrow, and in most of the chelæ it is wanting, so that it seems as if its higher development is to be regarded as a monstrosity. The length of the chelæ is 0·034—0·0429^{mm}, and the thickness of the shaft is between 0·0014 and 0·0029^{mm}, according as it is seen from the front or from the side; in chelæ with large brim the breadth of the shaft may reach 0·0050^{mm}. A few developmental forms were seen; the fine ones had a recurving at either end, but did not yet show any traces of alæ. The chelæ are found throughout the sponge, and they are abundantly present everywhere in the dermal membrane, besides in other places they are close-lying in the pore sieves in the strings of tissue between the pores.

Locality: Station 11, 64° 34′ Lat. N., 31° 12′ Long. W., depth 1300 fathoms, one specimen; station 18, 61° 44′ Lat. N., 30° 29′ Long. W., depth 1135 fathoms, three specimens; station 20, 58° 20′ Lat. N., 40° 48′ Long. W., depth 1695 fathoms, six specimens; station 36, 61° 50′ Lat. N., 56° 21 Long. W., depth 1435 fathoms, ca. ten specimens. The stations are situated in the Denmark Strait, south of Greenland, and in the southern part of the Davis Strait. The species is evidently a deep-water species, 1135 fathoms being the smallest depth, at which it has been taken. All the specimens are more or less, some to a very high degree, filled with the light-gray mud of which the bottom at the mentioned localities consisted; in it is found a great many Foraminifera and Coccoliths. This filling may, however, at all events partly, have taken place in the trawl.

Remarks: This species seems to be rather closely allied to the above mentioned *D. abyssi* Tops. whose chelæ, to judge from the figure, have a somewhat similar form, and whose dermal spicules are tornota. Also this species is a native of considerable depths, between ca. 2000 and 2500 fathoms. Topsent mentions that it, like *rhopalum*, contained much bottom material.

2. **D. obesichela** n. sp.

Pl. XIV, Fig. 2 a—d.

Form? The dermal membrane thin, supported by bundles of dermal spicules. Spicula: Megasclera: the skeletal spicules oxea 0·54—0·75^{mm}, the dermal spicules oxea 0·32—0·44^{mm}; microsclera of two forms, chelæ arcuatæ 0·026—0·0429^{mm}, sigmata 0·021—0·064^{mm}.

Of this species we have only a small, poor fragment, so that the description must chiefly be restricted to the spicules. As to the form of the sponge nothing can be said; the fragment is longish and has a greatest extent of 14^{mm}. The consistency is of a middle firmness. The colour (in spirit) is yellowish. The *dermal membrane* is mostly destroyed; it seems to have been a thin film, supported in the common way by dermal spicules. *Pores* and *oscula* were not seen.

The *skeleton*. The *dermal skeleton* consists of dermal spicules, and, in spite of the destroyed dermal membrane, it may be seen to have been arranged in the common way as more or less erect, penicillate bundles. As to the *main skeleton*, on the other hand, I can say nothing definite, as the fragment in hand may perhaps have been highly squeezed and pressed; in its present state the skeleton appears partly as irregularly arranged spicules and partly as spicula-bundles. No spongin was to be seen in the skeleton.

Spicula: a. *Megasclera*. 1. The skeletal spicules are oxea; they are slightly curved, evenly tapering, and the point is rather long. Their length is $0{\cdot}54-0{\cdot}75^{mm}$, the thickness is ca. $0{\cdot}011-0{\cdot}017^{mm}$. 2. The dermal spicules are also oxea, but by the form of their ends they approach somewhat to tornota; they are straight or quite slightly curved, and they taper a little towards the ends, the point is even, but short. Their length is $0{\cdot}32-0{\cdot}44^{mm}$, and the thickness in the middle is $0{\cdot}006-0{\cdot}010^{mm}$. b. *Microsclera:* these are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ arcuatæ are of a rather broad and compact form, the shaft is rather highly curved, the tooth is elliptical, more or less rounded, sometimes a little cut off at the end; there is a tuberculum, pointed downward; the alæ are of the same length as the tooth, and are more rounded. In contradistinction to the chela of the preceding species the shaft is here highly flattened. Their length varies from $0{\cdot}026-0{\cdot}0426^{mm}$ and the thickness of the shaft from $0{\cdot}0025-0{\cdot}0085^{mm}$, according as it is seen from the side or from the front. Very few developmental forms were seen; they are already highly flattened at an early stage. 2. Sigmata; these are of the common form and more or less contort; their length may upon the whole vary from $0{\cdot}021-0{\cdot}064^{mm}$, but it is rarely less than $0{\cdot}043^{mm}$, so that the small forms are rarely seen. The thickness is upon the whole $0{\cdot}0014-0{\cdot}0028^{mm}$. Both forms of microsclera occur in very large numbers, and through the whole sponge; the chelæ are seen in enormous numbers closely packed in the dermal membrane.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., on the eastern slope of the Reykjanæs-ridge, depth 799 fathoms.

Myxilla O. Schmidt.

(Dendoryx Gray 1867).

The form varying, from incrusting to lumpily massive, cushion-shaped, or forming more or less round masses, sometimes somewhat lobate; then more or less irregularly leaf-shaped, or finally club-shaped, stalked. The skeleton a polyspicular reticulation, which may be more or less irregular, sometimes rather diffuse. In the erect forms longer, primary fibres are found. It is no rare form that the reticulation consists of triangular meshes, which may be more or less regular. The dermal skeleton consists chiefly of erect bundles of dermal spicules, sometimes also horizontal spicules are found. Spongin is found, but almost always *to a very slight amount. Spicula: Megasclera: the skeletal spicules styli, most frequently spined, sometimes smooth, the dermal spicules diactinal, strongyla, tornota, tylota, or similar forms, the ends may be variously formed, and spined or smooth; microsclera, ancoræ spatuliferæ, sometimes of two forms, most frequently three-toothed, sometimes with more teeth; further sigmata may be added.*

In 1862 O. Schmidt established the genus *Myxilla* with the species *rosacea* Lieberkühn. In 1867 Gray established the genus *Dendoryx*, and as the first species under it he mentioned *incrustans* Johnst. In 1887 Vosmaer, in Porifera, Bronn's Klassen und Ordnungen , has the families *Desmacidonidæ* and *Ectyonidæ*, and he places *Myxilla* to the former family, and has *Dendoryx* with a query as a synonym to *Hastatus*, which, as is well known, is identical with *Myxilla*. In the same year Ridley and Dendy in Challeng. Report, under the family *Desmacidonidæ*, have the subfamilies *Esperellinæ* and *Ectyoninæ*, and here they place the genus *Myxilla* to the latter subfamily. They render a detailed account of the fact that the genus comprises as well species with accessory spicules as species without such spicules, but they have not wished to divide the genus. In 1888 Topsent (Arch. de. Zool. exp. et gén. Sér. 2, V, bis, 114) revives Gray's *Dendoryx*, and in 1892 he places the species without accessory spicules in *Dendoryx*, while he places the species with such spicules in *Myxilla*. Then *Dendoryx* is placed under *Esperellinæ* and *Myxilla* under *Ectyoninæ*. Thiele, however, in 1903 (Kieselschwämme von Ternate, II, Abhandl. der Senckenberg. nat. Gesell. XXV, 953) renders an account of the fact that the genus *Dendoryx*, as Topsent understands it, ought to be called *Myxilla*, as the typical species of *Myxilla*, *rosacea* Lieberk., according to Topsent (Mém. de la Soc. zool. de Fr. VII, 15, footnote 4) is identical with *incrustans* Johnst. Even if this view, as will be seen below, is not correct, the name of *Myxilla* will have to be used, as *rosacea* is, at all events, a species without accessory spicules.

1. **M. incrustans** Johnst.

Pl. IV, Figs. 6, 7. Pl. XIV, Fig. 3 a—h.

1842. *Halichondria incrustans* Johnston, A History of Brit. Spong. and Lithophytes, 122, Pl. XII, fig. 3, Pl. XIII, fig. 5.

1842. *Halichondria saburrata* Johnston, ibid. 120, Pl. XI, fig. 3.

1866. *Halichondria incrustans* Bowerbank, Mon. Brit. Spong. II, 249, 14.

1870. *Isodictya fimbriata* O. Schmidt (non Bow.), Grundzüge einer Spongienf. des atlant. Gebiet. 56.

1874. *Halichondria incrustans* Bowerbank, l. c. III, 108, Pl. XLIV, figs. 7—12.

1885. *Myxilla barentsi* Vosmaer, Bijdr. tot de Dierk. 12te Aflev., 3die Gedelt., 27, Pl. IV, figs. 15—16, Pl. V, figs. 56—59.

1885? *Hastatus Robertsoni* Fristedt, Kgl. Sv. Vet. Akad. Handl. 21, Nr. 6, 34, Tab. III, Fig. 4 a—b.

1886. *Desmacidon incrustans* Marenzeller, Die österreich. Polarstat. Jan Mayen, III, 10, Tab. I, Fig. 2.

1887? *Hastatus Robertsoni* Fristedt, Vega-Exp. Vetensk. Iakkt. IV, 442.

1888. *Dendoryx incrustans* var. *typica* Topsent, Arch. de zool. exp. et gén. Sér. 2, V, bis suppl. 118, Pl. VI, fig. 16 a.

1890. *Dendoryx incrustans* Topsent, Mém. de la Soc. zool. de Fr., 201.

1893. *Myxilla incrustans* Levinsen, Det vidensk. Udbytte af Hauch's Togter, 419, 17, Tab. I, Fig. 31—34.

1896. *Dendoryx incrustans* Topsent, Résultats scient. de la Campagne du Caudan, 274, 15.

1896. *Myxilla incrustans* Lambe, Transact. of the Royal Soc. of Canada, Ser. 2, II, Sect. IV, 101, Pl. I, figs. 10, 10 a—d.

Incrusting, forming irregular, massive masses, or being more roundish lumpy. The surface with sinuous grooves, more rarely even, not shaggy. The dermal membrane a thin film supported by penicillate bundles of dermal spicules. Oscula scattered, sometimes on the top of low cones. The skeleton chiefly a polyspicular reticulation of triangular meshes, sometimes more irregular. Spicula: Megasclera: the skeletal spicules acanthostyli with scattered spines 0·10—0·35^{mm}*, the dermal spicules tornota with slightly spined, rarely smooth ends 0·17—0·26*^{mm}*; microsclera of three forms, ancoræ spatuliferæ of two sizes, large ones 0·038—0·071*^{mm}*, small ones 0·017—0·028, sigmata 0·024—0·075*^{mm}*.*

This species may vary rather much in appearance, and in this respect it recalls *Halichondria panicea*. As in this species, however, the form is highly dependent on the substratum on which the sponge is growing. The most frequent forms are more or less extended, incrusting masses that may be thinner or thicker; then it may rise to cushion-shaped bodies or to irregular, roundish lumps. When growing on Algæ, roots of Algæ or similar bodies, it may have a quite irregular form, but then it is most frequently only incrusting. Oscula may sometimes be found on more or less distinct, conical projections on the cushion-shaped or lump-shaped sponge. The species seems sometimes to be growing directly on the sea-bottom; a few of the specimens in hand are not attached, but their basal surfaces are filled with sand and gravel. According to Johnston and Bowerbank, it is also frequently found on rocky bottom, growing on the rock. It is very often growing on *Pecten*-species, and then it is most frequently rather regularly cushion-shaped or flatly semiglobular. In the Ingolf-material we have it on *Pecten islandicus:* Bowerbank mentions it on *Pecten opercularis*, and Lambe has it from the American coast on *Pecten tenuicostatus*. Levinsen mentions it from Denmark on *Mytilus modiolus* and *Cyprina islandica*. As rather thin, irregular incrustations it is found on barnacles, Bryozoa, worm-tubes, and *Laminaria*-roots. The largest specimen in hand, which is not attached, has a greatest breadth of 115^{mm} and a height of 90^{mm}; most of the specimens are not so large and especially not so high; a middle-large one, growing on a *Pecten*, is 75^{mm} broad and ca. 25^{mm} high. The smallest specimen in hand forms a small crust on a barnacle, it has a greatest extent of 9^{mm} and is only 0·5^{mm} thick. The consistency is of middle hardness, it is only little elastic and rather fragile. The colour (in spirit) is most frequently light yellowish; in the fresh specimens it is described as yellow to orange. The *surface* may be somewhat varying; it may sometimes be quite even and smooth, but most frequently it is more or less, often highly grooved, and the grooves are separated by winding and wrinkling walls. These walls are formed by the parts of tissue separating the canals; these canals are present in large numbers, they run very close to each other, and are most frequently directed towards the surface. Although the dermal membrane, as will be mentioned later on, is supported by the projecting spicula-bundles, the surface is nevertheless almost smooth, the spicules projecting so little, that they are only to be observed by means of a highly magnifying lens. When the walls are more compressed and have sharp edges, these edges, however, are most frequently finely spined, which is owing to the skeleton below. The *dermal membrane* is a rather thin, transparent film. It is supported by bundles of dermal spicules projecting in a fan-shaped way. These spicula bundles, however, are frequently not perpendicularly erect, but more or less, often highly recumbent. Of spicules the membrane otherwise has only microscleres. In different individuals, or in different places of one individual, it may have a somewhat different appearance; in more compact individuals with not especially large canals (perhaps more contracted individuals), or in places of the individual showing such a condition, the skin is rather smooth, and the projecting spicula-bundles are here close-set and rather perpendicular. Where the surface is more grooved and the membrane stretched over the grooves, the structure is somewhat different, as there are here large parts of the membrane with no skeleton immediately below them, from which the bundles may arise. Then the bundles issuing in a fan-shaped way from the edge reach into the membrane, and are quite, or almost quite recumbent in it, and in the middle part of it, where the bundles do not reach, scattered horizontal spicules are further found. In other places the structure is again somewhat different, fibres running from the skeleton under the parts of the membrane stretched over the grooves, from which fibres fan-shaped bundles project and pass into the membrane where they are more or less horizontal. This latter structure gives to the dermal membrane a peculiar appearance, as the parts of the membrane that are stretched over the canals or the subdermal cavities and, on account of the cavities below, appear as dark areas, are again subdivided by the mentioned fibres, which form a reticulation, in the meshes of which the pores are then situated. The *pores* are found in the dermal skeleton in the areas formed by the skeleton; they may be present everywhere, but are seen especially numerous and close-lying in the parts of the dermal membrane situated over the subdermal cavities, which parts are here often reduced to a sieve. They are round or oval and of sizes from quite small ones to 0·15^{mm}. *Oscula* are found scattered in rather slight numbers; as mentioned above, they are sometimes found on the top of conical projections, but these projections are often quite low or quite wanting. In a few cases the conical projections are not separated, but form a continuous wall with several oscula placed in the edge. This structure is illustrated by Bowerbank's figure Pl. XLIV, 7. In the largest specimen in hand eleven oscula are found. The appearance of the oscula may be somewhat varying; in the more compact forms with even surface the osculum is a regular round or oval aperture definitely bounded by the skin, which rises sometimes to a sharp edge round the aperture. Here the oscula are most frequently small, and were measured down to 1^{mm} or less. In individuals with highly grooved surface, on the other hand, the edge of the oscula becomes often irregularly indented, so that the aperture is somewhat lobed. It is this structure which causes Johnston to use the expression: oscula obscure, substellated, presumably the dermal membrane has also been wanting to a great extent, and then oscula are little marked compared to the openings of the inhalent canals. When oscula are of the last-mentioned structure, they are generally rather large, and they were measured up to a diameter of 10^{mm}.

The *skeleton*. The *dermal skeleton* consists, as already mentioned, of perpendicular or more or less recumbent bundles of dermal spicules, which pass off from the main skeleton and support the dermal membrane, and bend as fibres under and into the parts of the membrane stretched over the subdermal cavities. Generally the question is only of bundles; but sometimes, in certain places of the sponge, they are lengthened more inward, so as to become short fibres passing out and ending in the dermal membrane. In the ridges of the surface that are more compressed and sharp-edged, the dermal skeleton is often much suppressed, and the main skeleton may continue quite out and give rise to the mentioned small spines. The *main skeleton* consists typically of triangular or, more properly, tetrahedral meshes, the sides of which have the length of a spicule and are formed of from one to five or six spicules. It may, however, be somewhat differently constructed in different individuals. Thus more or less marked fibres occur not rarely in larger or smaller numbers; they run especially in the direction towards the surface. When these fibres occur in larger numbers, some quadrangular meshes may be formed here and there, but a regular, quadrangular net of meshes is not formed. The longer fibres are generally a little thicker than the others. In other individuals the skeleton is much less regular and is not formed of so distinct triangular meshes, and then it is upon the whole of a more diffuse character. In the membrane coating the canals only microscleres are found. Spongin is found in the nodes of the skeleton, but it is only to be observed with much difficulty, as it is quite white and clear, and only a minimal amount is present.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, straight or slightly curved, most frequently with the curve near the upper end; the point is middle long or rather short. The spinulation may be somewhat varying, but is generally rather scattered; the spines are not rarely gathered a little more densely at the upper end; only a short part of the point shows no spines. The styli vary rather much in size, not, however, in one individual, but in different individuals, whereas the variation in one individual is most frequently only slight. The length varies altogether from 0·19—0·35^{mm}; in the single individuals may be found for instance: 0·19—0·22^{mm}, 0·21—0·268^{mm}, 0·238—0·298^{mm}, and 0·28—0·35^{mm}. The thickness, which is only partly proportionate to the length, varies altogether between 0·008 and 0·015^{mm}. Finer, down to quite fine styli which are certainly developmental forms, occur in most individuals scattered in the tissue. They have about the full length, and their point is long and fine. Among the finest of them some were smooth, but otherwise traces of spinulation occur early. In the fine forms the spines are small and especially low, so that these forms may get an irregular, knotty appearance. In an individual with needles of the greatest lengths given above, the fine developmental forms were measured, for instance, to 0·29^{mm} with a thickness of 0·0028^{mm}; the very finest one observed was 0·0010^{mm} thick, and ca. 0·17^{mm} long; in this needle no trace of spinulation was seen. From the finest stages all transitional forms are found to the fully developed needles. 2. The dermal spicules are tornota; they are straight, or at most quite slightly, irregularly curved. They are cylindrical and most frequently slightly fusiform. The ends are short pointed; often a slight constriction is found below the end; the ends are slightly spinulous, only in a few cases smooth or almost smooth. It is to be remarked that the ends of the tornota are not always quite equal, but one end is frequently a little thinner than the other. Their length varies in a similar way as that of the styli, altogether it is between 0·17 and 0·26^{mm}, but in individual specimens it was measured, for instance, to 0·17—0·20^{mm}, 0·19—0·22^{mm}, and 0·21—0·26^{mm}. The thickness is 0·0057—0·01^{mm}. Only very few finer forms were seen, and none very fine. *Microsclera:* these are of three forms, three-toothed isancoræ spatuliferæ of two forms, and sigmata. 1. The large ancoræ have a slightly curved shaft, and in either end three lanceolate teeth; in both ends a rather narrow ala is found on either side of the shaft; the alæ are most frequently a little longer than the teeth. The teeth are directed slightly outward. The length varies altogether between ca. 0·038 and 0·071^{mm}; it may vary somewhat in the single individual, not, however, so much. Thus in a specimen with the smallest ancoræ the greatest length was 0·043^{mm}, and in a specimen with large ancoræ the smallest form was 0·059^{mm} long. The greatest breadth of the ancoræ from one lateral tooth to the other is about 0·014—0·025^{mm}. Besides the length also the dimensions of the different parts may vary; thus alæ and tooth may be comparatively longer or shorter, and the free middle part of the shaft may, according to this variation, be from one third to one fifth of the whole length. Of this ancora a few half-developed stages were seen, in which only beginnings of the teeth and falces were present. — This ancora showed frequently, at all events in many individuals, many different deformities. It has been mentioned that the ancoræ may vary somewhat with regard to the length of the teeth; also the breadth of the teeth may vary, and they may be very narrow. Then they may be straight cut off at the end, and here they have very often an incision, so that they become more or less deeply split. Further the alæ may separate more or less from the shaft, and each form a tooth, or they may coalesce so as to form one tooth, so that we get four or five teeth, each directed its own way. The teeth or tooth-like structures which in the mentioned cases replace the alæ, appear, as far as I have been able to observe, when they are quite separated from the shaft, to be upon the whole of the same construction as the genuine teeth, but this is only rarely the case, as most frequently they are only partly separated from the shaft. All these deformities, for as such they must be regarded, show the peculiarity that they are always symmetrical, occurring in quite the same way in both ends. Finally the ancoræ are often somewhat twisted. 2. The small ancoræ have a comparatively more curved shaft than the large ones, and further the teeth are less directed forward, so that a line through the two middle teeth would be straight or almost straight. In either end there are three leaf-shaped teeth, which are most narrow at the base, and an ala on either side of the shaft. Teeth and alæ are comparatively long, so that the ends of the teeth approach each other, and the free middle part of the shaft is quite short, only ca. one eighth of the whole length, so that there is often only seen an incision between the alæ. The length of these ancoræ varies from 0·017—0·028^{mm}, but the dimensions of the different parts remain about the same. The breadth is ca. 0·0057—0·0085^{mm}. Also of this ancora a few developmental forms were seen. The two forms of ancoræ are sharply separated, both by their sizes and by the characteristic form of the small ancora. A few ancoræ may be found, however, that seem with regard to form and size to be intermediate between the two groups, yet with regard to form they approach always more nearly to the large ones. 3. Sigmata are more or less contort, up to one fourth of a turning. They are exceedingly varying in length, from 0·024—0·075^{mm}. The variation, however, is not so great in all individuals; thus the upper limit was measured in some specimens to 0·064^{mm}, and in others to only 0·04^{mm}, the lower limit, on the other hand, seems to be about the same. The thickness varies altogether from 0·001—0·005^{mm}, according to the size. The middle sizes of the sigmata occur very sparingly, and therefore the impression is frequently imparted that sigmata form two groups; this fact is especially conspicuous in the individuals in which sigmata reach the largest size, while the difference is smaller in individuals in which sigmata do not reach any considerable size. When they are divided in two groups, the fact is that the small sigmata may only vary a little in size, while the large ones vary somewhat more. All forms of microsclera occur throughout the sponge; they are also found in the skin, and especially in large numbers in the membranes of the canals.

Embryos. In most individuals embryos were found; they were present in large numbers and were lying rather close in the tissue. The embryos are globular, and their average size is 0·3—0·5mm. Of spicules only megasclera were found in almost all the examined specimens. These megasclera are finely knotty, straight tylostyli; in the fine ones the head is most frequently found a little below the end, while in the thicker ones the end itself is swollen. Their length was measured from 0·015 up to 0·13mm by a thickness of 0·001—0·005mm. Thus these needles are skeletal spicules, which accordingly are the earliest occurring ones, whereas no dermal spicules were found. In a few embryos, in which the styli were of the largest sizes, also microscleres were found, that is to say developmental forms of the ancoræ; these forms were measured to a greatest length of 0·028mm, but their form indicated that they belonged to the large form. Spicules were already present in all the examined embryos.

Locality: We have a rather copious material of the species. Station 31, 66° 35' Lat. N., 55° 54' Long. W., depth 88 fathoms; station 34, 65° 17' Lat. N., 54° 17' Long. W., depth 55 fathoms; station 127, 66° 33' Lat. N., 20° 05' Long. W., depth 44 fathoms; Holstensborg (Bergendal); Egedesminde (Traustedt); Jakobshavn (assistant Olsen); Jan Mayen, depth 55 fathoms (the Amdrup Expedition 1900); the Bay of Skagestrand, depth 33 fathoms (Ditlevsen); east of Nolso, depth ca. 30 fathoms, at the northern end of Nolso, depth ca. 100 fathoms (Th. Mortensen). The localities are situated off West-Greenland, north of Iceland, off Jan Mayen, and off the Faröe Islands.

Geogr. distr. The species is hitherto known from the coast of Jan Mayen (Marenzeller); from the Orkneys, the Shetland Islands, the Hebrides, and the coasts of Great Britain and Ireland (Bowerbank); the Sound (Levinsen); the coasts of France, at the Channel and at the Atlantic, for instance the Bay of Biscay, at depths of ca. 96, 133, and 206 fathoms (the "Caudan", Topsent), and finally from the Gulf of St. Lawrence (Lambe). In the seas in question it is thus distributed from 71° to 45° Lat. N. It is chiefly a shallow water- and shore-species, and the greatest depth, from which it is known, I suppose to be stations 19 and 32 of the "Caudan" in the Bay of Biscay with a depth of ca. 206 fathoms (400 metres).

Remarks: I have been able to determine this species with certainty, as I have examined a specimen sent by the Rev. Mr. Norman; this specimen showed distinctly the spined ends of the tornota. As will have been seen from the description, the species may be somewhat varying, especially with regard to the size of the spicules, and it seems even to be able to vary still more than shown by my material; thus Lambe l. c. gives the lower limit of the styli to 0·12mm and of the tornota to 0·14mm, but here, perhaps, developmental forms are included. The species has surely often been described under different names. As mentioned by Levinsen l. c., it is thus this species O. Schmidt has determined as *fimbriata* Bow., and, in Spong. des atlant. Gebiet. l. c., quoted from Denmark and Greenland, which fact is shown by the specimens in the museum at Copenhagen. I suppose that it may also be regarded as a certain fact that *M. barentsi* Vosm. l. c. is identical with the present species, and this seems also to hold good with regard to the *M. barentsi* mentioned by Lambe (Trans. of the Roy. Soc. of Canada, 1891, XII, Sect. IV, 121, Pl. II, figs. 9, 9 a—e). I also think that *[illegible]* Fristedt, l. c., is the same species. With regard to both species the descriptions agree exactly with *incrustans*. Of the two varieties of *incrustans*, *typica* and *viscosa*, mentioned by Topsent (Arch. de zool. exp. et gén.

Sér. 2, V, bis, suppl. 118), on the other hand, at all events only the former is *incrustans:* the tornote figured by Topsent has smooth ends, but perhaps the spines, which may be very fine, have been overlooked: the tornote with cleft ends figured for var. *viscosa*, on the contrary, belongs, no doubt, to the following species. Finally Topsent (Résultats du Voyage du S. Y. Belgica, 17) describes a *Dendoryx incrustans* var. *australis:* on account of the sizes of the megascleres, the styli are 0·5—0·6^{mm}, and the tornotes 0·32^{mm}, I think it more probable that it is an independent species. — The *Halichondria incrustans* var. with angulated anchorate and smooth acuate from the west coast of Florida mentioned by Carter (Proceed. of the Acad. of nat. Sc. of Philadelphia 1884, 205) cannot be the present species, but must belong somewhere else.

2. **M. rosacea** Lieberk.

Pl. IV, Fig. 8. Pl. XIV, Fig. 4 a—h.

1859. *Halichondria rosacea* Lieberkühn, Arch. für Anat. 521, Tab. XI, Fig. 2.

1862. *Myxilla rosacea* O. Schmidt, Spong. des adriat. Meer. 71.

1864. *Myxilla tridens* O. Schmidt, ibid., Suppl. I, 36, Tab. IV, Fig. 5 a—d.

1864. *Myxilla Esperii* O. Schmidt, ibid., 36, foot-note.

1880. *Myxilla rosacea* Vosmaer, Notes from the Leyden Mus. II, 123, 1.

1882. — Graeffe, Uebers. d. Seethierf. des. Golf. von Triest, Arbeiten aus dem zool. Inst. Wien IV, 6.

1888. *Dendoryx incrustans* var. *viscosa* Topsent, Arch. de Zool. exp. et gén. Sér. 2, V, bis, suppl. 119, Pl. VI, fig. 16, b.

1890. *Dendoryx incrustans* var. *viscosa* Topsent, Mém. de la Soc. zool. de Fr. 201.

1892. — — — — Topsent, Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 98.

Incrusting (sometimes forming free branches). The surface grooved, slightly shaggy. The dermal membrane thin, supported by penicillate bundles of dermal spicules. The skeleton a polyspicular reticulation, forming partly triangular meshes, partly quadrangular, or irregular ones. Spicula: megasclera: the skeletal spicules acanthostyli, dispersedly spined 0·178—0·24^{mm}, the dermal spicules tornota, most frequently with three-pointed ends 0·178—0·22^{mm}; microsclera of two forms, ancoræ spatuliferæ 0·0157—0·05^{mm}, sigmata 0·018—0·032^{mm}.

The specimens in hand of this species occur as thicker or thinner incrustations, especially on Hydroids, and a few ones on erect Bryozoa. In the material it is found growing on *Diphasia abietina*, *Halecium* sp., and *Lafoëa* sp., and of Bryozoa on *Cellaria fistulosa* and *Bugula murrayana*. As the form of the sponge chiefly follows the substratum, it becomes most frequently longish and rather irregular. It always grows all round the Hydroid. Independent free branches seem, however, also to be found, as the material includes some such branches, but they are torn off. The largest specimen in hand has a greatest extent of ca. 57^{mm} and a breadth of about 25^{mm}; the thickness of the incrustation is scarcely more than 5^{mm}. The mentioned free branches are more or less compressed, and have a greatest breadth of 14^{mm}, the longest one is 40^{mm} long. The consistency is rather firm and somewhat elastic. The colour (in spirit) is in some specimens whitish yellow to grayish yellow, but not rarely it is light brown or reddish brown. Lieberkühn states that the fresh sponge is of a dirty rose-red colour, and Schmidt says that it is yellowish or dirtily rose-red. The *surface* is much and irregularly grooved, being, as in the preceding species, provided with knobs or sinuous ridges separating interjacent grooves; otherwise it is quite slightly shaggy from projecting spicules. The *dermal membrane* is a thin film supported by projecting bundles of dermal spicules spread in a penicillate way; otherwise it has no skeleton. The *pores* are situated in the areas formed by the dermal skeleton; they are especially close-lying over the larger subdermal cavities, where they most frequently reduce the membrane to a network. They are round or oval, and their size is 0·018—0·11^{mm}. Distinct *oscula* were not seen.

The *skeleton*. The *dermal skeleton* consists, as in the preceding species, of bundles of tornota which project from the main skeleton, being spread in a penicillate way, and support and pierce the dermal membrane. The bundles have generally a length of only about one spicule; only where large subdermal cavities are found, short fibres are formed of the tornota, which fibres pass into the membrane stretched over the cavity, and branch, continually sending fan-shaped bundles up through the membrane. The bundles are most frequently rather erect, but may in places be more or less recumbent. Besides in the dermal skeleton tornota are also found in the membranes of, at all events, the larger canals. The *main skeleton* is a rather irregular, polyspicular network. It forms partly tetrahedral, partly more or less cubic or quite irregular meshes. Some longer fibres are found, especially running towards the surface. In the mentioned free branches rather long fibres are formed running lengthways of the branches. The fibres or spicula-bundles may have up to ca. six spicules alongside. As in the preceding species spongin is found in the nodes of the skeleton, but it is only to be observed with difficulty, as it is only present in small amount, and is quite white and clear.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli, they are most frequently slightly and evenly curved throughout their length, only more rarely they are straight; the point is even and middle long, but may vary a little in length. The spines are much scattered and rather small; only at the upper end they are a little more close-set, and are also here a little larger; the point is smooth for a longer or shorter space. The length varies from 0·178—0·24^{mm}, and the thickness from 0·008—0·011^{mm}. Some developmental forms were found, they were of different thickness, the finest ones were measured to ca. 0·0007^{mm}, and had a length of about 0·14^{mm}. Forms of a thickness of about 0·001^{mm} were slightly knotty or almost smooth, whereas forms a little thicker were distinctly spined. The developmental forms show a little distinct head-swelling, which is more distinct, the finer the needle is. 2. The dermal spicules are tornota; they are straight or slightly curved in different ways and slightly fusiform. Their ends are peculiarly formed; they taper only a little, and then they are abruptly cut off, the edge of the end thus cut off carries some small points, most frequently, as far as was to be seen, to a number of three. Sometimes the outer part of the tornote is quite slightly swollen. Most frequently their ends are not quite equal, one being a little thinner than the other. Their length varies from 0·178—0·22^{mm}, and the thickness from 0·004—0·008^{mm}. Developmental forms were seen in small numbers; in conformity to the development they show the greater difference between the two ends, the younger they are. b. *Microsclera* are of two forms, tridentate isancoræ unguiferæ and sigmata. 1. The ancoræ have an evenly curved shaft; at either end they have three teeth, and on either side a narrow ala. The alæ continue along the shaft, and in the middle they are connected by a quite narrow rim; thus there is no free middle part of the shaft, but only an incision in the rim running on either side. The ancoræ are very varying in size, their length is between 0·0157 and 0·05^{mm}, and the breadth is proportionately 0·004—0·018^{mm}. The larger ancoræ are most predominant. Developmental forms in different stages were seen. 2. Sigmata are of the common form and contort in different degrees; their size is rather varying, the length from 0·018—0·032^{mm}, and the thickness from ca. 0·0011—0·002^{mm}. Both forms of microsclera occur through the whole sponge and in no small numbers in the dermal membrane.

Remarks: Of this species I have for comparison had a fragment of one of Schmidt's type specimens sent to me by Dr. Marktanner-Turneretscher, and so I have been able to identify my species with certainty. It is also quite in conformity to Lieberkühn's description and figures l. c.; especially the figure of the acanthostyli is exceedingly characteristic. On the other hand neither Lieberkühn nor Schmidt mentions the pluripointed ends of the tornotes, but they must also be seen under very high magnifying powers to be made out distinctly. In Schmidt's type specimen the megasclera are a little smaller than in my specimens; thus the styli have an average length of 0·16^{mm}, and do not exceed 0·178^{mm}, and the average length of the tornotes is 0·15^{mm}, and they do not exceed 0·178^{mm}. Schmidt describes later, under the *M. tridens* established by him in 1864 l. c., the three-pointed tornotes very minutely, and compares very appropriately the form of their ends to the head of an *Ascaris*. In 1868 he (Die Spong. der Küst. von Algier, 27) joins, and, no doubt, correctly, this species to *M. rosacea*. When Vosmaer l. c. further refers Schmidt's *M. fasciculata* here, and says that this species is different from *fasciculata* Lieberk., I take this statement to be owing to a mistake. An original preparation here in our museum of *fasciculata*, labelled with Schmidt's own hand, shows that this is a quite different species, even a species with chelæ arcuatæ, and a specimen of *M. fasciculata* Lieberk. sent by Prof. v. Marenzeller, is quite agreeing with it as to spiculation. — Topsent maintains (Mém. de la Soc. zool. de Fr. VII, 1894, 16, the foot-note) that *M. rosacea* and *M. incrustans* are identical. This, as will have been seen, is not the case; but it will appear from the following how Topsent has arrived at this conclusion. The fact is that Topsent (Arch. de Zool. exp. et gén. Sér. 2, V bis, suppl. 118), as before mentioned, under *incrustans* mentions two varieties of this species, *typica* and *viscosa*, and while only var. *typica* can be identical with *incrustans*, var. *viscosa*, according to Topsent's description, proves to be identical with *rosacea*. Topsent's description leaves no doubt of the identity; he points out the pluripointed (Topsent says two-pointed) ends of the tornotes, he mentions the red colour, and finally he says that var. *viscosa* differs from var. *typica* by the presence of cellules sphéruleuses with large grains. Now the fact is that *rosacea* really has these cells in exceedingly large numbers, they are seen in enormous quantities in the tissue, especially in the membranes; they have a diameter of ca. 0·014^{mm}, and are filled with few, large, somewhat refractive grains.

The *M. rosacea* var. *japonica* enumerated by Ridley and Dendy (Challeng. Report, XX, 130, Pl. XXVI, fig. 3, Pl. XXVII, figs. 8, 8a—c, Pl. XLVII, fig. 3) must, according to the description, be a different species, and this holds also good of the *M. rosacea* var. mentioned by Lambe (Trans. of the Roy. Soc. of Canada, X, sect. IV, 71, Pl. II, fig. 6, Pl. V, figs. 6, 6a—f), which has higly spined styli 0·24—0·28^{mm} long and simply pointed tornota 0·22^{mm} long.

Locality: The Faröe Islands, 6 miles north to west of Kalsö, depth 60 fathoms, 2 miles off Börövig, depth 20—30 fathoms, at the north end of Nolsö, depth ca. 100 fathoms (Th. Mortensen); northwest of Strömö, depth 60 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902).

Geogr. distr. This species, which was originally only known from the Mediterranean, seems to be rather widely spread. Triest (Lieberkühn); the canals of Venice (Schmidt); Algeria (Schmidt); at the Azores, depth 69 fathoms, off the northern coast of Spain, depth 72 fathoms, 45° 48' Lat. N., 5° 58' Long. W., depth 85 fathoms ("l'Hirondelle", Topsent); at the French coast in the Channel at Luc and Roscoff (Topsent). The species is thus at present known from the Azores to the Faröe Islands. Its bathymetrical range is from ca. 5 fathoms (in the Channel) to ca. 100 fathoms (at the Faröe Islands).

3. M. fimbriata Bow.

Pl. IV, Figs. 9—10. Pl. XIV, Fig. 5 a—i.

1864. *Isodictya fimbriata* Bowerbank, Mon. of Brit. Spong. II, 337, 43.

1874. — Bowerbank, ibid. III, 147, Pl. LVIII, figs. 7—14.

1880. *Amphilectus fimbriatus* Vosmaer, Notes from the Leyden Mus. II, 116, 20.

Cushion-shaped or formed as a round lump, sometimes slightly lobed. The surface even, very slightly shaggy. The dermal membrane solid, supported by penicillate bundles of dermal spicules. Oscula scattered on the surface. The skeleton a polyspicular, most frequently irregular network of triangular or quadrangular meshes. Spicula: Megasclera: the skeletal spicules acanthostyli, rather densely spined, 0·26—0·43^{mm}, the dermal spicules tornota 0·23—0·32^{mm}; microsclera two forms of ancora spatulifera, large ones 0·064—0·09^{mm}, small ones 0·022—0·035^{mm}.

This species has a more or less lumpy, sometimes somewhat lobed form. It may be attached to different things; when growing on a rather extended substratum, as shells, it has often a flat, cushion-like form, but when it grows on worm-tubes, Hydroids, Bryozoa or the like, it becomes more roundish and lumpy. The smaller specimens seem to be the more regular ones, while the larger ones most frequently show the lobed or more irregular form. The specimens figured by Bowerbank l. c., which are all small, are thus rather regularly roundish, and he describes also the form as "nearly globular, or more or less roundish". The largest specimens mentioned by Bowerbank were of the size of a walnut, whereas I have before me considerably larger specimens; the largest one, which is of an irregular, longish form, has a greatest extent of about 80^{mm}, and then we have a series of specimens in evenly decreasing sizes, the smallest one has a greatest extent of 12^{mm}. The colour (in spirit) is most frequently more or less dark-brown, to almost black, a few specimens are of a lighter tawny colour. I suppose that the fresh sponge after its death becomes dark by the influence of the light or in spirit, as the dark specimens, when cut through, are seen to be lighter inside, and the light colour begins just under the surface. As stated by Bowerbank, the sponge also becomes dark when dried. The consistency is somewhat elastic, and the sponge may be rather hard and firm, or softer and looser. The *surface* is even and apparently smooth, but under the magnifying glass it is seen to be slightly shaggy from projecting spicules. The *dermal membrane* is a rather solid and not especially thin film, which may very easily be isolated; it is supported by projecting bundles of dermal spicules spread in a penicillate way. These bundles are most frequently very close-set; they may be erect or more or less recumbent, when bending over large subdermal cavities they are always recumbent. Sometimes the dermal spicules are quite recumbent and scattered in the membrane, and then it rests on the main skeleton, from which spicules may project through it. The *pores* are partly lying singly, scattered among the projecting spicula-bundles, partly they are closely gathered over the subdermal cavities where they form sieves. Their size was measured from 0·018—0·12^{mm}. *Oscula* may occur in very varying numbers; most frequently they are rather few and scattered, but in a few cases they are numerous, and may then in places be close-standing. Bowerbank says: »Oscula simple, dispersed, numerous». They are round, with a sharp, sometimes a little raised edge. Their size was measured from 0·5—4^{mm}.

The *skeleton*. The *dermal skeleton*, as mentioned above, is formed of close-set penicillate, more or less erect bundles of dermal spicules. They may sometimes be quite horizontal and scattered in the membrane. The *main skeleton* consists of polyspicular fibres with up to six spicules alongside; it forms a rather irregular network of triangular and quadrangular meshes. Some longer fibres are found running towards the surface, and they may be connected by transverse bundles, so as to form more regular, quadrangular meshes; these fibres may in places be rather numerous. A rather slight amount of spongin is found in the nodes of the skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight or slightly curved acanthostyli; the curve is most frequently nearest to the rounded end. The point may be somewhat varying, from rather short to middle long or rather long, in the latter case it is bounded by straight lines; in a few cases the point is rounded. The spinulation is rather dense, but the spines are small; they are often somewhat scattered in dots; most frequently the spines are a little closer gathered and also a little larger at the head-end and near the point, while they are smaller in the middle. Bowerbank designs this feature as »incipiently spined». The spinulation may be more or less marked, and when it is slight, the spicule may be almost smooth in the middle. The point is most frequently without spines, but sometimes they continue to the very end. The length varies from ca. 0·26—0·43^{mm}, and the thickness from ca. 0·01—0·024^{mm}. The small sizes are not frequently found. As well with regard to length as to thickness a little difference may be found in different individuals. Developmental forms of different sizes were found in small numbers; the young ones have a slight head-swelling and a rather closely, but finely spined or knotty surface. 2. The dermal spicules are tornota; they are straight, only sometimes a little sinuous. The points are short and bounded by curved lines, but end with a little mucro. The tornotes are sometimes quite slightly constricted inside the points. The two ends are almost never quite equal, but one is a little thinner and a little longer pointed than the other. Their length is between 0·23 and 0·32^{mm}, and the thickness in the middle is 0·005—0·012^{mm}. Developmental forms, of which the young ones are styli, occurred, but in no great numbers. — In this species it is almost always distinctly to be seen, which end of the tornotes is the original point, as it is always thinner and longer pointed, while the other end is broader pointed and has most frequently a more distinct constriction below the point (Pl. XIV, fig. 5 e). These spicules also generally grow rather thick, while one end still continues to appear as a distinct apex; this fact is, I suppose, what leads Bowerbank to speak of »acuate tension spicula»; otherwise he is somewhat obscure, and in his diagnosis he calls the spicules of the dermal membrane »acerate», but further says: »Interstitial membranes.

Tension spicula acuate", whereas, in the description and in the third volume under the explanation of the figures, he speaks of the spicules of the dermal membrane as monactinal ones. b. *Microsclera:* these are tridentate isancoræ spatuliferæ of two sizes. 1. The large ancoræ have a somewhat curved shaft, the teeth are oval and more or less broadly rounded at the end, sometimes pointed. The shaft has distinct alæ, a trifle longer than the teeth. The free part of the shaft between the alæ is about one fifth of the length. The ancora may vary somewhat in form, be more slender or more robust, and the tooth may vary a little in breadth. The length varies from 0·064—0·09mm, in by far most cases it is midway between the two sizes; the thickness of the shaft is 0·0057—0·008mm. 2. The small ancoræ have a similar form as that of the larger ones, the only difference being that the teeth of the two ends approach considerably in the middle. Their length varies from 0·022—0·035mm, and the thickness of the shaft is 0·0021—0·0028. Developmental forms in different stages are found of both forms of ancoræ, from exceedingly fine ones with only slight traces of teeth. Transitional forms between the two forms of ancoræ have not been observed in this species. Both forms occur in the dermal membrane and in the membrane-like parts of the sponge, often in large numbers; the small ancora is the more frequent one.

Embryos. In some of the individuals embryos were found copiously in the tissue. They are globular, the largest ones of a diameter of ca. 0·3mm. The smaller ones had no spicules, then megasclera occurred, and the larger ones showed both megasclera and developmental forms of the small ancora. The megasclera are spined tylostyli reaching a length of up to 0·14mm and a thickness below the head of up to 0·004mm. The developmental forms of the ancora were of the same length as in the grown sponge. At first the megasclera occur in small numbers and scattered; later, at the same time as they grow larger, they are numerous and closely gathered in a bundle; they are, especially at the head-end, far more coarsely spined than in the developed sponge. In the largest embryos the small ancora was fully or almost fully developed. The specimens in question were obtained in the months of May and July.

By comparison with a specimen of *M. fimbriata* Bow. sent me by the Rev. Mr. Norman I have been able to identify the species with certainty. From *incrustans* it is separated, besides by other characters, by the absence of sigmata; otherwise it is well characterized by its round or round-lobed form, its even surface, and the solid, not thin dermal membrane.

Locality: The species has been taken by the Ingolf, station 32, 66° 35′ Lat. N., 56° 38′ Long. W. depth 318 fathoms; station 85, 63° 21′ Lat. N., 25° 11′ Long. W., depth 170 fathoms; station 86, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; station 127, 66° 33′ Lat. N., 20° 05′ Long. W., depth 44 fathoms. It has further been taken at the following localities: Iceland, Cape North, depth ca. 37 fathoms (Ditlevsen); 64° 27′ Lat. N., 13° 27′ Long. W., depth 84 fathoms, 60° 55′ Lat. N., 8° 56′ Long. W., depth 69 fathoms, 62° 23′ Lat. N., 2° 35′ Long. E., depth 217 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902); the Faröe Islands, at the south end of Nolso, depth ca. 80 fathoms, at the north end of Nolso, depth ca. 100 fathoms, 6 miles east of Nolso, depth ca. 30 fathoms, 6 miles north to west of Kalso, depth 60 fathoms, 8 miles south-east of Miavenæs, depth 40 fathoms, off the mouth of Borovig, depth ca. 30 fathoms (Th. Mortensen); southwest of Myggenæs, depth 135 fathoms (Ditlevsen). Altogether about twenty larger and smaller specimens. The localities are situated in the Davis Strait (station 32), in the Denmark Strait (stations 85, 86, and 98), north of Iceland, round the Faröe Islands and off the coast of Norway. The depths are from 30—318 fathoms.

Geogr. distr. The species was hitherto only known from the Shetland Islands (Bowerbank).

4. **M. brunnea** Arm. Hans.

Pl. IV, Fig. 11. Pl. XIV, Fig. 6 a—h.

1885. *Myxilla brunnea* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 12, Pl. III, fig. 1 d, Pl. VI, fig. 5.

Erect, more or less irregularly leaf-shaped, sometimes lobed or in other ways irregular. The surface grooved or curly, not shaggy, or only imperceptibly so. The dermal membrane a rather thin film, supported by penicillate bundles of dermal spicules, and in some places with horizontal spicules. The skeleton a somewhat irregular, chiefly polyspicular network with quadrangular or irregular meshes; primary longitudinal fibres are found running up through the sponge and bending towards the surface. Spicula: Megasclera: the skeletal spicules acanthostyli and acanthostrongyla 0·238—0·38^{mm}, the dermal spicules tornota with two- to four-pointed ends 0·20—0·26^{mm}; microsclera two forms of ancoræ spatuliferæ, large ones 0·053—0·064^{mm}, small ones 0·027—0·034^{mm}.

This species is erect, and is more or less, but often very indistinctly leaf-shaped. It is attached below; the specimens that have not been torn off from the underlayer, are attached to shells, Balanæ or stones. The most regular specimens are quite leaf-shaped, and are at the base narrowed to a quite short stalk. Of this form we have one specimen, 95^{mm} high, 65^{mm} broad, and ca. 5^{mm} thick. Then we have some specimens that are more irregular, the leaf being thicker and more irregularly lobed, and the form of a leaf may be quite effaced. These specimens, which appear to have been attached with a broad base, are 40—75^{mm} high and of similar breadths. A few smaller specimens are more ramiform. Finally we have a specimen attached to a stone, which from a lower lobed part passes above into two lobes forming together an open, bilobate calyx. The consistency is little elastic and rather brittle; the thin leaves are more flexible. For some of the specimens taken by the Ingolf, the colour of the fresh sponge is stated to have been dark orange; in spirit all the specimens have a dark brown to almost quite black colour; only very few ones are of a lighter shade. When cut through they show a lighter colour inside. The *surface* is highly grooved or curly; for, the sponge being traversed by a number of horizontal canals, the dermal membrane forms over their mouths sunk grooves, separated by curly or sinuous ridges. The surface is otherwise smooth, or finely, almost imperceptibly shaggy from projecting dermal spicules. The *dermal membrane* is a rather thin, but tolerably solid and easily separable film, partly supported by penicillate bundles of spicules, partly provided with scattered spicules. The *pores* are, as usual, lying in the dermal membrane, sometimes scattered, sometimes very close-set; they are round or oval, but in places where they are close-lying often of an irregular form. They were measured to about 0·029—0·23^{mm}. The question as to the *oscula* is not easily decided. A great number of canal-mouths are seen in the surface, but many of these apertures have evidently their origin from the fact that the dermal membrane is damaged, either torn over the canals, or quite wanting, and it is impossible in each single case to decide, whether damaging has taken place. Where, however, the membrane is preserved to any greater extent, circular openings of a diameter of about 0·5mm are found in it, also a few smaller ones, and these openings must be regarded as oscula. In the thicker, irregularly leaf-shaped specimens a few wide perpendicular canals are also often found, opening in the edge; but I am not quite sure, whether the question is here of real oscular canals, or they are secondary canals arisen by coalescing. In the membrane coating these canals, dermal spicules are found and also pore-shaped openings; this, however, does not exclude the fact that they may belong to the original canal system, and, on the other hand, in undamaged specimens their mouths are surrounded by the dermal membrane as a round, sharply bounded opening. I therefore regard it as probable that the question is of oscula, and the fact is then that the small oscula on the surfaces lead to the smaller, horizontal canals, while the oscula found in the edge are larger and lead to longer perpendicular canals which pass down through the thicker parts of the irregularly leaf-shaped sponge.

The *skeleton*. The *dermal skeleton*, as mentioned above, consists chiefly of bundles of dermal spicules, which are spread in a somewhat penicillate way and support the dermal membrane, and, but only to a slight degree, pierce it. This skeleton is otherwise little regular, the bundles are most frequently more or less recumbent, often quite so, and scattered spicules may also be found in the membrane; in some places the skeleton may be formed entirely of horizontal, scattered spicules, which seems especially to be the case in places where no pores are found. The ridges of the surface are often seen to be more spined, which is then owing to the fact that the spicules of the skeleton itself here project through the dermal membrane; I suppose, however, that this feature is often due to damaging. Tornotes are not found in the membranes of the canals, except in those of the above mentioned larger longitudinal canals. The *main skeleton* is a somewhat irregular, mostly polyspicular network. The meshes are mainly quadrangular or rectangular, but may also be more irregular. The skeleton has otherwise a similar structure as in many leaf-shaped Renieræ and Chalininæ, longitudinal fibres being found running from the base up through the sponge, and bending to all sides towards the surface, accordingly as well towards the two sides as towards the edges. Where the skeleton is most regular, these fibres are running parallelly with a distance between them of about one spicule; the connecting transverse spicules may be placed perpendicularly on the longitudinal fibres or more or less irregularly, and with greater or smaller distance between them, but long secondary fibres are not found. The longitudinal fibres may reach a thickness of up to 0·15mm, and have a considerable number of spicules alongside; the transverse fibres, on the other hand, are single spicules or bundles of only few spicules. Often the skeleton seems to be somewhat less regular. Spongin is distinctly present in the nodes of the skeleton, but it is very clear; also in the longitudinal fibres it is found rather copiously.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli and acanthostrongyla mixed in about equal numbers; they are straight or most frequently slightly curved with the curve nearest to the basal end. The spinulation may be somewhat varying, sometimes it is rather dense, sometimes more scattered, and almost quite smooth needles may be found singly. The spines are most frequently rather coarse; at the upper end they are a little more close-set and generally somewhat larger. The styli have a sharp, middle long to rather long, point, which is oftenest smooth through its whole extent. The strongyla are distinctly seen to be monactinal, being always broader at one end than at the other, so that a distinction is always found between a basal end and an apical end corresponding to the point; they are otherwise of the same form as the styli, but are spined throughout their length, and the spines are generally more close-set, not only at the basal end, but also at the apical one. Although styli and strongyla are certainly nothing but modifications of the same form of spicule, which is also seen by the fact that the strongyla seem upon the whole to be a little shorter than the styli, no transitional forms, or, at all events, only very few ones, are found between them. The length, which may be given collectively for styli and strongyla, varies from 0·238 – 0·38mm, and the thickness from ca. 0·012 –0·021mm, the longest ones being far from always the thickest ones. Developmental forms were found, but only in very slight numbers; these forms were always long pointed, and consequently I suppose the strongyla to begin as styli. The developmental forms are finely, a little ruggedly spined, and they show not rarely a head-swelling. 2. The dermal spicules are tornota; they are straight, cylindrical, often quite slightly fusiform. Their ends are slightly swollen, about pear-shaped, with the end turned outwards; they have a similar structure as in *rosaceæ*, being cut off and having, as far as could be discerned, two to four small points. This form of the ends is, however, much less conspicuous here than in *rosacea*, and it is only to be seen distinctly under high magnifying powers. The two ends of the tornotes are not equal, one being a little thicker than the other. Their length is 0·20—0·29mm, and the thickness is 0·004—0·007mm. Developmental forms were seen in small numbers, the finest ones are styli with one end pointed; by and by they get their final form. b. *Microsclera* are isancoræ spatuliferæ of two forms, larger and smaller ones. 1. The large ancoræ are mainly similar to the ancoræ in *fimbriata;* they have an evenly curved shaft and distinct, rather broad alæ a little longer than the teeth. The alæ approach each other closely and are very often connected by a narrow rim along the middle of the shaft as in *rosacea*. The ancoræ may be somewhat varying in form especially with regard to the length of the terminal parts in proportion to the total length, and accordingly with regard to the length of the teeth, the ends of which may thus approach each other more or less. Their length is 0·053—0·064mm, and the thickness of the shaft 0·005–0·007mm. 2. The small ancoræ are more slender, the shaft may be a little more or less curved, the terminal parts are comparatively longer, so that the teeth approach rather closely in the middle; the teeth are leaf-shaped and most narrow at the place of attachment. Also in this ancora the alæ approach closely or are connected in the middle by a rim. Their length is 0·027—0·034mm, and the thickness of the shaft is about 0·0014—0·002mm. Developmental forms of both ancoræ occur at all stages. The ancoræ are found throughout the sponge and especially in the dermal membrane, often very abundantly; the small ancoræ are far more numerous than the large ones. — Some difference as to the size of the spicules may be found in different individuals; a specimen from the Davis Strait had spicules still a little larger than the given measures, its skeletal spicules reaching 0·44mm, the dermal spicules 0·35mm, and the large ancoræ 0·069mm, while, on the other hand, the small ancoræ did not exceed the given measures.

Embryos. In some individuals embryos were found; they are scattered in the tissue, are globular, and of an average diameter of 0·3mm. Of spicules the examined specimens had both megascleres and microscleres. The megascleres are straight, rather coarsely spined subtylostyli of an average length of 0·11mm and a thickness of 0·0057mm. Of microscleres only the small ancora was found, it was of normal size. The megascleres were lying in a bundle, all with the head-end turned the same way towards the periphery. The specimens in question had been obtained in the beginning of August.

As I have had one of Armauer Hansen's type specimens for examination, I have been able to identify the species with certainty. The species is rather interesting, and it seems to be closely allied to the *Damiria Prouhoi* established by Topsent (Arch. de zool. exp. et gén. 1892, Sér. 2, X XXII); the exterior form of this latter species is a similar one, it has also a mixture of styli and strongyla, and its colour, finally, is also orange and gets black in spirit.

Locality: Station 9, 64° 18′ Lat. N., 27° 00′ Long. W., depth 295 fathoms; station 10, 64° 24′ Lat. N., 28° 50′ Long. W., depth 788 fathoms; station 89, 64° 45′ Lat. N., 27° 20′ Long. W., depth 310 fathoms; station 127, 66° 33′ Lat. N., 20° 05′ Long. W., depth 44 fathoms; it has further been taken at 65° 27′ Lat. N., 54° 45′ Long. W., depth 67 fathoms (Wandel), and 64° 27′ Lat. N., 13° 27′ Long. W., depth 84 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). Altogether ca. 12 specimens and some fragments. The mentioned localities are situated in the Davis Strait, the Denmark Strait, and north and east of Iceland.

Geogr. distr. The species has hitherto only been taken by the Norwegian North-Atlantic Expedition, station 275, 74° 08′ Lat. N., 31° 12′ Long. E., depth 147 fathoms. For this locality is stated a bottom temperature of ÷ 0°4 C., whereas all the other localities from which I have it are positive ones with bottom temperatures from 3°5—8°4 C. The locality of the Norwegian North-Atlantic Expedition, however, is situated at the very border between the cold and the warm area, and its depth is rather small, so that the species surely does not belong to the cold water, but is a native of the warm area.

5. M. perspinosa n. sp.

Pl. V, Fig. 1. Pl. XIV, Fig. 7 a—e.

The form lumpy, slightly lobed. The surface folded, not shaggy. The dermal membrane thin, supported by recumbent bundles of dermal spicules, in places with horizontal spicules. The skeleton a diffuse network of spicules and spicula-bundles, a few longer fibres are found. Spicula: Megasclera: the skeletal spicules strongly spined acanthostyli 0·14—0·208^{mm}, the dermal spicules tornota with slightly spined, sometimes smooth ends 0·13—0·178^{mm}; microsclera of two forms, ancoræ spatuliferæ 0·018—0·03[illegible]^{mm}, sigmata 0·018—0·024^{mm}.

This species is of an irregularly lumpy, slightly lobate form; the two specimens in hand are attached to Hydroids, one of them together with a small specimen of *Halichondria panicea* of a similar form. One specimen has a greatest extent of 35^{mm}, the other of hardly 20^{mm}. The colour (in spirit) is a dirty gray. The consistency is slightly elastic. The *surface* has more or less deep, irregular grooves or folds, otherwise it is apparently smooth. The *dermal membrane* is a very thin film, partly supported by somewhat projecting, but highly recumbent fibres and bundles of dermal spicules, partly in places provided with horizontal, scattered spicules. *Pores* are found in some places of the surface in dense groups, they were measured to a diameter of up to 0·06^{mm}. *Oscula* were not found.

The *skeleton.* The *dermal skeleton* consists in most places of bundles of tornotes, which support the membrane, but are generally more or less recumbent, most frequently highly so. In other places the tornotes seem to be quite horizontal and often scattered in the membrane. The *main skeleton* of this species, as far as I have been able to decide from the slight material, is only little differentiated. It consists of a rather dense, but diffuse framework of spicula-bundles and spicules, and no real network, or, at all events, only a quite irregular one is formed. In the skeleton rather long and thick, but loose fibres occur, but they have also a quite irregular course; these fibres, in which many spicules are found alongside, reach a thickness of up to 0·12^{mm}. Spongin, no doubt, is present, but only to a very slight degree.

Spicula: a. *Megasclera.* 1. The skeletal spicules are straight or slightly curved acanthostyli with an even and rather long point; the spinulation is powerful, the length of the spines being generally more than half the diameter of the needle. Generally they are gathered closely at the head-end and continue over the tapering almost to the very point. Their length varies from 0·14—0·208^{mm}, and the thickness from 0·004—0·007^{mm}. Quite few fine developmental forms were seen. 2. The dermal spicules are tornota; they are straight or a little irregularly curved; they are otherwise of a similar form as in *incrustans*, but the ends are sharper and more lanceolately pointed; a slight narrowing is almost always found below the end. The points are exceedingly slightly and finely spined, sometimes smooth. In the fully developed tornotes the ends are equal or about equal. Their length is 0·13—0·178^{mm}, and the thickness varies from ca. 0·0035—0·005^{mm}. b. *Microsclera;* these are of two forms, three-toothed isancoræ spatuliferæ and sigmata. 1. The ancoræ are of the same type and of a similar form as the small ancoræ of the preceding species; they have an evenly curved shaft, and three leaf-shaped teeth and a narrow ala at either end. Their length varies from 0·018—0·030^{mm}, and the thickness of the shaft is 0·0014—0·002^{mm}. 2. Sigmata are small, of the common form, and more or less contort; they are characteristic by their highly recurved ends. Their length is 0·018—0·024^{mm}, and the thickness is 0·0007—0·0014^{mm}. The ancoræ are especially found in the dermal membrane, but they are otherwise only present in small numbers, sigmata occur far more frequently.

Locality: Faskrudsfjord in Iceland, depth between 20 and 50 fathoms (Hörring), one specimen; Jan Mayen, depth 50—60 fathoms (The Amdrup-Expedition), one specimen.

6. **M. pedunculata** n. sp.

Pl. V, Fig. 2. Pl. XV, Fig. 1 a—d.

Club-shaped, stalked. The surface slightly shaggy. The dermal membrane thin, supported by bundles of dermal spicules, and in places with horizontal spicules. The skeleton consists of polyspicular primary longitudinal fibres connected by irregular transverse spicula-bundles and spicules. Spicula: Megasclera: the skeletal spicules smooth styli 0·30—0·50^{mm}, the dermal spicules tornota 0·238—0·34^{mm}; microsclera of one form, ancoræ spatuliferæ 0·054—0·060^{mm}.

This species is of a somewhat club-shaped form; below it has a rather short stalk attached by a small basal expansion; above it passes into a thicker part which in the best preserved specimen is somewhat triangular and slightly compressed. This specimen has a height of 22^{mm}, and a thickness above of 10^{mm}, the stalk is about 5^{mm} long and 1^{mm} thick. The smallest specimen is about 10^{mm} high; it is more evenly club-shaped without any marked stalk. Of the specimens one is attached to a stone, the two others to living specimens of an *Arca*-species. The colour (in spirit) is light brownish. The consistency is rather soft, but somewhat elastic. The *surface*, as far as I have been able to observe, is slightly shaggy when undamaged; in many places in the specimens in hand it is more shaggy, the ends of primary fibres projecting, but this, I think, is only due to damaging. The *dermal membrane* is a thin film, mostly supported by bundles of dermal spicules. *Pores* and *oscula* were not observed.

The *skeleton*. The *dermal skeleton*, as far as I have been able to see, consists of bundles or short fibres of dermal spicules, issuing from the skeleton and supporting the dermal membrane; this membrane, however, has also in places horizontal, scattered spicules, and, besides, it is highly filled with microscleres. The primary fibres of the skeleton pass perhaps also in places quite to the surface. The *main skeleton* consists of primary longitudinal fibres, passing from the stalk up through the sponge, branching and bending to all sides towards the surface. These fibres are polyspicular and powerful, and in the lower part of the sponge, above the stalk, they may be 0·25^{mm} thick; upward and outward they become thinner. Regular secondary fibres are not formed, but between the longitudinal fibres are found partly transverse spicula-bundles, partly single transverse spicules, placed more or less irregularly. A distinct, but clear and little conspicuous mass of spongin is found. It is especially visible in the nodes, but it may also often be seen to coat the longitudinal fibres with a very thin layer. Down in the stalk the spongin is more copious and of a yellowish colour.

Spicula: a. *Megasclera*. 1. The skeletal spicules are smooth styli; they are somewhat curved, most frequently nearest to the head-end, more rarely they are straight. They taper evenly to an about middle long point. Their length varies from 0·36—0·50^{mm}, and the thickness is in proportion 0·014—0·021^{mm}. Quite few finer developmental forms were seen. 2. The dermal spicules are tornota; they are cylindric and straight, or more rarely quite slightly curved. In the form of their ends they are most similar to the tornota in *M. fimbriata*, the ends being rather stubby, but with a little mucro at the apex. Generally one end is a little thicker than the other. Their length is 0·238—0·34^{mm}, and the thickness is 0·007—0·008^{mm}. Developmental forms with one end quite pointed were found quite singly. b. *Microsclera*: these are of only one form, three-toothed isancoræ spatuliferæ. These ancoræ are of a similar form as the large ancoræ in the preceding species; the teeth are most frequently broadly rounded at the end, and narrow alæ are found of the same length as the teeth. The length of the ancoræ is between 0·054 and 0·066^{mm}, and the thickness of the shaft is ca. 0·005—0·007^{mm}. The ancoræ occur throughout the tissue, but are especially numerous in the dermal membrane.

Embryos. In one specimen embryos were found; they were scattered in the tissue and were easily distinguished by their dark, yellowish red colour. They are globular, of an average diameter of 0·26^{mm}. Most of the specimens examined showed no spicules, or only a few small styli which would thus seem to be first appearing. One of the embryos, on the other hand, had both megascleres and microscleres. The megascleres are small subtylostyli, they are not smooth, but spined or rugged. The microscleres were developmental forms of the ancora, they were smaller than in the developed sponge, only ca. 0·035^{mm} long. The specimen in question was obtained towards the close of July.

Locality: Station 2, 63° 04' Lat. N., 8° 21' Long. W., depth 262 fathoms, one fragment; station 110, 70° 05' Lat. N., 8° 26' Long. W., depth 371 fathoms (bottom temperature ÷ 0·4 C.), two specimens. Of the localities one is situated south of Jan Mayen, the other between Iceland and the Faröe Islands.

I suppose that the species must be regarded as a native of the cold bottom; station 2, to be sure, shows a temperature of 5.3 C., but this station is situated on the Iceland-Faröe ridge, and here, I think, the circumstances may be changing.

Note. Topsent, in 1904 (Résultats des Campagn. sc. du Prince de Monaco, Fasc. XXV, 174, Pl. III, fig. 5, Pl. XIV, fig. 17, Pl. XVIII, fig. 2), has established a genus, *Stelodoryx* with the species *procera*: this species has an exterior and a skeletal structure quite similar to that of *pedunculata*, its microsclera are ancoræ with five teeth at either end. Topsent says that it is related to *Lissodendoryx* by its smooth skeletal spicules, but deviates by its skeletal structure, which latter fact is his principal character for the establishing of the genus. On this character, however, the genus surely cannot be maintained, and as the species has ancoræ, it belongs to *Myxilla*. It seems, by its five-toothed ancoræ, to be closely allied to the following two species, *diversiancorata* and *pluridentata*, of which *diversiancorata* seems to be closely allied to it also by its form and skeletal structure.

7. M. diversiancorata n. sp.

Pl. V, Fig. 3. Pl. XV, Fig. 2 a—i.

(Erect, stalked?). The surface slightly shaggy. The dermal membrane thin, supported by bundles of dermal spicules. The skeleton an irregular reticulation of polyspicular longitudinal fibres connected by scattered spicules and spicula-bundles. Spicula: Megasclera: the skeletal spicules smooth styli 0·38—0·62mm, the dermal spicules tornota 0·327—0·458mm; microsclera two forms of pluridentate ancoræ spatuliferæ, large ones with five, sometimes six to seven teeth 0·071—0·090mm, small ones with seven to eight teeth 0·0357—0·048mm.

Of this species we have only a very scanty material, viz. two specimens, both more or less damaged. The largest specimen has a somewhat irregular ovate form, and looks as having belonged to an erect sponge. It is broken below, and perhaps it has had a stalk. It has a height of 17mm and a greatest breadth of 11mm. The other specimen is a very small one, attached to the shell of a Brachiopod, and it is assuredly only a fragment. The colour (in spirit) is light brown. The consistency is rather soft and somewhat elastic. The *surface*, where it is undamaged, seems to be slightly shaggy. The *dermal membrane* is a thin film, which, as far as I have been able to see, is supported by more or less projecting bundles of dermal spicules. It is filled with microscleres to an exceedingly high degree. *Pores* and *oscula* were not seen.

The *skeleton*. The *dermal skeleton*, as before mentioned, seems to consist of spicula-bundles issuing from the skeleton and supporting the dermal membrane. The *main skeleton* consists of a rather irregular reticulation of polyspicular, but rather loose fibres. Longitudinal fibres occur, especially running up through the sponge and sending branches to the surface or bending out to the surface, but their course does not seem to be regular, as it is, for instance, in the preceding species. Transverse fibres are not formed, but bundles of spicules or single spicules are irregularly scattered between the longitudinal fibres. Spongin is found in the fibres, but being little copious and exceedingly white and clear it is only to be observed with difficulty; it is most distinctly seen in the nodes.

Spicula: a. *Megasclera*. 1. The skeletal spicules are smooth styli, somewhat curved, almost always nearest to the rounded end; the point may be somewhat varying, but is upon the whole middle long or rather long; sometimes it is abruptly more shortly pointed at the very point itself. Their length is $0{\cdot}38-0{\cdot}62^{\mathrm{mm}}$, and the thickness is proportionately $0{\cdot}012-0{\cdot}021^{\mathrm{mm}}$. The smaller sizes are little frequent. Developmental forms occurred in small numbers, the finer ones were slightly rugged. 2. The dermal spicules are tornota; they are cylindric and straight, or slightly, not rarely somewhat irregularly, curved; the ends are shortly and bluntly pointed with a little outer point marked off especially. One end is always a little thicker than the other, and this latter is generally a little longer pointed. Their length varies from $0{\cdot}327-0{\cdot}458^{\mathrm{mm}}$, and the thickness is ca. $0{\cdot}006-0{\cdot}01^{\mathrm{mm}}$. Very few finer forms occurred, the thin ends of which were quite pointed, and accordingly they were styli. b. *Microsclera:* these are two forms of pluridentate isancoræ spatuliferæ, larger and smaller ones. 1. The large ancoræ are of a very beautiful form; the shaft is slightly curved, and they have at either end five lanceolate teeth and a pair of narrow alæ of about the same length as the teeth. The teeth are placed in such a way, that a transverse section of the ancora through the teeth is about circular. Ancoræ with six or seven teeth, or with six or seven teeth at one end and five at the other end occur singly. Not rarely the ancoræ are a little twisted, so that the teeth of one end are situated opposite to the intervals at the other end. Their length is $0{\cdot}071-0{\cdot}099^{\mathrm{mm}}$, and the thickness of the shaft is $0{\cdot}0057-0{\cdot}0080^{\mathrm{mm}}$. Developmental forms of this ancora at all stages occurred frequently. The youngest ones are quite fine, and look as if they had at either end a single, median, hook-like recurving, so that it might be supposed that the median tooth was the one first formed. By a closer examination, however, a couple of ridges are seen at the end of the shaft, which are surely beginning teeth, but on account of the smallness and fineness of the parts it is a very difficult thing to get a clear view of the exact structure of the end of the finest stages; soon after, in stages a little older, all five teeth are seen as thin, plate-shaped outgrowths, so that it may more nearly be said that falxes are first formed. 2. The small ancoræ are also of a highly beautiful form; they have an almost straight shaft, and seven to eight teeth and narrow alæ at either end. The alæ most frequently continue along the middle of the shaft as a narrow rim. The teeth are about parallel to each other and to the shaft, and they are very close-standing; they are so long as to be only little removed from each other in the middle. Most frequently the teeth are slightly curved, so that the ends are directed a little inward. The length is $0{\cdot}0357-0{\cdot}048^{\mathrm{mm}}$, and the thickness of the shaft is $0{\cdot}0028-0{\cdot}0035^{\mathrm{mm}}$. The large ancora occurs numerously, and in especially large numbers in the dermal membrane; the small ancora, on the other hand, is far less abundantly present.

Embryos. Some embryos were found scattered in the tissue; they are globular and of a size of up to $0{\cdot}3^{\mathrm{mm}}$. In the specimens examined no spicules were found.

Locality: Station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; station 80, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms. Both stations are situated in the Denmark Strait.

8. M. pluridentata n. sp.

Pl. V, Fig. 4. Pl. XV, Fig. 3 a—e.

Cushion-shaped. The surface slightly shaggy. The dermal membrane thin, with penicillate bundles of dermal spicules. The skeleton an irregular, polyspicular reticulation. Spicules: Megasclera: the skeletal *spicules smooth styli 0·32—0·50 mm, the dermal spicules strongyla or subtylota, most frequently with slight spines at the ends, 0·220—0·32 mm; microsclera of one form, ancoræ spatuliferæ with five to seven teeth 0·071—0·007 mm.*

Of this species we have no great material either, only three specimens; two of them are entire ones; they are cushion-shaped and are attached with a broad base. One of these specimens, however, is torn off, the other is attached to a calcareous alga. One specimen has an extent of 20 mm, and a thickness of 9 mm, the other is a trifle smaller. The third specimen is the largest one; it is a much damaged fragment and consists chiefly of the part that has been nearest the underlayer; it has an extent of 25 mm, its form would also indicate that the whole sponge has been cushion-shaped. Also this specimen is torn off from the underlayer, but both the torn off specimens show on their basal surfaces pebbles and remnants of Bryozoa. The colour (in spirit) is brown. The consistency is rather firm. The *surface* seems in undamaged places to be slightly shaggy. The *dermal membrane* is a very thin film. *Pores* are found in the membrane, in places very close; they vary in size from quite fine apertures to a diameter of ca. 0·21 mm. *Oscula* were not seen.

The *skeleton*. The *dermal skeleton*, as far as I have been able to decide from the slight material, consists of bundles of dermal spicules spread in a more or less penicillate way; they project from the skeleton below and are erect or more or less recumbent, and spicules are also seen in small numbers lying horizontally in the membrane. In places the dermal skeleton seems to be less developed, and here the fibres of the main skeleton seem to project, but this feature is perhaps due to damaging or contraction. The *main skeleton* is a rather dense, but irregular reticulation of polyspicular fibres. Most markedly occur fibres that have a tolerably distinct course towards the surface, and these fibres are the thickest ones with many spicules alongside, but they have no regular course. Between them short fibres and spicula bundles are found placed quite irregularly, so that a network is formed, irregular in most places, and in it, moreover, many single spicules are found. A distinct mass of spongin is found in the fibres, and in the nodes it becomes rather copious.

Spicula: a. *Megasclera.* 1. The skeletal spicules are smooth styli somewhat curved, most frequently nearest to the head-end; sometimes they are a little irregularly curved. The point is rather short, at most middle long; it may, otherwise, be somewhat varying, sometimes the style tapers evenly and the outermost point is short, sometimes, on the other hand, the point may be of a rather considerable length, and in both cases it may be bounded by straight lines; in other cases the shorter or longer point may be distinctly marked off. The length of the styli is 0·32—0·50 mm, and the thickness is ca. 0·009—0·019 mm. Length and thickness are often in no absolute proportion to each other, long, but rather thin styli being especially often seen. Developmental forms occur in small numbers, they are not rugged. 2. The dermal spicules vary between strongyla and subtylota. They are cylindric and straight or slightly curved. The form of the ends is somewhat varying; sometimes they are simply rounded or bluntly pointed and not swollen or only slightly so; they may be smooth, but they have most frequently a few fine spines. Frequently, however, they are somewhat swollen, from almost imperceptibly to very distinctly so, and with broadly rounded or almost cut off ends, where they have more or less distinct spines; frequently the swelling is also slightly ribbed. Generally one end is distinctly thicker than the other, and the finer they are, the more conspicuous is this feature. Monstrous forms with several swellings are not unfrequently found. Their length varies from 0·226—0·32^mm, and the thickness from 0·005—0·010^mm. b. *Microsclera:* these are of one form, pluridentate isancoræ spatuliferæ; they remind of the ancoræ of the preceding species, but are more slender; the shaft is somewhat curved, either evenly, or, what is frequently the case, with a somewhat sharper bend in the middle. At either end is found a number of teeth which seems most frequently to be five, but may also be six or seven, and the number may be different at each end; otherwise some irregularity is found in the construction, the teeth may be of different length, often in such a way, that the lateral teeth are the longest, but also often in a quite irregular way. A narrow ala is found at each end, also often showing some irregularity; it continues generally as a quite narrow rim along the middle of the shaft. The length of the ancoræ varies from 0·071—0·097^mm, and the thickness of the shaft is 0·0042—0·0057^mm. The ancoræ are found throughout the sponge, but are not especially seen in the dermal membrane.

Locality: The Ingolf, station 127, north of Iceland, 66° 33' Lat. N., 20° 05' Long. W., depth 44 fathoms; the Bay of Skagestrand in Iceland, depth 33 fathoms (Ditlevsen); Axarfjord, depth 20 fathoms (H. M. S. Beskytteren Otterstrom). Three specimens in all.

Note. The present species and the preceding one are closely allied to each other, and at first I was inclined to regard them as one species; it is, however, chiefly the occurrence of the peculiar pluridentate ancoræ, by which they become so closely allied, while other characters, which are quite constant in the material in hand, separate them from each other. These characters are especially the occurrence of the two different ancoræ in one species, while in the other only one form occurs, the marked difference in the form of the dermal spicules, and the difference in the skeletal structure.

Of *Myxilla*-species with pluridentate ancoræ two have hitherto been described, viz. the *Stylodoryx procera* Tops. with five-toothed ancoræ[1]) mentioned before under *pedunculata*, and the *Dendoryx dentata* described in the same place (172, Pl. XIV, fig. 19) with ancoræ with five to six teeth at either end; both species are *Myxilla*-species.

Of the *Dendoryx pectinata* with peculiar ten-toothed ancoræ established by Topsent in 1892, on the other hand, I dare say nothing with certainty; the species might perhaps be an *Iotrochota*-species without birotulæ.

Lissodendoryx Tops. (emend.).

The exterior passes through all forms, from incrustations through massive, often more or less lobed forms, to erect, club-shaped, or finally digitate or richly branched forms. The skeleton is somewhat dependent on the form: it may be a diffuse and quite irregular polyspicular reticulation, in the massive forms longer fibres may be found, in the branched forms distinct primary longitudinal fibres may occur, and it may finally be of dendritic type. Spongin is present more or less copiously. Spicules: Megasclera: the skeletal spicules are smooth or spined styli, the dermal spicules are diactinal, tornota, tylota, strongyla,

1) Perhaps two species may be hidden under this one, Topsent mentioning a specimen with considerably larger megascleres and with ancoræ with five to six teeth.

or similar forms, sometimes with spined ends: microsclera are chelæ arcuatæ of one or more forms, and often sigmata.

The genus *Lissodendoryx* was established by Topsent, first in 1892 (Résultats des campagn. scient. du Prince de Monaco, Fasc. II, 97), as a subgenus of *Dendoryx* (= *Myxilla*), and later, in 1894 (Mém. de la Soc. zool. de Fr. VII, 35) raised to an independent genus. The typical species was *L. leptoderma* Tops. The species first described among those belonging to *Lissodendoryx* seems, as stated by Topsent, to be *L. isodictyalis* Cart., described by the author under *Halichondria*. Later, Topsent (Rev. Suisse de Zool. IV, 1897, 457) has described a species from Amboina, which he identifies with *isodictyalis* Cart., and at the same time he identifies his own *leptoderma* with this species; according to this, *isodictyalis* Cart. would become the type. Thiele (Studien über pazif. Spong., Zoologica, Heft 24, II, 1899, 18, Taf. V, Fig. 10) thinks, however, that Topsent's species from Amboina is not identical with *isodictyalis* Cart., and gives it the name of *similis*: at the same time he says that he cannot decide with which of the two species *leptoderma* may possibly be identical. Accordingly *leptoderma* must still for the present be regarded as the type of the genus.

The character by which Topsent distinguished the genus from his *Dendoryx*, was exclusively the smooth styli in contradistinction to the spined ones in *Dendoryx*. This character is a very untenable one, as species are found with scarcely perceptible spinulation, and Topsent himself admits also this fact. Instances of such species are *firma* Lambe, with styli with scarcely perceptible spinulation, and the species *fragilis* Frstdt. and *indistincta* Frstdt., to be treated hereafter, which have slightly spinulous to quite smooth styli. An even transition is in reality found from species with strongly spined styli to such ones where the styli are quite smooth. According to this the genus therefore would scarcely be maintainable. There is, however, another character which sharply separates the species of the genus *Dendoryx* (or *Myxilla*, as it ought now to be called) into two groups, whether they have smooth or spined styli; the fact being that in some species ancoræ occur, in others chelæ arcuatæ (see the account of these spicules in the introduction). This character is a quite sharp one without transitions of any kind, and in my opinion great stress may be laid on it for systematic purposes. As *L. leptoderma* Tops. is a species with arcuate chelæ, the genus containing species with these chelæ will accordingly get the name *Lissodendoryx*, while in the genus *Myxilla*, with the typical species *rosacea* Lieberk. only species with ancoræ remain.

The name of *Lissodendoryx* is not exactly a good one by the new limitation of the genus, but it cannot be rejected. Otherwise the fact seems to be that most *Myxilla*-species have spined styli, and most *Lissodendoryx*-species smooth ones.

1. **L. lobosa** n. sp.

Pl. V, Fig. 5. Pl. XV, Fig. 4 a—c.

Erect, irregularly lobed-branched. The dermal membrane very thin. The skeleton a somewhat diffuse and irregular reticulation, chiefly of polyspicular fibres with single transverse spicules between them. Spicula: Megasclera: the skeletal spicules acanthostyli with rather dense spinulation 0·31—0·369ᵐᵐ, the dermal spicules tylota 0·25—0·29ᵐᵐ; microsclera of one form, chelæ arcuatæ 0·038—0·044ᵐᵐ.

The two specimens in hand of this species have an erect, lobed-branched form. Below they are attached to shells of arenose Foraminifera. The few stubby and irregular lobes or branches issue from about the upper half. The height is 32^{mm}. The consistency is very soft and loose. The colour (in spirit) is a dirty grayish yellow. The *surface*, in the present state of the sponge, is shaggy from projecting spicules, but this seems partly to be owing to damaging; in the undamaged sponge I suppose it to be finely shaggy. The *dermal membrane* is a transparent and very thin film, but it is wanting to a great extent. *Pores* are found in the dermal membrane in the common way; they were seen from quite small ones to a diameter of $0·22^{mm}$. *Oscula* were not observed, which was perhaps due to the loose consistency and collapsed state of the sponge; as far as I was able to see, some large canals were running longitudinally through the branches and lobes, which canals probably run to the top, where the oscula should accordingly be found.

The *skeleton*. The *dermal skeleton* is formed by dermal spicules supporting the membrane. When a piece of the dermal membrane is seen from above, the spicules are seen to lie horizontally in it, partly scattered singly, partly in bundles here and there, but on account of the state of the material, I have not been able to observe the relation between the dermal skeleton and the main skeleton. I suppose that in the undamaged sponge more or less projecting bundles of dermal spicules are found. The *main skeleton* is a somewhat diffuse and irregular reticulation. Long polyspicular fibres are found, especially in the branches; they run longitudinally through the branches in a tolerably regular way, but are loose and not very conspicuous. Transverse fibres are not found between them, but only quite irregularly placed spicules, almost all of which are placed singly. Regular meshes, therefore, are not formed, and the whole skeletal net gives a rather irregular picture. The ends of the fibres bend towards the surface, or they give off short branches passing to the surface. Spongin is found in the nodes of the skeleton, but only to a very slight amount.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they have often a small head-swelling, so as to approach subtylostyli. They are evenly curved, often a little irregularly. They are evenly and middle long or rather long pointed, but the outermost point itself is most frequently short pointed. The spinulation may be somewhat varying, but is most frequently rather dense, and the spines are fine; they continue to the very point. The length is rather constant, from $0·31–0·366^{mm}$, and the thickness is ca. $0·008–0·012^{mm}$. Very few developmental forms were seen, the finest ones were already somewhat spined. 2. The dermal spicules are tylota; they are straight and have at either end a longish, rather slight swelling. Their size is rather constant, the length $0·25–0·20^{mm}$ and the thickness about $0·005^{mm}$. The two ends of the tylota are not quite equal, one end having a more distinct and more marked swelling than the other; this is owing to the fact that the shaft is not of equal thickness throughout the length, but tapers somewhat towards one end, and so the swelling of this end becomes more marked; this again is connected with the fact that the tylota are secondarily diactinal. b. *Microsclera:* these are of only one form, chelæ arcuatæ. The chelæ have a curved shaft, the curve of which is strongest in the middle, while the ends, on the other hand, are a little recurved. The tooth is elliptical and rather narrow, and of the same length as the alæ; the lower edge of the alæ is rather much indented, so that, when seen from the side, they have a somewhat tooth-like form. When the chela is seen from the side in a certain position, we shall often get a quite wrong impression of the alæ, as well in this as in many other arcuate chelæ, if it is not sufficiently magnified; the fact is that only the foremost, refolded edge is seen distinctly, and the ala seems to be more or less claw-shaped. When, on the other hand, the magnifying powers are sufficiently high, the contour of the ala is seen distinctly, as given in Fig. 4 c, Pl. XV. The length of the chela is 0·038—0·044^{mm}, and the thickness of the shaft is 0·0024—0·0050^{mm}; this variation of the thickness of the shaft is most dependent on the way in which the chela is seen, from the front or from the side, as the shaft is not cylindric, but rather much compressed. Developmental forms in different stages were seen in small numbers.

Locality: Station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms, a fragment; station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms, two specimens and a fragment. The stations are situated in the Denmark Strait and in the Davis Strait.

2. **L. Sophia** Frstdt.

Pl. V, Fig. 6. Pl. XV, Fig. 5.

1887. *Esperia Sophia* Fristedt, Vega Exp. vetensk. lakttag. IV, 451, Pl. 25, figs. 30—32.

Erect, leaf-shaped. The surface smooth. The dermal membrane a thin film, on the pore side supported by pillars of dermal spicules, but here without horizontal spicules, while on the oscular side it has only horizontal spicules. Oscula and pores each on their own side. The skeleton diffuse and quite irregular, formed by single spicules and loose bundles. Spicula: Megasclera: the skeletal spicules acanthostyli 0·44—0·518^{mm}, the dermal spicules strongyla with finely spined, sometimes smooth ends, 0·27—0·34^{mm}; microsclera of one form, chelæ arcuatæ 0·028—0·034^{mm}.

We have two somewhat damaged specimens of this species; both of them are erect and leaf-shaped; one specimen is seen to have been attached by its lower edge, which shows a surface of attachment; this surface occupies almost the whole breadth of the leaf, so that the sponge has not been narrowed to a stalk. Fristedt says of the species that it is "massive, probably thickly incrusting hard objects". Whether the question is here of the sponge forming below a basal expansion, or Fristedt has made a mistake in his interpretation, I am not able to decide. The largest of my specimens is 50^{mm} high, 80^{mm} broad, and ca. 11^{mm} thick. The consistency is middle hard and little elastic. The colour (in spirit) is dirtily brown. The *surface* is smooth, without projecting spicules. The *dermal membrane* is a thin, transparent film, supported by pillars of dermal spicules which do not project through it, or only to a very slight degree; on the pore side it is otherwise without spicules, while on the oscular side it has horizontal spicules. *Pores* and *oscula* belong each to their own side; the pores are closely gathered, so that the membrane gets a sieve-like appearance; they are generally of a circular form, and were measured of sizes from 0·035—0·15^{mm}. Pores may also be found on the oscular side. Oscula are found scattered and in rather small numbers on the opposite surface; they are only to be seen with difficulty, as the opening itself is not seen; the fact is that the membrane forms a quite low and almost not at all projecting spout or cone, at the top of which the lobate aperture is found. While the horizontal spicules of the membrane otherwise are scattered on the oscular side, they are here gathered to bands running to the top of the cone, and the cone being, as it were, a little twisted, the mentioned bands get a somewhat spiral course.

The *skeleton*. The *dermal skeleton*. In the dermal membrane of the pore side no horizontal spicules are found; the membrane of the oscular side, on the other hand, is provided with horizontal, scattered, rather close-lying dermal spicules; on the pore side the membrane is supported by more or less perpendicular pillars of dermal spicules; they spread in a penicillate way and support the membrane, but they do not pierce it, or almost not at all. These spicules support the membrane between the pores, and sometimes a few quite horizontal spicules may reach from them into the membrane. On the oscular side no pillars of dermal spicules are seen, but the membrane is resting on the main skeleton below, the styli of which may project a little here and there. When on the oscular side here and there a group of pores is found, the membrane is in this place constructed quite as on the pore side and is supported by pillars. The *main skeleton* is quite irregular; longer fibres are not found, and meshes are scarcely to be spoken of, as the spicules more particularly convey the impression of being irregularly scattered, their ends, however, are generally seen to meet. They are partly lying singly, partly in loose bundles of few spicules. In the nodes of the skeleton a distinct mass of spongin is found.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli; they are generally somewhat curved, and the curve is almost always situated near the head-end; they are evenly and rather long and finely pointed. The spinulation may be somewhat varying, but is generally rather scattered, and the spines are fine; they continue to the very point. At the head-end a few spines are placed more close together. It is especially in the upper two thirds of the style, below the closer placed spines of the head-end, that the spines are highly scattered, in the lower part they are generally again closer together. The spines of the lower part are frequently directed somewhat backwards. Their length is rather constant and is between 0·44 and 0·518^{mm}, and the thickness is 0·010—0·0128^{mm}. 2. The dermal spicules are strongyla; they are more or less curved, more rarely straight. Their ends, which may sometimes be very slightly swollen, are generally finely spined, but the spinulation may become almost indiscernible, and they may also be quite smooth. They are somewhat fusiform, being thickest in the middle. The two ends are not equal, one being always a little thicker than the other. Their length is 0·27—0·34^{mm}, the thickness is 0·007—0·010^{mm}. Quite few developmental forms were seen, they were distinctly monactinal and showed no spines. b. *Microsclera*: these are of only one form, chelæ arcuatæ; they resemble the chelæ of the preceding species, but are finer, and their terminal parts are not recurved. The tooth is elliptical, broadest below and of the same length as the alæ; the lower edge of the alæ is not much indented, and therefore they have no tooth-like appearance, in this respect the chelæ approach the palmate chelæ. The length is 0·028—0·034^{mm}, and the thickness of the shaft is ca. 0·002^{mm}. The chelæ are found throughout the sponge, but especially in the dermal membrane.

As I have examined a piece of Fristedt's type specimen, I have been able to identify the species with certainty. It seems to be closely allied to the preceding one, but all three forms of spicules show distinguishing characters.

Locality: 62° 11' Lat. N., 19° 36' Long. W., depth 1142 fathoms. (The cruise of the fishery investigation steamer "Thor", 1903).

Geogr. distr. Fristedt has the species from East Greenland, 65° 30' Lat. N., depth 130 fathoms.

3. **L. fragilis** Frstdt.

Pl. V, Figs. 7—8. Pl. XVI, Fig. 1 a—g.

1885. *Hastatus fragilis* Fristedt, Kgl. Sv. Vet. Akad. Handl. Bd. 21, Nr. 6, 35, Taf. III, Fig. 6 a—h.

The form somewhat varying, forming thick incrustations, or the sponge irregularly massive or erect, formed like an irregular, thick leaf. The surface grooved and finely shaggy. The dermal membrane a very thin film, in some places with erect bundles of dermal spicules, in other places with spicules horizontally in the membrane. Oscula scattered, or found only on one side. The skeleton an irregular, polyspicular reticulation of triangular, quadrangular, or polygonal meshes; in the leaf-shaped specimens longer fibres may be found. Spicula: Megasclera: the skeletal spicules very finely spined or smooth styli 0·29—0·40mm, the dermal spicules tornota 0·20—0·268mm; microsclera of two forms, chelæ arcuatæ 0·037—0·060mm, sigmata 0·018—0·025mm.

Of this species we have a rather large material, but it consists mostly of fragments or much damaged specimens. To judge from this material the species may vary somewhat with regard to its outer form. Sometimes it forms only an irregular, thick incrustation, but the larger specimens seem always to rise from the underlayer, growing upwards and assuming a more or less irregular leaf-shape. These leaf-shaped specimens are always rather thick. The specimens are attached to plate-shaped Bryozoa or have their bases expanded over bottom material of different sorts. The largest specimen which seems to be the lower part of a leaf-shaped individual, has a greatest extent of ca. 45mm, and a thickness of ca. 10mm; a rather regularly leaf-shaped fragment is of similar dimensions. Entire specimens of the sponge are evidently much larger. The massive specimens are smaller. The colour (in spirit) is a lighter or darker grayish yellow. The consistency is rather firm, but brittle and fragile, and this is surely the reason, why the specimens are in a so highly damaged condition. The *surface* is grooved, about as in *M. incrustans*, and it is finely shaggy from projecting spicules. The *dermal membrane* is a very thin and transparent film; it rests on the skeleton below, and is partly supported by this skeleton, partly by special dermal spicules. *Pores* are found in the membrane, often closely gathered, so that pore-sieves are formed. Their size was measured to 0·047—0·29mm. In the markedly leaf-shaped specimens the pores seem only to occur on one side, while oscula belong to the other side; in the irregular specimens, on the other hand, there is no definite localisation of oscula and pores. *Oscula* are seen as circular openings scattered on the side that has no pores; they are of an average size of 1—2mm. The sponge is set through very closely with canals running from one side to the other, not, however, running straight across, but sinuous and branched in different ways. Some of the largest of these canals open on the oscular side as oscula, and in the oscular canal a great many smaller canals are seen to open. When the dermal membrane is removed from the opposite side, a great many close-standing incurrent canals are here seen.

The *skeleton*. The *dermal skeleton* may be somewhat different in different places of the sponge;

in many places, especially, perhaps, where pore-sieves are found, there are penicillate bundles of dermal spicules supporting the dermal membrane. Along the edge of the pore areas they may become short fibres branching into the area among the pores, and then they are more or less, often quite recumbent in the membrane. They do not reach quite into the middle part of the area, and here the membrane is consequently without spicules. In other places dermal spicules are only found scattered in the skin, both singly and in bundles. In these last places the membrane is resting on the main skeleton below, the spicules of which project, and also where projecting bundles of dermal spicules are found, projecting skeletal spicules are seen in them The *main skeleton*, by far the greatest part of it, is a polyspicular, irregular, and rather close network. No distinction can be made between primary fibres and secondary ones; the meshes are triangular or quadrangular or quite irregular. The fibres, as mentioned, are most frequently polyspicular. but the meshes are also here and there bounded by single spicules. In the leaf-shaped specimens longer fibres may be found running in the longitudinal direction of the leaf, but else without any regularity. Otherwise, longer fibres are not found in the skeleton, and in the leaf-shaped specimens no fibres are found passing perpendicularly to the surface or spreading towards the surface in a penicillate way. Spongin is found in the nodes of the skeleton, but to a very slight amount; moreover, it is white and clear, and consequently only to be seen with difficulty.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they have a curve, most frequently a rather slight one, nearest to the rounded end, while the other part of the needle is straight or almost straight; more rarely the curve is more even through the whole length of the spicule, or it is irregular. The point is even and middle long. The styli may be slightly spined or smooth. In the spined ones the spines are only found in a short part at the upper end, and the spines are so small as only to make the surface finely gritty; a few scattered, also very small spines are often found farther down the styli. This slight spinulation may become quite minimal, and it may entirely disappear, so that the style becomes smooth. In the material in hand there are no instances of smooth and spined styli occurring in equal numbers; either all the styli are spined, and smooth ones occur only as exceptions, or the case is the reverse. The length varies from 0·29—0·40^{mm}, the smallest length occurring more rarely, and the thickness is ca. 0·011—0·017^{mm}, the longest ones being far from always the thickest ones. Some finer to quite fine developmental forms occur; they seem to be finely and dispersedly gritty from spines almost through their whole length, and this not only in the specimens that have almost no smooth styli, but also in those with almost exclusively smooth styli. The finest stages observed had a length of 0·26^{mm} with a thickness of only 0·0014^{mm}. 2. The dermal spicules are tornota; they are straight, only rarely a little irregularly curved. Their two ends are not equal, one is a little thicker, and it is rounded with a quite slight mucro, the other, on the other hand, forms a rather short point, so that the needle might be interpreted as a short-pointed style[1]). The length is 0·20—0·268^{mm}, and the thickness 0·003—0·005^{mm}. The finer these spicules are, the more marked is the difference between their two ends, and I have seen quite few fine developmental forms with the thin end rather long pointed. b. *Microsclera:* these are of two forms, chelæ arcuatæ and sigmata. 1. The chelæ have a curved shaft with the strongest curve in the middle;

[1]) The several compound terms (tornostrongyla etc.), which may often be used advantageously, are here, as often else, not sufficiently characteristic; the name that would best describe the present form should, I suppose, be »oxytornote«.

the tooth is most frequently elliptical, but may vary rather much in form, be more narrow or broader, and rounded or straight cut off at the end; it is of the same length as the alæ; the lower edge of these is somewhat indented, so that they get a tooth-like form, but they may be somewhat varying in form, as upon the whole the chela may vary rather much in appearance. In a few individuals peculiar deformities occurred rather frequently. The size of the chela is somewhat varying, the length is between 0·037—0·060^{mm}, the smallest ones occurring most rarely; the thickness of the shaft is ca. 0·005—0·007^{mm}, it is not cylindrical, but somewhat compressed. Developmental forms at different stages, the youngest ones quite fine, were seen in rather small numbers. 2. Sigmata are distinguished by being very fine; they are otherwise of the common form and more or less contort. Their length is 0·018—0·025^{mm}, they are so fine, that their thickness is only ca. 0·0007^{mm}. Both forms of the microsclera occur through the whole sponge and are rather frequent in the dermal membrane.

Remarks: Although I have not examined Fristedt's type specimen, I take the determination to be quite sure, as description, measures, and figures agree very well, thus especially the figure of the fine sigma. Fristedt does not mention that the styli may be finely spined, but this feature is easily overlooked, or he may have had a specimen with almost exclusively smooth styli. The specimen figured by Fristedt I suppose to be the lower part of a larger individual. The name *fragilis* is well adapted to the brittle consistency.

Locality: Station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; 66° 20′ Lat. N., 25° 12′ Long. W., depth 96 fathoms (Wandel); 62° 53′ Lat. N., 9° 06′ Long. W., depth 245 fathoms, 62° 26′ Lat. N., 4° 49′ Long. W., depth 228 fathoms, 62° 36′ Lat. N., 3° 21′ Long. E., depth 198 fathoms (Ad. Jensen, the cruise of the Michael Sars 1902); at the northern end of Nolso, depth ca. 100 fathoms (Th. Mortensen). The localities are situated in the Denmark Strait, round the Faröe Islands, and at the western coast of Norway.

Geogr. distr. The species is hitherto known from the Koster Islands at the coast of Bohuslän, depth 95 fathoms. It is thus distributed from the Denmark Strait to the coast of Bohuslän, and its bathymetrical range is from 95 to 245 fathoms.

4. **L. diversichela** n. sp.

Pl. V, Fig. 9. Pl. XVI, Fig. 2 a—h.

More or less irregularly thick leaf-shaped? The surface almost smooth. The dermal membrane a thin film supported by penicillate bundles of dermal spicules. The skeleton a polyspicular, irregular reticulation, forming triangular to quadrangular or irregular meshes, here and there longitudinal fibres. Spicula: Megasclera: the skeletal spicules rather densely spined acanthostyli 0·34—0·429^{mm}, the dermal spicules tornota 0·238—0·28^{mm}; microsclera of four forms, chelæ arcuatæ of three forms, large ones 0·047—0·071^{mm}, middle ones 0·018—0·028^{mm}, small ones of peculiar form, highly curved, 0·010—0·015^{mm}, sigmata 0·023—0·085^{mm}.

Of this species, which is interesting on account of its chelæ, we have only fragments, so that nothing definite can be said of its form. The largest specimen is of an erect, compressed, but somewhat irregular form (Pl. V, Fig. 9); a smaller fragment is likewise compressed. The form may, according to this, be taken to be more or less leaf-shaped, presumably with a broad base. The largest fragment has a height of 45^{mm} and a thickness in the leaf-shaped part of 8^{mm}. The colour (in spirit) is light yellowish. The consistency is rather firm, but brittle. The *surface* is almost smooth or only very slightly shaggy, and the shagginess is chiefly due to the large chelæ, lying closely in the membrane. The *dermal membrane* is a thin film, supported by bundles of dermal spicules. The *pores* are closely gathered in sieve-like areas, often so close as to be separated only by thin strings; their size was measured to $0.09—0.70^{mm}$. *Oscula* are circular openings of a diameter of ca. 2^{mm}. To judge from the material, the pores are situated on one side, and oscula on the other.

The *skeleton*. The *dermal skeleton* consists of bundles or short fibres of dermal spicules spread in a penicillate way; they issue from the skeleton below and reach mostly horizontally into the membrane. When a piece of skin is cut off and seen from above, the fibres are seen especially to issue from the edge of the subdermal cavities or the incurrent canals, over which the pore areas are found then they pass into the area and send off branches into the strings between the pores. Also on the oscular side the construction of the dermal skeleton is similar, the skin over the numerous canals that pass the sponge about transversely being also supported by short fibres. The membrane is, moreover, filled with chelæ, especially of the largest form. The *main skeleton* is chiefly constructed as in *fragilis*, and forms an irregular network of triangular, quadrangular, or polygonal irregular meshes. It is generally polyspicular with rather many (4—8) spicules alongside. No distinction can be made between primary and secondary fibres; here and there a little longer fibres may be found running in the longitudinal direction, but continuous fibres are otherwise not formed. When a section placed in xylole is examined, all the canals are distinctly seen, as the membranes coating these canals are highly filled with chelæ. Spongin is found in the skeleton, but it is white and clear, and only a very small amount is present.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli with rather dense spinulation. They are evenly and slightly curved, and have a middle long point, which is, for a greater or smaller part, without spines. Their length varies from $0.34—0.429^{mm}$, the shortest ones being rather rare; the thickness is ca. $0.0128—0.021^{mm}$. A few developmental forms were found, the finest ones, of a thickness of ca. 0.002^{mm}, were seen to be finely spined. 2. The dermal spicules are tornota; they are straight or, more rarely, a little irregularly curved. They resemble the tornota in *L. fragilis*, and one end is a little thicker than the other, which is somewhat longer pointed; in the finer forms this feature is most marked. Their length is $0.238—0.28^{mm}$, and the thickness $0.0047—0.0060^{mm}$. b. *Microsclera.* These are chelæ arcuatæ of three forms and sizes, and sigmata. 1. The large chelæ are very characteristic: their shaft is strongly curved, almost to a semicircle, and the terminal parts are relatively small; the tooth is short and stubby, and the likewise stubby alæ are of the same length as the tooth. Their size is somewhat varying, the length from $0.047—0.071^{mm}$, most frequently it is nearest the latter size; the thickness of the shaft is $0.0057—0.014^{mm}$; this variation in thickness is due to the fact that the shaft is not cylindrical, but somewhat flattened, and therefore a transverse section of it is elliptical. Of this chela some developmental forms were found; the younger these forms are, the more flattened is the shaft, so that it may be quite thin, almost band-shaped. A transverse section shows, however, that a thicker part is running through the middle of it, while the lateral parts are quite thin; then it becomes by degrees elliptical during the growth. In the youngest forms the alæ are only seen as a little more marked expansions at either end of the thin lateral parts. The very finest forms are cylindrical. 2. The chelæ of the middle form are considerably smaller; they have a rather highly curved shaft; the terminal parts are considerably larger than in the large ones, so that the free part of the shaft is only about one third or a little more. The tooth is rather narrow, the alæ are of the same length as the tooth, and their lower edge is indented, so that they have a somewhat tooth-like form when seen from the side. Their length is 0·018—0·028^{mm}, and the thickness of the shaft is ca. 0·0021—0·0028^{mm}. Quite singly chelæ are seen that seem to occupy a position midway between these chelæ and the preceding form. 3. The smallest chela is of a peculiar and very characteristic form. It is highly curved, and the terminal parts are so large, that the free middle part of the shaft is less than a third of the whole length; but when the chela is seen from the front, the terminal parts are, on account of the curving, seen a little from the end and therefore shortened, so that in a frontal figure the terminal parts and the free part of the shaft will be of about equal length. The tooth is narrow and shorter than the alæ, and their lower edge is almost not indented. The chela is very small, its length is 0·010—0·015^{mm}, and the thickness of the shaft is ca. 0·0010^{mm}. On account of the form of the alæ this chela approaches the palmate chelæ, but on account of its strong curving and the narrow teeth it is more properly referred to the arcuate chelæ. 4. Sigmata are of the common form, and are more or less contort, up to one fourth of a turning. They are very varying in size, the length from 0·023—0·085^{mm}, and the thickness proportionally from 0·001—0·003^{mm}. The microscleres occur throughout the sponge, especially in all membranes; the large chela, as mentioned, is particularly conspicuous both in the dermal membrane and in the membranes of the canals.

Locality: Station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms; station 85, 63° 21' Lat. N., 25° 21' Long. W., depth 170 fathoms; 62° 36' Lat. N., 3° 21' Long. E., depth 198 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). Four fragments in all. The localities are situated in the Denmark Strait and off the western coast of Norway.

5. **L. indistincta** Frstdt.

Pl. V, Fig. 10. Pl. XVI, Fig. 3 a—h.

1887. *Hastatus indistinctus* Fristedt, Vega Exp. vetensk. Iakttag. IV, 444, Pl. 25, figs. 13—19.

Massive, more or less lobate. The surface slightly grooved or smooth, very finely shaggy. The dermal membrane not especially thin, supported by erect or more or less recumbent bundles of dermal spicules. Oscula scattered, few. The skeleton an irregular, mostly polyspicular reticulation; longer fibres passing towards the surface may be found; sometimes the reticulation is more diffuse and unispicular. Spicula: Megasclera: the skeletal spicules slightly and dispersedly spined, sometimes smooth, styli 0·35—0·50^{mm}, the dermal spicules tornota or tornostrongyla 0·20—0·29^{mm}; microsclera of three forms, chelæ arcuatæ of two forms, large ones 0·018—0·044^{mm}, small peculiar ones 0·008—0·015^{mm}, sigmata 0·026—0·05^{mm}.

This species has chiefly a massive, more or less lobate form. It may grow expanded on the substratum, and from the expanded part, which grows to a considerable thickness, round projections or lobes may rise; but most frequently it seems, when rising, to assume a somewhat compressed form, always, however, forming some stubby lobes. Thus the roundlobed form is the most marked character of its exterior. The specimens in hand, none of which are quite entire, reach a rather considerable size; a specimen of a massive and more expanded form has a greatest extent of ca. 100^{mm}, and a greatest height of ca. 90^{mm}, the thickness of the expanded part is ca. 30^{mm}. The largest of the more erect and compressed specimens has a breadth of 125^{mm}, a thickness of ca. 40^{mm}, and a height of ca. 80^{mm}. Thus these specimens are considerably larger than that of Fristedt, which had a length of 40^{mm}, a breadth of 15^{mm}, and a thickness of 20^{mm}; according to these measures his specimen must have been of massive form. The colour (in spirit) is whitish yellow. The consistency is rather brittle and only little elastic. The *surface* is very slightly grooved; only here and there the grooves were a little deeper, in other places the surface is quite smooth. We have here in reality the same structure as in several *Myxilla*- and *Lissodendoryx*-species with grooves separated by ridges, only that here the grooves are very shallow or disappearing and the ridges little conspicuous[1]. The surface gets, however, a somewhat netlike appearance, the subdermal cavities situated under the grooves shining through with a darker colour. The surface is in most places very finely shaggy from projecting spicules. The *dermal membrane* is a somewhat transparent, not especially thin film. It is supported by bundles of dermal spicules, which may be highly recumbent. In most places, especially where pores are found, the membrane gets a peculiar appearance, about as mentioned under *M. incrustans*. The subdermal cavities, which shine darkly through the membrane, are here distinctly seen; sometimes they are somewhat roundish, sometimes more irregularly sinuous, and separated by the parts of tissue between the canals, which appear whitish. The darker areas over the subdermal cavities, however, are subdivided into smaller areas, fibres or parts of tissue stretching from the edges of the subdermal cavities below the suspended membrane. The pores are then situated in the areas that arise in this way. Therefore the sponge, as to its surface, is very similar to such specimens of *M. incrustans* as have a tolerably smooth surface. The *pores* are lying in groups in the mentioned areas of the dermal membrane, and thereby these areas become pore-sieves. The pores are round, or, when placed close together, irregularly polygonal; their size was measured to $0{\cdot}03$—$0{\cdot}23^{mm}$, sometimes they were still larger. *Oscula* are scattered and only few in number; they are round or sometimes more irregular openings, surrounded by the dermal membrane with a sharp edge. They are very varying in size and reach at most a diameter of ca. 4^{mm}.

The *skeleton*. The *dermal skeleton* consists of penicillate bundles of dermal spicules, which pass out from the skeleton below and support the dermal membrane, piercing it. Where the membrane is lying over the parts of tissue separating the subdermal cavities, the question is only of bundles, which are perpendicular or more or less recumbent. From the edges of the subdermal cavities shorter, a little branched fibres run into the suspended membrane, where they end, spread in a penicillate way, and finally fibres run under the suspended membrane, or more loosely lying dermal spicules are found in the strings of tissue that pass under it, and in both cases more or less erect, penicillate bundles project from here through the membrane. Moreover, the membrane is highly filled with microscleres.

[1] I suppose the structure of the surface in these species to be owing to the strength of the dermal membrane, thus *M. incrustans* has a thin dermal membrane and deeper grooves, *M. fimbriata* a thick dermal membrane and a smooth surface, and in both respects the present species occupies a position about midway between these two species.

The dermal spicules project only very little through the membrane, so that the surface is only very slightly shaggy. The *main skeleton* is a rather close, but irregular reticulation. It is mostly polyspicular; fibres may be found running chiefly upwards or towards the surface. They may be somewhat different with regard to their number of spicules alongside, but most frequently they have but few spicules, and they are rather loose. Coherent transverse fibres are not formed, but are only represented by single spicules or spicula-bundles. These transverse spicules are placed rather irregularly, and so the net of meshes is upon the whole irregular. Frequently longer fibres are not found, but the skeleton forms a quite irregular network of a somewhat diffuse character. The meshes are then irregular, also often triangular; in this case the network is often more unispicular, so that the whole may convey an impression of being quite diffuse with scattered, mostly single spicules without any formation of a distinct network. A distinctly observable, but rather slight amount of spongin is found in the nodes of the skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are slightly and dispersedly spined, sometimes quite smooth. They are most frequently slightly curved, sometimes a little more or irregularly so; the point is rather short. The spinulation may be very varying; at most the styli are dispersedly spined, and then all transitions are found to quite smooth ones. Then differences in this respect may be found in different individuals; in some spined styli are almost exclusively found, and of these most belong to the most highly spined ones, while quite smooth ones are only rarely seen; in other individuals the smooth styli are predominant, and the spined ones are then very slightly spined. Their length varies from $0{\cdot}35-0{\cdot}50^{mm}$ and the thickness from $0{\cdot}008-0{\cdot}014^{mm}$. There may be some difference with regard to the length in different individuals; in the material in hand the fact seems to be that in individuals where the spined styli are predominant, they attain a little greater length than in individuals with predominant smooth styli. Also the thickness may show a little difference in the different individuals, a few ones especially having frequently thinner styli than the others. 2. The dermal spicules are tornota or tornostrongyla; sometimes one or both ends are a little swollen, so that they approach tylota or tylotornota. They are straight, more rarely they may be somewhat irregularly curved. Their length varies from $0{\cdot}20-0{\cdot}29^{mm}$ and the thickness from ca. $0{\cdot}0035-0{\cdot}0057^{mm}$. Some difference may be found in different individuals, so that in some the dermal spicules are upon the whole a little longer than in others. As mentioned, there is most frequently a little difference between the two ends, one being a little more swollen and especially a little more rounded than the other. A few developmental forms were seen, which were quite monactinal with the thin end pointed. In a single individual almost all the dermal spicules had ends a little swollen, and these subtylota had not rarely uniform or almost uniform ends. b. *Microsclera.* These are chelæ arcuatæ, some peculiar, very small chelæ, and sigmata. 1. The chelæ arcuatæ have a regularly curved shaft; the tooth is elliptical and rather long, and the alæ, of the same length as the tooth, are rather narrow and therefore tooth-like; the chelæ, therefore, are very similar to ancoræ, and by a superficial examination they may be confounded with ancoræ, but by a closer examination they are seen to be chelæ. This chela varies much in size, its length is $0{\cdot}018-0{\cdot}044^{mm}$, and the thickness of the shaft is $0{\cdot}0018-0{\cdot}004^{mm}$. The largest sizes are less frequent. 2. The small peculiar chelæ are, on account of their smallness, only to be examined with difficulty. They consist of a curved shaft, which has, at either end, a number of teeth or tooth-like processes. Their number seems, at all events most frequently, to be about ten. The shaft is not smooth, but looks, as if it were rather highly rugged. By sufficient high magnifying powers it is seen, however, that the shaft may better be called lobate, as it has on either side a row of lobes, and these give to it its rugged appearance. The lobes are placed in such a way, that in the middle of the shaft they are nearest to the dorsal side, and when the chela is seen in a lateral position, the lobes in the middle are turned a little backward; farther out on the shaft the lobes by degrees turn to the opposite side, and they seem to pass evenly into the tooth-like processes of the ends, becoming at the same time longer. The terminal parts of the shaft, from which the teeth issue, are a little expanded. The teeth may be somewhat varying in size, often the middle tooth or the middle teeth may be longest. The chela varies somewhat in form, the shaft especially may be more or less curved. The described construction is only to be distinguished under high magnifying powers. As mentioned, these chelæ are very small, their length is ca. 0·008—0·015^{mm}, and the thickness is ca. 0·001^{mm}. — I have placed this peculiar spicule to the chelæ; I suppose that the rows of lobes of the shaft correspond to the alæ, and then the recurving part must correspond to a tooth, but nothing can otherwise be said as to the relations of this spicule to the other chelæ. 3. Sigmata are of the common form and more or less contort; their length varies from 0·026—0·05^{mm}, and the thickness about from 0·0018—0·0030^{mm}. By far most frequently the size is near to the larger limit. All the microscleres are frequent in the membranes through the whole sponge and also present in large numbers in the dermal membrane.

Remarks: As I have examined Fristedt's type specimen, the identification is sure. Fristedt has not seen the construction of the small chela, which he therefore mentions as the small sigma, and so he gets of microscleres one chela and two forms of sigmata, while in reality there are two forms of chelæ and only one form of sigmata. It is easily understood, on account of the smallness of this chela, that he has not interpreted it correctly. His name *indistincta* shows that he has found nothing characteristic in the species; but now this name is rather unhappy, as the species, on account of the small chela, is especially distinct. When he says of the dermal spicules: "They are often curved", this expression is quite correct, as in his type specimen these spicules especially frequently occur as curved; on the other hand, the figure of this spicule is quite a mistake with regard to one end. Fristedt gives the length of the styli to 0·35^{mm}; his type specimen belongs to those where the smooth styli are predominant, and the styli are also, in conformity to what has been said above, comparatively short; I have measured them, however, of lengths of up to 0·417^{mm}.

Locality: Station 34, the Davis Strait, 65° 17′ Lat. N., 54° 17′ Long. W., depth 55 fathoms; the Davis Strait, 65° 22′ Lat. N., 54° 02′ Long. W., depth 60 fathoms (Wandel); the Davis Strait, depth 100 fathoms (Th. Holm); Hekla Harbour, depth 5—12 fathoms (the East-Greenland Expedition 1891—92). About ten specimens or fragments in all.

Geogr. distr. Fristedt has the species in one specimen from Spitzbergen, depth 60 fathoms. The species seems to be a native of more shallow water, as it is only known from depths of 5—100 fathoms.

6. L. complicata Arm. Hans.

Pl. V, Fig. 11. Pl. XVI, Fig. 4 a—g.

1885. *Reniera complicata* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 7, Pl. I, fig. 8, Pl. VI, fig. 8.

1885. *Myxilla grisea* Armauer Hansen, ibid. 12, Pl. I, fig. 3, Pl. VI, fig. 9.

1887. *Clathria corallorhizoides* Fristedt, Vega Exp. vetensk. Iaktt. IV, 460, Pl. 25, figs. 73—77, Pl. 29, fig. 23.

Erect, bush-shaped, with more or less, often highly anastomosing branches. The surface shaggy. The dermal membrane a very thin film with partly projecting, partly horizontal dermal spicules. The skeleton a somewhat irregular network; primary, polyspicular longitudinal fibres are found, bending gradually towards the surface; they are connected by irregularly placed, mostly single transverse spicules. Spicula: Megasclera: the skeletal spicules smooth styli 0·42—0·68mm, the dermal spicules strongyla to subtylota 0·22—0·40mm; microsclera of three forms, chelæ arcuatæ 0·04—0·058mm, sigmata of two forms, small ones 0·017—0·023mm, large ones 0·042—0·055mm.

This species has a beautiful and characteristic outer form, and in this respect it recalls the Clathriæ. It is markedly bush-shaped; from a small base of attachment a number of branches issue, rising and ramifying and anastomosing copiously. Especially the anastomoses are numerous and lead to the forming of plate-shaped parts pierced by larger or smaller holes, so that only the outermost short branches are free. The tendency to plate-shaped coalescing is also seen by the fact that the branches are not cylindrical, but more or less compressed. The species may in this respect be somewhat varying, the branches in some individuals being comparatively free, while in others they are quite coalesced, so that the question is really not of branches, but of anastomosing curled lamellæ. As mentioned above, the base of the sponge is comparatively small, and sometimes a short stalk is formed. The largest specimen in hand has a height of 85mm, a greatest breadth of ca. 100mm, and a breadth at the base of 30mm. The outermost, free parts of the branches have a thickness of ca. 4—8mm. Then we have specimens in decreasing sizes, the smallest one, which seems to be entire, has a height of ca. 25mm. None of the specimens are attached, but in several of them loose bottom material is found on the basal surface, so that the sponge seems to have grown directly on the bottom. The colour (in spirit) is light yellow or whitish yellow, sometimes more gray, which latter I take to be due to the sponge containing sand. The sponge has a characteristic, net-like appearance, such as is found in many *Reniera*-species, which is due to the fact that the mouths of the close-set canals under the dermal membrane are seen shining through the membrane as dark spots. The consistency is firm and elastic. The *surface* is very shaggy from projecting spicules; some individuals may be more shaggy than others. The *dermal membrane* is an exceedingly thin and transparent film resting on the skeleton below and supported by dermal spicules. *Pores* and *oscula:* the pores are found in the dermal membrane, frequently gathered in sieve-like areas, but also in other places singly and much scattered; they are circular or oval. Their size was measured to ca. 0·012—0·3mm. Then some larger, round or oval openings are found, sometimes closely gathered, sometimes more scattered. Their size may vary from ca. $0{\cdot}2^{\mathrm{mm}}$ up to ca. 1^{mm}. These openings lead into canals passing horizontally inward and losing themselves in a net of smaller canals. These larger openings are surely oscula; but as it is seen, all the openings pass evenly into each other with regard to size, and so it is often not to be decided whether an opening is incurrent or excurrent.

The *skeleton*. The *dermal skeleton*. As mentioned above, the dermal membrane rests on the skeleton below, and the fibres of the skeleton project through it, by which means the surface of the sponge is made shaggy. Otherwise the dermal skeleton is formed by dermal spicules in the common way; partly these spicules form bundles projecting from the main skeleton, often in connection with the projecting ends of the fibres, but mostly they are lying horizontally in the dermal membrane, partly scattered singly, partly in bundles, and in the pore areas they are often seen branching in between the pores; upon the whole, however, the dermal skeleton must be said to be little developed. The *main skeleton* is a somewhat irregular, mostly polyspicular network. Longitudinal fibres are found, running in the longitudinal direction of the branches, and by degrees bending out and piercing the dermal membrane, or giving off branches that bend out in this way; these primary fibres are all polyspicular and have an average thickness of $0{\cdot}07-0{\cdot}12^{\mathrm{mm}}$, and their course is rather regular. By far the greatest part of the transverse fibres is only represented by single spicules, only here and there a few are seen alongside each other; these spicules are placed quite irregularly, and coherent fibres are not formed. In a longitudinal section the skeleton so far conveys the impression of some regularity, as the longitudinal fibres are running rather parallelly, and the same is the case in a transverse section, the ends of the fibres bending towards the surface being here seen, especially in the circumference of the section, as rather regularly radiating radii. In the skeleton a rather copious, slightly yellowish mass of spongin is found, wrapping the fibres completely. Down towards the base, and especially in the stalk of the individuals provided with a stalk, the spongin is very abundant and forms a thick sheath round the fibres; consequently the sponge is here firm and hard.

Spicula: a. *Megasclera.* 1. The skeletal spicules are smooth styli; they are slightly curved, and the curve is most frequently found nearest to the upper end; they are evenly and middle long or rather long pointed. No head-swelling is found, but the greatest thickness is generally situated at the very head-end, and here the axial canal shows a small, but distinct widening, not situated just at the end of the canal, but a little below it. Their length is somewhat varying, from $0{\cdot}42-0{\cdot}68^{\mathrm{mm}}$, and the thickness from $0{\cdot}016-0{\cdot}025^{\mathrm{mm}}$. A few developmental forms were seen; they show especially distinctly that the head-end is a little thickened, and in the finest ones a swelling is found, often placed a little below the end. 2. The dermal spicules are strongyla with transitions to tylota; a discernible swelling of the ends are almost always found, but it is always slight, so that the needles may perhaps be best characterized as subtylota. They are straight, more rarely slightly curved. As is generally the case, the two ends are not quite equal, one being a little thicker than the other, and a few, quite fine developmental forms showed the thinner end quite pointed. They are somewhat varying in size, the length from $0{\cdot}22-0{\cdot}40^{\mathrm{mm}}$, and the thickness from $0{\cdot}0035-0{\cdot}007^{\mathrm{mm}}$. The variation is not found in its whole extent in one and the same individual, thus there are individuals in which the dermal spicules do not exceed $0{\cdot}33^{\mathrm{mm}}$, and others in which they do not go below $0{\cdot}28^{\mathrm{mm}}$. b. *Microsclera:* these are of three forms, chelæ arcuatæ and sigmata of two sizes. 1. The chelæ arcuatæ have chiefly the same form as the large chelæ in *L. diversichela;* they have a highly curved shaft, scarcely, however, so highly curved as in the mentioned chela, the terminal parts are small in proportion to the length of the shaft, tooth and alæ are stubby. Their length is $0{\cdot}04$—$0{\cdot}058^{mm}$, the smallest lengths being rare, and the thickness of the shaft is $0{\cdot}005$—$0{\cdot}012^{mm}$. Also in this chela the shaft is broadly elliptical in section, and this is the cause of the variation in thickness. Developmental forms at different stages were seen, the development is as mentioned under the large chelæ in *diversichela.* 2. Sigmata of the small form; these are rather characteristic; they are highly curved, often almost in a circular manner, the points, however, being generally curved a little more inward; they are plane. The sigmata are rather small, but their size is tolerably constant, the length is $0{\cdot}017$—$0{\cdot}023^{mm}$ and the thickness about $0{\cdot}001^{mm}$. 3. Sigmata of the large form; besides the small sigmata, which occur in great numbers, a larger form is found only occurring very sparsely; they have the common sigmaform, the ends are rather highly curved in a somewhat hook-like manner, and they are more or less contort. Their length is $0{\cdot}042$—$0{\cdot}055^{mm}$, and the thickness is ca. $0{\cdot}002^{mm}$. As mentioned, they occur in very slight number, so that they might be supposed to be extraneous bodies; but as they show a distinct form and may be found in any specimen by a closer examination, they belong doubtless to the species. They must not be confounded with the youngest developmental forms of the chela, to which they bear a superficial resemblance. They seem to occur especially in the dermal membrane. The other microscleres occur through the whole sponge and especially in the dermal membrane, where in some places the chelæ occur rather closely.

Remarks: As I have examined type specimens of the quoted species, established by Armauer Hansen and Fristedt, I have been able to make a sure identification. As the original name, under which it has been established, is *complicata,* this name must be used. Armauer Hansen's description and figures of *complicata* might raise a doubt as to the specific identity; as, however, the type specimen I have examined is the present species, and as Armauer Hansen's figure of the exterior also absolutely belongs to this species, I have thought it best to take up the name; most of the spicules described and figured by Armauer Hansen do not agree, and either he must have confounded them with the spicules of an Axinellid, as might well be done, as the species has some outer resemblance to an Axinellid, or else there must have been an abundance of extraneous spicules in his preparation.

Locality: Station 141, 63° 22′ Lat. N., 6° 58′ Long. W., depth 679 fathoms, (bottom temperature ÷ 0°6 C.); station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms, (bottom temperature ÷ 0°4 C.); 70° 32′ Lat. N., 8° 10′ Long. W., depth 470 fathoms (The East-Greenland Expedition 1891—92); ca. fourteen specimens in all. The localities are situated north of the Faröe Islands and south of Jan Mayen.

Geogr. distr. The species has been taken before by the Norwegian North-Atlantic Expedition, and, according to the statement, at its station 84. For this station is stated a bottom temperature of 6°5 C. As now the two Ingolf-stations from which we have the species show negative temperatures, and as also the locality south of Jan Mayen, according to the investigations of the "Ingolf", must be a negative one, it is not probable that the species occurs at a bottom with a temperature of 6°5 C. To be sure, station 84 is situated at the very border between the warm and cold area, and so the species might possibly be found there; but station 84, according to the list of the zoological stations, is no zoological one; on the other hand, station 87 is a zoological one, and its temperature is ÷ 1.1 C.; a confounding of these stations may therefore possibly have taken place. Fristedt has the species from the Baffin Bay, 68° 08' Lat. N., 58° 17' Long. W., depth 169 fathoms. Accordingly the species is known from the Baffin Bay and the North-Atlantic south of Jan Mayen and north of the Faröe Islands, with a bathymetrical range from 169—673 fathoms, and it must be supposed to be a native of the cold area.

7. **L. vicina** n. sp.

Pl. V, Fig. 12. Pl. XVII, Fig. 1 a—f.

Bush-shaped? with anastomosing branches. The surface shaggy. The dermal membrane very thin, partly with projecting bundles of dermal spicules, partly with horizontal ones. The skeleton an irregular, mostly polyspicular network; longitudinal fibres are found, connected by irregularly placed spicules and spicula-bundles. Spicula: Megasclera: the skeletal spicules smooth styli 0·71—0·80^{mm}, the dermal spicules tylota 0·32—0·38^{mm}; microsclera of three forms, chelæ arcuatæ 0·034—0·057^{mm}, sigmata of two forms, small ones 0·017—0·023^{mm}, larger ones 0·028—0·033^{mm}.

Of this species we have only two fragments; they show, however, that the species has an exterior, quite similar to that of *L. complicata*, as they consist of some anastomosing, flattened branches. The larger fragment has a longitudinal extent of 60^{mm}. The colour (in spirit) is yellowish white, and the sponge has the same net-like appearance as the preceding species. The consistency is rather firm and somewhat elastic. The *surface* is very distinctly, but somewhat dispersedly, shaggy from projecting spicules. The *dermal membrane* is a very thin film, partly resting on the skeleton below, partly supported by dermal spicules. With regard to *oscula* and *pores* the facts are as in the preceding species. The pores are for a great part situated in sieve-like areas; they were measured from quite small ones up to 0·47^{mm}. Oscula are round openings of sizes from 0·6^{mm} to ca. 1·5^{mm}; but also in this species pores and oscula may pass into each other with regard to size.

The *skeleton* is in every respect constructed in a similar way as in *L. complicata*. The *dermal skeleton* consists of dermal spicules, partly forming bundles or short fibres that may project a little or lie horizontally in the membrane, partly being found singly scattered in the membrane, but upon the whole the dermal skeleton is little developed; further spicules from the main skeleton project. The *main skeleton* is an irregular, mostly polyspicular network; fibres are found, running chiefly in the longitudinal direction, but branching irregularly, and being upon the whole rather irregular. Between them spicules and spicula-bundles are found irregularly placed, and bundles issue to the surface. The longitudinal fibres do not bend towards the surface in any regular way, and as well in longitudinal sections as in transverse ones the skeleton conveys an impression of greater irregularity than in *L. complicata*. This may, however, be owing to the fact that we have only irregular fragments with copious anastomoses, a thing that influences the regularity of the skeleton. Spongin is found in the fibres.

Spicula: a. *Megasclera.* 1. The skeletal spicules are smooth styli; they are somewhat curved, almost always nearest to the head-end, and the curve may be more or less strong, sometimes it is a little irregular. They have an evenly tapering, rather long point. Their length is 0·71—0·80^{mm}, most frequently midway between these limits, the thickness is 0·018—0·025^{mm}. Also in these styli a widening of the axial canal is seen at the upper end, and this widening is generally found a little below the end of this canal. 2. The dermal spicules are tylota; they are comparatively long and thin with well-developed end-swellings, and they are straight, sometimes slightly curved. Their length is 0·32—0·38^{mm}, and the thickness 0·0028—0·0035^{mm}. The two ends of the tylota are not quite equal, the shaft is in one end a little thicker, while the swelling is here comparatively smaller, whereas in the other end it is a little thinner, and the swelling is larger, often almost globular. To judge from a few developmental forms, it is, however, this end which is originally pointed. b. *Microsclera:* these are of three forms, chelæ arcuatæ and sigmata of two sizes. 1. Chelæ arcuatæ are of the same form as the chelæ in *L. complicata;* the shaft is rather highly curved, the ends are relatively small, and tooth and alæ are stubby. The length is 0·034—0·057^{mm}. The shaft is somewhat flattened, and in section flatly elliptical, its thickness, from the side and from the front, is ca. 0·0028—0·008^{mm}. A few developmental forms were seen. 2. Sigmata of the small form have most frequently a more common sigma-form as in the preceding species, they are comparatively small and fine, and they are plane. Their length is 0·017—0·023^{mm} and the thickness at most 0·0010^{mm}. 3. Sigmata of the large form; also in this species a larger sigma occurs, but in rather small numbers; it is of the common type, more or less contort, 0·028—0·033^{mm} long and ca. 0·0014^{mm} thick. The microscleres are found throughout the sponge and in the dermal membrane, where the large chela is especially frequent.

As is shown by the description, this species is very closely allied to the preceding one, but is distinguished from it by sure characters; these distinguishig characters are especially the longer styli, a different form of sigmata, and, above all, a different form of the tylota.

Locality: Station 19, 60° 29′ Lat. N., 34° 14′ Long. W., depth 1566 fathoms. The bottom temperature was here 2°4 C. It is an interesting fact to notice that while the preceding species is a native of the cold bottom, the present species, which is so closely allied to it, but is surely distinguished, belongs to a bottom with positive temperature. The locality is situated in the southern Denmark Strait.

8. **L. stipitata** n. sp.

Pl. V, Fig. 13. Pl. XVII, Fig. 2 a—e.

Erect, stalked, club-shaped, somewhat compressed. The dermal membrane not especially thin, supported by bundles of dermal spicules and also provided with horizontal spicules. The skeleton dendritic; from the stalk polyspicular fibres pass up through the sponge, branching and anastomosing. Spicula: Megasclera: the skeletal spicules smooth styli 0·39—0·63^{mm}, the dermal spicules tornota 0·31—0·488^{mm}; microsclera of one form, chelæ arcuatæ 0·032—0·045^{mm}.

This species is markedly club-shaped; it consists of a rather thin, cylindric stalk, which is below attached to the substratum by a small basal expansion. The stalk is of equal thickness throughout its length, and above it carries a head which is somewhat compressed and may best be described as irregularly cordate. This part is compressed in such a way, that one side is convex and the other flat or a little concave. The edge is rather sharp. The smallest specimens are only little or not at all compressed. The largest specimen is 45^{mm} high, of which the stalk makes ca. 15^{mm} and the upper part ca. 30^{mm}; the breadth of the leaf-shaped part is 24^{mm}, and the thickness ca. 10^{mm}; the thickness of the stalk is only $1{\cdot}5^{mm}$. Then we have specimens of decreasing sizes, the smallest one with a height of 9^{mm}, of which the stalk makes $2{\cdot}5^{mm}$, and the thickness of the upper part is 2^{mm}. All the specimens are attached to larger or smaller stones. The colour (in spirit) is dirtily brownish gray. The consistency of the tissue itself is soft, but the skeleton makes the sponge rather firm and elastic. On account of the peculiar softness of the tissue, the sponge contracts much in drying, and also in spirit it seems to be highly contracted. The *surface* is damaged in most specimens, so that its character cannot be decided from these specimens. To judge from tolerably entire individuals, ends of fibres project, and in the protuberances formed in this way spicules project; also the longitudinal fibres lying under the skin give rise to keel-shaped ridges separated by grooves, so that the surface gets upon the whole a slightly grooved appearance. In undamaged specimens a *dermal membrane* may be separated as a not especially thin, intransparent film. *Pores* were not seen. *Oscula:* here and there, to be sure, a few scattered openings are seen, but these, I think, are only due to damaging. In the best preserved specimen, on the other hand, a spout-shaped osculum is found on the top of the sponge. It consists of a small, somewhat conical spout formed by the dermal membrane; it has a height of $1{\cdot}5^{mm}$ and a somewhat similar breadth. In the spout, formed by the dermal membrane, the dermal spicules are lying very close, parallel to the longitudinal axis. In the other, less well preserved specimens, this osculum is not found, but everything indicates that it has been present, some perpendicular canals being found in the upper part of the sponge, and some thin-skinned parts with openings being seen in the uppermost edge. The mentioned specimen shows only one osculum, but in other specimens several oscula seem to have been found.

The *skeleton.* The *dermal skeleton.* The fibres running from the main skeleton to the surface end in bundles of dermal spicules spread in a more or less penicillate way, which bundles cause the projections of the surface and rise through them. As the fibres are not perpendicular on the surface, but directed upwards, the projecting bundles are recumbent, when the dermal membrane is seen from above. The dermal membrane, which is suspended between the projections, has, moreover, horizontal dermal spicules, partly singly scattered, partly here and there in bundles. Besides, the membrane is copiously provided with chelæ. The *main skeleton* is of dendritic type. In the basal expansion spicules are found closely packed without any order, but chiefly parallel to the underlayer. Towards the middle they rise upward, and the expansion passes into the stalk. Neither are the spicules in the stalk arranged quite as in a fibre, some of them being placed more or less obliquely; chiefly, however, they are placed in the longitudinal direction. Especially in the central part of the stalk they are directed longitudinally, while the more scattered arrangement is found in the peripheral layer; outermost a looser layer is found with spicules turned in all directions, and from this layer spicules project, so that also the stalk becomes shaggy. Dermal spicules were not seen, either in the stalk or in the basal expansion. Not till the stalk passes into the upper body, the spicules are arranged so as to lie quite parallelly in the fibres. In the basal expansion and the stalk the spicules are shorter than in the other parts of the body; upward in the stalk they become gradually longer. Where the stalk passes into the upper body, it begins to divide, and the fibres continue up through the sponge, copiously branching in a dendritic manner and also frequently anastomosing. Branches continually bend out towards the surface, and end in the bundles of dermal spicules of the skin. All the fibres are polyspicular, and the thicker ones have many spicules alongside. The first and thickest fibres issuing from the stalk have an average thickness of 0·6mm, and the thinnest branches going to the surface are ca. 0·05mm thick. Spongin is found in the fibres through their whole length, coating them, perhaps, with an exceedingly fine layer, but it is white and clear and not easily observed; it is most copious in the stalk.

Spicula: a. *Megasclera.* 1. The skeletal spicules are smooth styli; they are slightly curved, and the curve is generally situated nearest to the head-end. They taper quite imperceptibly towards the head-end; towards the point they are somewhat tapering, but the point itself is short. Their length is between 0·39 and 0·63mm, and the thickness is 0·012—0·016mm; the longest ones are not always the thickest ones. In the basal expansion and in the stalk the styli, as mentioned, are considerably shorter, only 0·208—0·35mm; upward in the stalk they become gradually longer, and in the upper part of the stalk they reach 0·47mm. 2. The dermal spicules are tornota; they are straight, or slightly, and then frequently a little irregularly, curved. Their ends are most frequently slightly swollen, they are about rounded and end with a little mucro. The ends are not quite equal, one being a little thinner than the other and generally a little more pointed. Their length is 0·31—0·488mm, and the thickness 0·0067—0·010mm. b. *Microsclera;* these are only of one form, chelæ arcuatæ. They have a somewhat curved shaft, the lower edge of the alæ are only little indented, and therefore the ala is not much tooth-shaped; the tooth is narrowly elliptical, of the same length as the alæ, and there is a small tuberculum broadest downward. The chela must be called arcuate, but it forms a transition to the palmate ones. The length is 0·032—0·045mm, the thickness of the shaft is ca. 0·003—0·005mm; the shaft is not cylindrical, but more or less compressed. A few developmental forms were seen as thin staves recurved at both ends. The chelæ occur through the whole sponge, but they are especially numerous in the dermal membrane.

Embryos. In most specimens embryos were found copiously scattered in the tissue. They are globular or a little flattened, of a diameter of up to 0·48mm; on account of their white colour they were easily discerned in the tissue. No spicules were found in them.

Locality: Station 10, 64° 24′ Lat. N., 28° 50′ Long. W., depth 788 fathoms (bottom temperature 3·5 C.), two, mostly denuded, skeletons; station 104, 66° 23′ Lat. N., 7° 25′ Long. W., depth 975 fathoms (bottom temperature ÷ 1°1 C.), one large and two small specimens; station 105, 65° 34′ Lat. N., 7° 31′ Long. W., depth 762 fathoms (bottom temperature ÷ 0°8 C.), four specimens; 62° 30′ Lat. N., 1° 56′ Long. E., depth 275 fathoms (bottom temperature negative), a small specimen (Ad. Jensen, the cruise of the Michael Sars 1902). As is seen from the list, the three localities are from the cold bottom, and according to this the species must be supposed to be a native of the cold area; the fourth locality, station 10, on the contrary, is situated on the south side of the ridge between Iceland and Greenland, and it is positive. Now it is to be remarked, however, that from this locality we have only two almost quite denuded skeletons, and so there is a possibility that these specimens have been dead, and have been carried to this locality as dead. This is also indicated by another fact; all the other specimens with the exception of a few ones that have been broken off, are attached to the stone which serves for their attachment, whereas the two specimens from station 10, although they have the basal expansion of the stalk undamaged, are loosened from their substrata.

Note. This species has a skeletal structure similar to that of the species *ternatensis* established by Thiele (Abhandl. d. Senckenberg. nat. Gesellsch. XXV, Heft IV, 953), and by him referred to the genus *Hamigera*. The genus *Hamigera* with the typical species *hamigera* O. Schmidt was by Topsent (Résultats des Campagn. scient. du Prince de Monaco, Fasc. II, 102) referred to the *Ectyoninæ* on account of its skeletal structure. Thiele l. c. says that, after having examined sections of Schmidt's type specimen, he cannot follow Topsent in this, as he finds styli and strongyla to be intermingled. I have also examined a piece of Schmidt's type specimen, kindly sent me by Dr. Marktanner, and although the examination of a small, dried fragment must necessarily be somewhat deficient, as, on account of contraction, it gives only a rather indistinct idea of the skeleton, I must nevertheless admit Topsent to be right. The fibres consist almost exclusively of strongyla, only a few subtylostyli being found here and there in them; on the other hand subtylostyli are seen to project from the fibres. When upon the whole a group *Ectyoninæ* is admitted, *Hamigera*, according to my examinations, must doubtless be referred to it. Thiele's species *ternatensis*, of which it is expressly said that the fibres almost exclusively consist of styli, while at the surface radiating bundles of dermal spicules are found, is surely not to be referred to *Hamigera*, but must be a *Lissodendoryx*. When Thiele as the principal difference between *Dendoryx* (= *Myxilla*) and *Hamigera* mentions the want of a regular choanosomal skeleton in the latter, this character cannot be used as a generic distinction, as reticular and dendritic skeletons may be found in the different species of as well *Lissodendoryx* as other genera. When Thiele says, in a foot-note: Vermutlich werden noch mehrere *Lissodendoryx* -Arten in die Gattung *Hamigera* gehören , this is quite correct according to his view, but according to what has been propounded here, such species will just have to be kept in the genus *Lissodendoryx*.

Iophon Gray.

The form somewhat varying, incrusting or massive, but not rarely erect, cylindrical or branched, or, finally, more or less regularly leaf-shaped. The skeleton a most frequently irregular, mostly polyspicular reticulation, without any distinction between primary and secondary fibres; sometimes longer fibres are present. The dermal skeleton well developed, consisting of bundles of dermal spicules, partly lying horizontally in the membrane, partly erect and penicillate. A rather slight amount of spongin is found. Spicula: Megasclera: the skeletal spicules styli, most frequently more or less spined, sometimes smooth, the dermal spicules diactinal, strongyla or most frequently tylota, oftenest with slightly spined ends; microsclera anisochelæ palmatæ of a characteristic form with the smaller end provided with a spur, and almost always bipocilla, which may be somewhat varying in form.

The genus *Iophon* is an especially distinctly characterized genus, and the distinct characters are found in the microsclera. To be sure, chelæ of the same form as in *Iophon* and bipocilla are again found in *Pocillon*, which is the pendant of *Iophon* among the *Ectyoninæ*, but surely these two genera are also, in spite of the grouping, very closely allied to each other. The peculiar chela is always present in *Iophon*, while bipocilla may be wanting in a few cases, and therefore the chela is the form of microsclera most characteristic of the genus. This chela is never found in any other genus, with the only exception of the above mentioned *Pocillon*[1]. The chela is a palmate anisochela, whose smaller end is considerably smaller than the larger one; from the axial recurving of the smaller end a sharp spine or spur issues. The chelæ may in some species occur in two different sizes. In a few species they may also form rosettes, and then, as is generally the case, only the large chelæ form rosettes, while the small ones, when such are found, are never gathered in rosettes. Neither are bipocilla known outside the genera *Iophon* and *Pocillon*[2]. The author who first mentions these bodies is Bowerbank; his description of them, like his descriptions of the chelæ upon the whole, is deficient, and he calls them in different places and according to the different positions in which he finds them unipocillated and bipocillated bihamates or bipocillated anchorates . Gray calls them bipolicated anchorates , I suppose on account of a misreading of Bowerbank. Vosmaer (Niederl. Arch. für Zoologie, Suppl. Band I, 1881, 82) says that they are probably a modification of sigmata. Ridley and Dendy calls them bipocillate spicules or bipocilli [3], and of the peculiar bipocillum in *Iophon chelifer* they say that they are inclined to regard it as a much modified anisochela. Topsent says also in 1901 (Résultats du Voyage du S. Y. Belgica, Spongiaires), under *Iophon radiatus* that the bipocilla must be regarded as modified anisochelæ, but his reason for this opinion, that their smaller end shows a fine dentation, is scarcely of any importance. Thiele, finally, in 1903 (Arch. für Naturgesch. 1903, I, 389) calls the bipocilla anisochelæ without any further explanation. — The common form of the bipocilla had never been correctly described till the appearance of Wilson's work, mentioned below. Generally, as by Ridley and Dendy, they are described as consisting of a shaft with a cup-like expansion at each end. Wilson in 1904 (Mem. of the Mus. of comparative Zoology at Harvard College, XXX, Nr. 1, 143—154, Pl. 19, fig. 6 b—e, Pl. 20, fig. 6 a et c, fig. 15 a, c—f) gives for the first time a thorough description of the construction of the bipocilla in the species treated by him; here for the first time a correct and exact description is given, together with good figures. The author does not say that the bipocilla are to be regarded as chelæ, but he calls the peculiar bipocilla in *I. chelifer* and *lamellata* chelate bipocillus . — The bipocilla are in reality somewhat modified anisochelæ, and the principal modification is that a tooth only is developed in one end, which may be designated as the upper end. The bipocillum, in its common and typical form, consists of a curved shaft, which has always an exceedingly fine brim on either side. At the lower end the shaft is so much recurved, as to form about a right angle with the middle part of the shaft, but the curve is round and even; in this recurved part the lateral brim of the shaft is broader, and therefore this part has a somewhat spoon-like form. At the upper end the lateral brim is also a little widened and forms a pair of small alæ; then follows, as usually, a thin connection with the tooth, formed by the shaft alone; the tooth is a comparatively

[1] Carter (Ann. Mag. Nat. Hist., Ser. 5, IX, 291, Pl. XI, fig. 16 e, f) mentions and figures a very small chela occurring in his *Esperia lævis*, which might seem to be of the *Iophon*-type, as Carter also remarks. *Esperia lævis* is evidently a *Mycale*, and it has a typical *Mycale*-anisochela; how the fact really is with regard to the small chela, whether it is an extraneous *Iophon*-chela or a peculiar chela belonging to the species, cannot be decided.

[2] In a work by Swartschewsky (Beitrag zur Kenntniss der Schwamm-Fauna des Schwarz. Meer., Kiew Naturforsch. Gesellsch. Schrift. XX, 27, 51, Taf. 5, Fig. 5 a—d) published in 1905, the author establishes a species *Esperella Iophon*; it seems to be a *Mycale*, and it has typical *Mycale*-anisochelæ gathered in rosettes, but besides it has smaller chelæ, which may be more or less, and often highly, curved; in the latter case, the author says, they assume the form peculiar to the bipocilla. To judge from the figures, some of these chelæ may seem to be bipocilla, but perhaps the question is only of peculiarly formed anisochelæ, and they seem also by transitions to be connected with the common chelæ.

[3] As pocillum is a neuter noun, I use the plural form bipocilla.

large, about circular, arched plate, and it forms about a right angle with the shaft. No falx is developed. When the bipocillum is viewed from the front, it conveys the impression of consisting of two cup-shaped plates connected by a shaft, which has given rise to the common description of it. The lower, spoon-shaped end of the bipocillum is most frequently or always finely indented in the edge, which is best seen in the largest specimens. From this typical form of the bipocillum deviations may be found. Thus in species where the bipocilla are otherwise of the typical form, forms may occur with the tooth split to two or three teeth, as for instance in the *I. piceus* treated below; the splitting is often irregular, and also other deviations in the form may occur. Then the bipocillum may constantly be of a different form, as in *I. chelifer*, where the tooth is always split to three or sometimes two lobes, and the lower end is prolonged to two points. — Both forms of microscleres seem to be rather varying in the same species with regard to their frequency; in some individuals they are found in great numbers, in others they are scarce, and sometimes one form, sometimes the other is the most frequent one. This variation seems to be most marked with regard to the bipocilla, which may sometimes be seen only quite singly.

The *Iophon*-species have always, whether they are preserved in spirit or dried, a very dark, sometimes quite black colour, and this feature has sometimes been used as a character of the genus. This colour, however, as has especially been pointed out by Topsent, is not original, but they are in the fresh state of the common colour, yellow to lightly brown. In the air or in spirit they assume, however, the dark colour. Sometimes specimens may keep the original colour more or less markedly. This feature of the colour getting dark after death is also found in *Pocillon*.

While *Iophon* is distinctly characterized as genus, the same cannot be said to hold good with regard to its species. Ridley and Dendy have determined part of the Challenger-material as *Iophon Pattersoni*, and in this species united several of Bowerbank's species, of which, however, *Hyndmanni* and *scandens* in reality belong to *Pocillon*. Topsent is more inclined to embrace the contrary opinion that the question is of several species. The fact is that the *Iophon*-species, or, at all events, some of them, may evidently be somewhat polymorphous. The microscleres yield no good specific characters, both the chelæ and the bipocilla in their typical form being exceedingly uniform in the different species. The styli may in the same species vary very much with regard to spinulation, from about quite smooth needles to highly spined ones. All these features make it a difficult thing to separate the different species. A sure distinction will, however, generally be obtained, when characters are drawn as well from the spiculation, the skeletal structure, and the exterior, as from the structure of the dermal membrane. Thus among the species described below, *I. piceus* is somewhat polymorphous both with regard to form and spiculation, but nevertheless it is a well characterized species, and the same holds good of *I. dubius*, which is, however, somewhat less polymorphous.

1. I. piceus Vosm.

Pl. VI, Figs. 1—2. Pl. XVII, Fig. 3 a—b.

1881. *Alebion piceum* Vosmaer, Niederl. Arch. für Zool. Suppl. Band I, 42, Pl. I, fig. 10, Pl. III, figs. 75—78 et 81—82.

1885. *Albion piceum* Vosmaer, Bijdr. tot de Dierk. 12te Afl., 3die Gedeelt. 31, Pl. V, fig. 50.
1887. *Esperia nigricans* Fristedt (non Bow.), Vega Exp. vetensk. Iakttag. IV, 448.

Erect, leaf-shaped, or more irregular, lobate with smaller or larger lobes. One surface generally with more or less shallow grooves, separated by ridges. The surface smooth. The dermal membrane a distinct, but thin film, with a skeleton of horizontal dermal spicules forming on the pore side a reticulation, and being scattered on the oscular side; it is supported by penicillate bundles of dermal spicules. Oscula numerous, scattered on the even surface, pores in grooves on the opposite surface. The skeleton a rather close, irregular, polyspicular reticulation. Spicula: Megasclera: the skeletal spicules more or less spined acanthostyli 0·26—0·45^{mm}, the dermal spicules tylota with spined ends 0·238—0·298^{mm}; microsclera of two forms, anisochelæ palmatæ of the Iophon type 0·016—0·036^{mm}, bipocilla 0·008—0·014^{mm}.

This species may have a somewhat varying appearance, but typical and well developed specimens have a quite characteristic form. The species is always erect and more or less leaf-shaped, but sometimes somewhat irregularly folded or curved, so that various, but then always irregular, sometimes somewhat cup-shaped forms arise, or the form becomes still more irregular, more or less lobate. It is attached with the base to the sea-bottom, or to things on the bottom, and the most regular specimens form a rather thick, oval leaf, which is broadest below, not being restricted here. What gives to the species its characteristic appearance, however, is its two surfaces. They differ from each other first in the fact that one is the oscular side, the other the pore side, but other differences are also found. The oscular surface is most frequently tolerably smooth, or shows only a few irregular and oftenest shallow grooves. The pore surface, on the other hand, has a number of more or less deep grooves of varying sizes, separated by walls of varying breadths. The grooves are of an irregular form, and the walls between them may be undulating or sinuous. These grooves are distinctly present in far the greater number of specimens and give to these a characteristic appearance. They may, however, be conspicuous in different degrees, especially they may be fewer, and then they are larger and more shallow, and consequently less characteristic. The described form of the sponge is the one most frequent and characteristic; but it may also by transitions pass into a thinner leaf-shaped form, especially as to the upper part of the sponge. It is especially in such forms that the grooves of the pore side become large and shallow, and they may quite disappear, so that the leaf-shaped sponge shows more or less even surfaces. Thus the extremities with regard to form seem on one side to be the quite irregular, more or less lobed forms, on the other side the quite leaf-shaped ones, and the middle form between these extremities is found in the regular, grooved specimens of the first described form, which seems to be the most frequent and most normal form of the sponge. Unfortunately, only few tolerably entire specimens are found in the material in hand, but a great many fragments; therefore I am not able to speak of the variation in form with absolute certainty. The largest typical specimen is ca. 165^{mm} high, ca. 125^{mm} broad, and ca. 35^{mm} thick. The smallest specimen among the tolerably entire ones has a height of 35^{mm}, a similar breadth, and is rather thin. The largest quite leaf-shaped specimen has a height of ca. 140^{mm}, a breadth of 215^{mm}, and a thickness in the middle of ca. 10^{mm}; thus it is considerably thinner than the typical specimens. The consistency is brittle and little elastic, and the specimens are therefore easily broken; the thin, leaf-shaped specimens are more flexible. The colour (in spirit) is more or less dark brown, often quite black; a few pieces have kept their original lighter colour. The *surface* is smooth, without projecting spicules. The *dermal membrane* is very distinct and may easily be removed. It is a thin and transparent film with a special skeleton of dermal spicules lying horizontally in it, and it is supported by more or less perpendicular pillars of dermal spicules. *Pores* and *oscula*: As mentioned above, pores are found on one side and oscula on the other. On the pore side the spicules form a network, and the pores are here very close-standing, especially in the grooves, while they are few or wanting on the walls separating the grooves. Several pores are lying together in the meshes of the network, they are round or oval and of a diameter from 0·024–0·17^{mm}. On the opposite, more even side oscula are found, they are present in large numbers and rather close-lying. They are circular or oval, their edge is most frequently slightly rising, and generally somewhat fringed. Their size was measured from 2·5 down to 0·5^{mm}. The close-lying spicules of the skin reach into the fringes of the oscular edge.

The *skeleton*. The *dermal skeleton*. A genuine dermal skeleton, lying in the membrane itself, is found here, besides the skeleton that supports the membrane and also consists of dermal spicules. The skeleton of the membrane itself is differently arranged on the two sides of the sponge. On the pore side and especially in the grooves of this side a beautiful reticulation is found, recalling the reticulation in *Halichondria panicea*. The reticulation is polyspicular and forms triangular or polygonal meshes. It may have a somewhat different appearance, and the fibres may have more or fewer spicules alongside, and also single spicules may be found subdividing the larger meshes by running from the fibres in between the pores. Sometimes the dermal spicules form longer, thicker fibres running irregularly, and the spaces bounded by these fibres are again subdivided by thinner fibres or single spicules. On the walls between the grooves the reticulation may be more irregular, or the spicules may be quite scattered. On the oscular side the spicules are not arranged in a network; they are here scattered, or only gathered in a somewhat bundle-like way, and they are rather close-lying. The dermal membrane thus equipped is on both sides of the sponge supported by pillars of dermal spicules; these pillars issue from the skeleton below and pass to the dermal membrane, but they do not pierce it. Generally the pillars spread a little in a penicillate way towards the ends. Most frequently these pillars are short, only a little longer than one spicule, but under the grooves of the pore side they may get a greater length. In these latter places large subdermal cavities are then formed, and the cavities under the membrane seem upon the whole to be larger on the pore side than on the oscular side. The *main skeleton* is a rather close, irregular, polyspicular reticulation; the meshes are triangular or irregular, and no distinction can be made between primary fibres and secondary ones. The number of spicules in the fibre may be varying, generally it seems to be two to six. In conformity to the construction no longer fibres are found in the irregular net of meshes formed in this way. Sometimes, however, longer fibres may be found, running chiefly in the longitudinal direction up through the sponge, and especially to be seen in longitudinal sections parallel to the surfaces; but they are thin, little conspicuous, and only to be seen when sections of the skeleton are viewed under the microscope. Down towards the base the sponge is most frequently rather hard and solid; the skeletal net is here still more close than farther up, and the fibres are thicker and consist of more spicules; in other respects, however, it has the same appearance as farther up, and has no longitudinal fibres; moreover, it is often more irregular and somewhat diffuse. The skeletal net, when seen in larger sections, is of a peculiar appearance on account of the many canals running through it. They are present in very large numbers, and run chiefly, at all events the larger ones, more or less horizontally through the sponge from the subdermal cavities of the pore side to the oscula. In a transverse section, therefore, they are seen as straight or somewhat curved, sometimes branched canals passing from one side to the other, while in a section parallel to the surface they are seen as close-set round holes. A white and little conspicuous mass of spongin is found in the nodes of the skeleton; in the more solid basal parts the spongin is a little more copious and more extended in the network than farther up. In the dermal network no spongin is found.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are straight or, most frequently, curved in different degrees, often nearest to the head-end. The point may be somewhat varying in different individuals, from rather short to middle long. The spinulation may vary much in different individuals; in some it is very dense in the whole extent of the spiculum, and then all transitions are found to almost quite smooth spicules. Also the size of the spines is varying, from rather coarse to very fine; the coarse spines are especially found in the highly spined needles. Sometimes the spines are more closely gathered round the head-end of the style, and they are also often closely gathered near the point. In some needles the spinulation continues out on the very point, in others the point is smooth. The mentioned variation takes place especially from one individual to another, but some variation may also be found in one individual. When all the examined individuals are included, the length of the styli varies from 0·26—0·45^{mm}, these being thus the extreme limits found, but it does not vary very much in the single individuals; as instances may be given, 0·26—0·31^{mm}, 0·29—0·37^{mm}, 0·35—0·42^{mm}, 0·38—0·45^{mm}. The thickness varies between about 0·010—0·020^{mm}; it is otherwise also somewhat varying in the individuals, those with the longest needles having not always the thickest ones. A few finer, slightly spined developmental forms were seen. 2. The dermal spicules are tylota with spined ends; they may be straight or more or less curved, most frequently they are evenly and slightly curved; they may be of about equal thickness throughout, but they are oftenest thickest in the middle and accordingly fusiform. Generally the two ends are not equal, one being a little thicker and with a roundish swelling, the other a little thinner with a more longish swelling, which is most frequently less marked; the difference, however, is often slight or quite imperceptible. These spicules are much less varying than the skeletal ones; their common length is 0·238—0·298^{mm}, sometimes up to 0·31^{mm}; in individuals in which the skeletal spicules are of the greatest length, the dermal spicules may also be of the longest, for instance 0·28—0·3^{mm} long. The thickness is ca. 0·005—0·011^{mm}, most frequently about 0·008^{mm}. Of the dermal spicules a few developmental forms were seen showing that they are begun as monactinal needles. b. *Microsclera.* These are anisochelæ palmatæ of the *Iophon*-type and bipocilla. 1. The chelæ are of the form common in the genus; the tooth is of the same or about the same breadth as the alæ, and of the same length or a little shorter; at the smaller end the tooth and the alæ are of equal size, and here the axis in the common way sends off from the curve a short spur. At the larger end a longish tuberculum is found; at the lower end the tuberculum appears together with the spur as a pear-shaped body. The chelæ vary much in size, and at the same time the dimensions are a little altered, the larger end of the smaller chelæ

being comparatively larger than that of the larger chelæ. The chelæ may also vary somewhat in form in different individuals, thus sometimes the alæ of the larger end may continue far down towards the other end, and may even be united with the alæ of this end, which feature, however, must be regarded as a monstrosity; in such cases also the tooth passes far down towards the tooth of the lower end. The length of the chelæ is between 0·016 and 0·036mm, and the breadth is 0·0057—0·011mm.
2. The bipocilla are of the common form described in the preliminary remarks of the genus; the slight indentation of the edge of the lower end is rather distinct under high magnifying powers. The shaft is somewhat expanded through its whole length, and above it forms a narrow ala on either side. The bipocilla are somewhat varying in size, as well in one individual as in different individuals; in the larger ones the indentation of the edge of the lower end is distinctly discernible; the indentation often continues rather far up. Sometimes, especially in some individuals, monstrous forms of the bipocilla occur, the most common monstrosity being that the tooth of the upper end is split, often quite irregularly, and also the alæ may be separated from the shaft and assume peculiar forms. The length of the bipocilla varies from 0·008—0·014mm, but sometimes it does not exceed 0·011mm. The microscleres are found both in the tissue and in the dermal membrane, perhaps in larger numbers at the latter place. Sometimes the chelæ seem to be present in larger numbers than the bipocilla, sometimes the reverse is the case.

Embryos. In some individuals embryos were found lying in the tissue in large numbers. They are globular, and their diameter is ca. 0·30mm. Of spicules the examined specimens showed only chelæ, which are thus the first occurring spicules. In the spicula-preparations, however, just from specimens with embryos, some needles are found gathered in a bundle-like manner, which have surely belonged to the embryos. These spicules are straight or slightly curved; they are highly thickened at the head-end, thus approaching subtylostyli, and they are comparatively strongly spined; they were measured to a length of 0·12—0·14mm.

This species is characteristic and well bounded, when both the outer form, the spicules, and the structure of the dermal skeleton is considered. — I regard the determination as sure. Vosmaer's specimen evidently is not regularly cup-shaped, what is seen partly from the figure, partly from the expression "a cup-shaped great mass". It is also to be noticed that his figures 79 and 80 evidently represent spicules not belonging to the sponge; fig. 80 looks as a *Mycale*-anisochela. — The species mentioned by Levinsen (Dijmphna-Togtets zool.-bot. Udbytte, 360, 161) as *Esperella fusca*, according to my examinations, is not this species, but a new one, see under *I. frigidus* p. 183. The species mentioned by Fristedt l. c. as *Esperia nigricans*, to judge from a fragment examined by me, is identical with the present species, as is also shown by his remark that the sponge may be leaf-shaped; when he says that it is generally an amorphous mass, it is, I suppose, on account of his having had only fragments before him.

Locality: This species has been obtained in a great many specimens, mostly, however, only fragments. Station 1, 62° 30' Lat. N., 8° 21' Long. W., depth 132 fathoms; station 3, 63° 35' Lat. N., 10° 24' Long. W., depth 272 fathoms; station 4, 64° 07' Lat. N., 11° 12' Long. W., depth 237 fathoms; station 7, 63° 13' Lat. N., 15° 41' Long. W., depth 600 fathoms; station 27, 64° 54' Lat. N., 55° 10' Long. W., depth 393 fathoms; station 32, 66° 35' Lat. N., 56° 38' Long. W., depth 318 fathoms; station 43, 61° 42' Lat. N., 16° 11′ Long. W., depth 645 fathoms; station 53, 63° 15′ Lat. N., 15° 07′ Long. W., depth 795 fathoms; station 54, 63° 08′ Lat. N., 15° 40′ Long. W., depth 691 fathoms; station 55, 63° 33′ Lat. N., 15° 02′ Long. W., depth 316 fathoms; station 73, 62° 58′ Lat. N., 23° 28′ Long. W., depth 486 fathoms; station 81, 61° 44′ Lat. N., 27° 00′ Long. W., depth 485 fathoms; station 85, 63° 21′ Lat. N., 25° 21′ Long. W., depth 170 fathoms; station 92, 64° 44′ Lat. N., 32° 52′ Long. W., depth 976 fathoms; station 93, 64° 24′ Lat. N., 35° 14′ Long. W., depth 767 fathoms; station 95, 65° 14′ Lat. N., 30° 39′ Long. W., depth 752 fathoms; station 96, 65° 24′ Lat. N., 29° 00′ Long. W., depth 735 fathoms; station 98, 65° 38′ Lat. N., 26° 27′ Long. W., depth 138 fathoms; station 115, 70° 50′ Lat. N., 8° 29′ Long. W., depth 86 fathoms; station 143, 62° 58′ Lat. N., 7° 09′ Long. W., depth 388 fathoms (bottom temperature ÷ 0°4 C.). It has further been taken in the Denmark Strait at 65° 29′ Lat. N., 28° 25′ Long. W., depth 553 fathoms (Ryder), and at 63° 15′ Lat. N., 9° 35′ Long. W., depth 270 fathoms (Wandel). Finally it has been taken at 64° 56′ Lat. N., 11° 48′ Long. W., depth 115 fathoms, and 62° 30′ Lat. N., 1° 56′ Long. E., depth 275 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). The greatest number of specimens were taken at station 95. The localities are situated over about the whole Ingolf-territory, in the Davis Strait, the Denmark Strait, south of Iceland, at Jan Mayen, between Iceland and the Faröe Islands, and at the coast of Norway.

Geogr. distr. The Barent Sea, at depths of 145, 170, 192, and 220 fathoms (Vosmaer l. c.); Fristedt l. c. has it from north of Spitzbergen, 79° 47′ Lat. N., 11° 15′ Long. E., depth 100 fathoms, and at South-Greenland, 59° 33′ Lat. N., 43° 25′ Long. W., depth 120 fathoms. The species is, accordingly, widely distributed between ca. 50° Long. W. and 50° Long. E. and between ca. 59° and 80° Lat. N. Its bathymetrical range is from 86 fathoms (at Jan Mayen) to 976 fathoms (the northern Denmark Strait). The species seem to be a native on bottom with positive temperature; it was taken, however, at station 143 with a temperature of ÷ 0°4 C.

2. **I. dubius** Arm. Hans.

Pl. VI, Figs. 2—5. Pl. XVII, Fig. 4 a—e.

1885. *Reniera dubia* Armauer Hansen, The Norwegian North-Atlantic Exp. XIII, Spongiadæ, 6, Pl. II, fig. 1, Pl. VI, fig. 7.

1887. *Esperia Pattersoni* Fristedt (non Bow.), Vega-Exp. vetensk. Iakttag. IV, 448.

The form most frequently branched, more or less free or somewhat coalesced, cylindric or flattened branches issuing from a base; sometimes the sponge is more irregularly lobate or forms incrustations. The surface smooth or very slightly shaggy. The dermal membrane an easily separable, thin film, provided with a reticulation of dermal spicules, and supported by penicillate bundles of such spicules. Oscula scattered. The skeleton a close, irregular, partly polyspicular, partly unispicular reticulation. Spicula: Megasclera: the skeletal spicules acanthostyli 0·208—0·274^{mm}, the dermal spicules tylota to strongyla with spined ends 0·19—0·25^{mm}; microsclera of two forms, anisocheliæ palmatæ of the Iophon-type 0·017—0·031^{mm}, bipocilla 0·007—0·010^{mm}.

This species may, according to its mode of growth, have a somewhat varying appearance. It grows especially on Hydroids, and is found on many different species, and on erect Bryozoa. It may then form common, more or less thick incrustations, the thicker ones may be irregularly cushion-shaped, or they send off more or less stubby lobes. By far most frequently, however, it forms more or less free branches that may here and there be attached to the branches of the Hydroid, but may also be quite free; thus, as to its mode of growth, it reminds of *Esperiopsis Normani*, and the branched form is the one that is typical and most characteristic of the species. The branches may be variously formed, thicker and more irregular and flattened, or thinner and cylindric. They may branch in different ways, and they may be more or less coalesced, sometimes in such a way as to form plate-shaped parts. When the species is growing on a different substratum, it may form a common incrustation, but this seems to be a rare case; we have only one specimen of this form, growing on a large shell of *Modiola modiolus*. The largest specimens in hand, which may be described as irregular, longish cushions, have a greatest extent of 75^{mm}. The most frequent length of the more or less branched specimens is ca. 25–55^{mm}. The consistency is of middle firmness and somewhat elastic, the free branches are soft and flexible. The colour (in spirit) is a lighter or darker brown to grayish black or almost quite black; in some of the jars the sponge has kept its original grayish yellow colour, or has only turned a little darker. The *surface*, when undamaged, is smooth or at most very slightly shaggy. The *dermal membrane* is a thin and transparent film, but it is distinct and separable; it has a special skeleton of horizontal dermal spicules, and it is supported by more or less perpendicular pillars of dermal spicules; these spicules may be a trifle projecting. The *pores* are round; in most places they are lying close together in the meshes of the dermal reticulation, several pores in each mesh. They are rather small, their size being measured to between 0·023–$0·083^{mm}$. *Oscula* are little conspicuous, but they may almost always be found by a closer examination. Most frequently they are more or less hidden at the base of the branches or in the clefts between these, or at other places in folds of the surface. They form most frequently irregular openings, the thin membrane round them being split into lobes; in these lobes the dermal spicules are closely gathered parallel to the longitudinal axis of the lobe, that is to say, with the ends towards the opening. Most frequently the oscular aperture leads into a larger or smaller cavity just under the membrane. Oscula are present in only rather small numbers.

The *skeleton*. The *dermal skeleton* is of a similar structure as in *I. piceus*, and forms a beautiful, in most places rather close, reticulation of polyspicular fibres. The meshes are triangular, quadrangular, or polygonal. The fibres have rather many spicules alongside, but in this respect they are varying, and accordingly of varying thickness; generally thicker fibres are found having a sinuous course, chiefly in the longitudinal direction of the sponge; between these fibres then thinner ones are found, and sometimes only a few spicules are seen together, or the meshes are divided by single spicules. As in the preceding species the fibres are almost always of some length so as to contribute to the formation of several meshes, more rarely they are so short that they only reach from one fibre to the next; the thickest fibres are generally the longest. This structure gives to the dermal reticulation a peculiar, characteristic appearance; the appearance may otherwise be somewhat varying, especially with regard to the closeness of the net of meshes and the thickness of the fibres. The dermal membrane is supported by perpendicular or more or less recumbent pillars of dermal spicules, spread in a penicillate way; these spicules may project quite slightly through the membrane, so that the surface becomes very slightly shaggy. The pillars are generally only of the length of one spicule. The *main skeleton* is a close, quite irregular reticulation, in which there is no distinction between primary and secondary fibres. The network is partly polyspicular, partly unispicular, from one to four or five spicules being found alongside. Some long fibres are found, especially distinct in the branches, in which they run longitudinally; they are not thick, however, scarcely above 0·03^{mm}. In the nodes of the skeleton a little copious, white, and clear mass of spongin is found, but no spongin is seen in the dermal skeleton.

Spicula: a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are either quite straight or slightly curved. The point is rather short, at most middle long. The spinulation may be somewhat varying, the spines being more or less powerful, but they are most frequently rather scattered; also in this feature, however, some variation is found. Next the spinulation is remarkable by the fact that the spines are almost always a little closer gathered at the upper end, and that here most frequently a few larger spines are found; especially in the thinner styli the spines are distinctly more closely gathered at the upper end. The length varies from 0·208—0·274^{mm}. The thickness is very varying, from 0·0057—0·0128^{mm}; this variation in thickness is in no proportion to the length; the thinner ones being fully as long as the thick ones. Developmental forms of the styli, down to exceedingly fine ones, are rather frequent; they are of about the full length; the finer ones are quite slightly spined, they resemble most frequently subtylostyli, a little swelling being seen just below the upper end, presumably corresponding to the closely gathered spines later found here. 2. The dermal spicules are tylota or strongyla with spined ends and of a similar form as in the preceding species; they are slightly and evenly curved; they may be about equally thick through their whole length, but most frequently they are thickest in the middle; there may be a little difference between the two ends, but most frequently they are almost quite equal. Their length is 0·19—0·25^{mm}, and the thickness 0·005—0·007^{mm}. Developmental forms were rather frequent, in which one end was always thinner than the other. b. *Microsclera* are anisochelæ palmatæ of the *Iophon*-type and bipocilla. 1. The anisochelæ are of the common form, the tooth is of about the same breadth as the alæ and most frequently a little shorter; the larger end has a long, narrow tuberculum, at the smaller end a shorter tuberculum is found joining the spur. The chelæ may be somewhat varying with regard to the length of the free part of the shaft. Their total length varies from 0·017—0·031^{mm}, the breadth is proportionally 0·006—0·0128^{mm}. Some developmental forms at different stages were seen; the youngest ones are fine staves recurved at the ends; the spur of the smaller end, which in reality is only a peculiar development of the tuberculum, is already begun at an early stage. 2. The bipocilla are of the common form, the indentation of the edge of the lower end is only seen with difficulty; their length is 0·007—0·010^{mm}. The microscleres are found throughout the tissue and especially in the dermal membrane.

With regard to the spicules this species is chiefly distinguished from *I. piceus* by having upon the whole smaller spicules, and by some difference in the spinulation of the acanthostyli; when this fact is regarded in connection with the exteriors and modes of growth of the two species and with the feature of their oscula and pores, the species are with certainty to be distinguished from each other. — As I have had a type specimen of Armauer Hansen's *Renicra dubia* for examination, I have been able to identify the species with certainty. Armauer Hansen has not seen the microscleres at all, and without an examination of the type specimen a determination would have been quite impossible, as I think that Armauer Hansen's always bad drawings of spicula may be said to reach their climax in the figures of the spicula of this species. Also of Fristedt's *Esperia Pattersoni* I have examined one of the author's specimens, and have found his species to be identical with *dubius*, only the spicules are a little more spined than in my specimens. How the relation is between this species and those of Bowerbank, I cannot say with certainty; the question can only be of the two species *nigricans* and *Pattersoni*. Of *Pattersoni* I have examined a specimen sent me by the Rev. Mr. Norman; according to this specimen, this species seems to have thinner styli, they did not exceed 0·008mm in thickness. Bowerbank figures the dermal spicules as spined all over, but in the description he says "terminally spined"; in the specimen I have examined only the ends were spined. *I. nigricans* I have not seen; the style figured by Bowerbank does not show the spines more closely gathered at the upper end, but this feature is not always distinctly marked in *dubius* either. None of the two species, on the other hand, seems to have the characteristic exterior so frequent in *dubius*. Topsent (Rev. biol. du Nord de la Fr. VII, 19) unites Bowerbank's two species, which is perhaps correct; neither is it precluded that the present species may prove to be identical with them; this question can only be decided by a close examination of all Bowerbank's specimens, and for the present *dubius* must be kept up.

Locality: We have a very great number of the species, but only from the sea round the Faröe Islands, where it must be very commonly found, and southeast of Iceland. At the north end of Nolsö, depth ca. 100 fathoms; six miles northwest of Kalsö, depth 60 fathoms; thirteen miles northwest of Borönæs, depth 30 fathoms (Th. Mortensen); 64° 27' Lat. N., 13° 27' Long. W., depth 84 fathoms (Ad. Jensen, the cruise of the «Michael Sars» 1902).

Geogr. distr. Between Spitzbergen and Norway, at 72° 27' Lat. N., 35° 01' Long. E., depth 136 fathoms (The Norwegian North-Atlantic Exp.); the Vaigat Islands at Spitzbergen, depth 60 fathoms (Fristedt l. c.). The species seems to be a native of rather shallow water, its bathymetrical range being 30–136 fathoms. For the locality from the Norwegian North-Atlantic Expedition is stated a bottom temperature of 0° C.

3. I. frigidus n. sp.

Pl. XVII, Fig. 5 a–f.

1886. *Esperella picea* Levinsen, Dijmphna-Togtets zool.-bot. Udbytte, 360, Tab. XXXI, figs. 1, 2 a–d.

Form? The dermal membrane a thin film with a reticulation of dermal spicules. The skeleton an irregular, for a great part unispicular, network. Spicula: Megasclera: the skeletal spicules acanthostyli with some close-set, large spines at the head-end, 0·208–0·387mm; the dermal spicules styli with spined ends 0·25–0·32mm; microsclera of one form, anisochelæ palmata of the Lophon-type 0·017–0·022mm.

Of this species we have from the Ingolf-territory only one very small fragment, and so I am obliged to use Levinsen's specimen for the description; also this specimen, however, is so badly preserved, that the description must chiefly be restricted to the spicules. From the Kara Sea we have some fragments (Levinsen's specimen), which have presumably belonged to one sponge. The largest one of these fragments has a greatest extent of 70mm. The consistency in the present state is loose and soft, and the colour (in spirit) is brown, not especially dark. A thin *dermal membrane* is found with horizontal spicules, forming a net, but it has not been possible to examine the structure more particularly, as the dermal membrane is mostly wanting. *Oscula* and *pores* were not seen; the largest fragment, which is of a longish form, may perhaps have had an osculum in one end, which then must have been the upper end, an opening being found here leading into a long canal, but nothing can be said with certainty as to this fact.

The *skeleton*. The *dermal skeleton*, as mentioned, consists of dermal spicules lying horizontally in the dermal membrane, and the membrane is presumably supported in the common way by perpendicular spicules. The *main skeleton*, as far as I have been able to examine it, consists of an irregular network, partly polyspicular, partly, and for the greater part, unispicular; as in the two preceding species, some longitudinal fibres are found here and there. In the nodes of the skeleton a very slight, white, and clear mass of spongin is found.

Spicula: a. *Megasclera*. 1. The skeletal spicules are acanthostyli; they are comparatively long and slender, somewhat curved, sometimes straight; the curve is most frequently nearest to the upper end. The point is middle long or rather long. The spinulation may be somewhat varying, from tolerably close to rather scattered, and there may also be some difference in the sizes of the spines; the point is generally smooth for a shorter or longer space. A very characteristic feature of the needle is that at its upper end some closer standing, larger spines may be found; this feature may be more or less marked, but is almost never quite wanting. The length is 0·298—0·387^{mm}, the shortest forms are not frequent; the thickness is 0·0071—0·0128^{mm}. The specimen from the Kara Sea has comparatively shorter and thicker styli than that obtained by the Ingolf. 2. The dermal spicules are tylota with rather slightly swollen, spined ends; they are straight or very slightly curved, and cylindrical or slightly fusiform. As usual, there is a little difference between the two ends, one being a little thicker, the other a little thinner with a longer swelling; in the thicker end the spines are most frequently only found at the very end, which is somewhat abruptly cut off; the same feature may be seen in the thinner end, but here they extend most frequently all over the swelling. The length is 0·25—0·32^{mm} and the thickness 0·0055—0·0085^{mm}. b. *Microsclera:* these are of only one form, anisochelæ palmatæ, bipocilla not being found. The chelæ are of the common type, the free part of the shaft is comparatively long, the tooth is of the same breadth and the same, or about the same, length as the alæ. They vary somewhat in size, the length is 0·017—0·044^{mm} and the breadth 0·005—0·015^{mm}.

This species is especially characterized by its rather long, slender styli with a few larger spines at the head-end, and by the form of one or both ends of the tylota. The want of bipocilla is rather interesting, and may also be regarded as a character of importance; but this fact alone would not be sufficient for a characterization of the species, as the bipocilla seem to be present in very different numbers in different individuals of the same *Iophon*-species, and they may sometimes be found in very slight numbers. Levinsen l. c. says that two sizes of the chela occur, but in reality all transitions as to size are found.

Locality: From the Ingolf territory we have only a small fragment obtained at East-Greenland, at 72° 25' Lat. N., 19° 33' Long. W., depth 140 fathoms (The East-Greenland Expedition 1891—92).

Geogr. distr. Levinsen's specimen is from the Kara Sea, depth 73 fathoms. To judge from these two localities, there is some reason to suppose the species to be a native of the cold bottom.

It was said in the preliminary remarks of the genus that a close relation, no doubt, existed between the genera *Iophon* and *Pocillon*. The two last described species, *I. dubius* and *frigidus*, also show some features indicating such a relation. Thus both of them, and especially the latter, show a little larger spines at the head-end of the acanthostyli, which is a feature common in *Ectyoninæ*. In *I. dubius* some thinner acanthostyli are further found which have as a marked feature larger spines at the head-end, but are connected with the thicker styli by all transitions, and considerably shorter acanthostyli are found quite singly. In *I. frigidus*, as mentioned, the larger spines at the head-end of the styli are still more marked than in *dubius*, and also here a few shorter acanthostyli are found, reminding of the accessory styli of the *Ectyoninæ*. It is absolutely impossible to refer the two species to the *Ectyoninæ*, as no spicules are found at all projecting from the fibres, and perhaps, as has often been hinted at before, it is not improbable that the division into *Mycalinæ* and *Ectyoninæ* is no natural one, and will have to be abandoned.

Iotrochota Ridley.

The form varying, incrusting, thick cushion-shaped or irregularly massive, erect, more or less leaf-shaped, or frequently more or less cylindric, unbranched or with few branches. The skeleton also developed very variously, in the incrusting forms quite irregular and diffuse, consisting of spicules and spicula-bundles; in the massive ones it becomes an irregular, polyspicular network, and in the erect ones it passes into a more regular arrangement, which may become quite regular with primary and secondary fibres. Spongin generally or always present to a higher or, most frequently, smaller degree. Spicula: Megasclera: the skeletal spicules styli, sometimes with a tendency towards a rounding of the point, or a mixture of styli and oxea, or exclusively oxea, oftenest smooth, sometimes (I. spinosa) spined, the dermal spicules tylota or strongyla, in a few cases with so different ends as to become tornestrongyla or styli; microsclera pluridentate isancoræ unguiferæ and birotulæ, or only birotulæ of one or two forms.

1. **I. varidens** n. sp.

Pl. XVIII, Fig. 1 a—e.

Incrusting. The surface smooth. The dermal membrane rather thin, supported by erect or more or less recumbent bundles of dermal spicules. The skeleton a diffuse network of spicula-bundles and single spicules. Spicula: Megasclera: the skeletal spicules styli 0·51—0·608mm, the dermal spicules tylota 0·208—0·38mm; microsclera of two forms, isancoræ unguiferæ with five to eight free teeth 0·052—0·057mm, birotulæ with nine to fourteen teeth 0·015—0·018mm.

Of this species we have one entire specimen and a small fragment. The species seems to be incrusting, the entire specimen forming an irregular incrustation growing on pebbles and other bottom material. The specimen has a greatest extent of 25mm, and the thickness is about 10mm. The colour (in spirit) is grayish yellow. The consistency is rather firm. The *surface* is about smooth. The *dermal membrane* is a rather thin film, supported by bundles of dermal spicules most frequently highly recumbent. *Pores* and *oscula* were not seen on the specimen.

The *skeleton*. The *dermal skeleton*, as far as I have been able to judge from the material, consists of bundles of dermal spicules more or less erect, but most frequently so highly recumbent as to be lying almost or quite horizontally in the membrane. In places they may become short fibres. The *main skeleton* is quite irregular and consists of a diffuse network of loose spicula-bundles and single spicules, but fibres are not formed, at most loose, band-like strings. Spongin is found in the skeleton, chiefly cementing the ends of the spicula-bundles, but it is only present to a very slight amount, and is only to be observed with difficulty.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli, more or less curved, only rarely straight, they are evenly and middle long to rather long pointed; generally they are a little tapering towards the rounded end. Their length is rather constant and is between 0·51 and 0·608^{mm}, most frequently nearer to the latter size, the thickness is 0·013—0·019^{mm}. Developmental forms, down to quite fine ones, were seen singly. 2. The dermal spicules are tylota, they are almost always straight, at most quite slightly curved, and they are a little thicker in the middle than towards the ends. Their length is somewhat varying, from 0·298—0·38^{mm}, and the thickness is 0·005—0·009^{mm}. A few developmental forms were seen, of which the finer ones have one end distinctly thinner than the other. b. *Microsclera:* these are of two forms, isancoræ unguiferæ and birotulæ. 1. The ancoræ have an evenly curved shaft and a number of from five to eight teeth at either end. Alæ are not found, but besides the mentioned number of teeth that are free, one or two teeth are found running down the dorsal side of the shaft and coalesced with it. The one or two teeth thus connected with the shaft grow considerably longer than the free teeth; their form and the way in which they are connected with the shaft are quite irregular, sometimes one is situated just at the dorsal side, sometimes they are found one at either side, or one more at the side, the other more behind. Also the free teeth show some irregularity, some being broader than others, which is dependent on their number. The number of teeth may also be different at either end. The length is 0·054—0·0657^{mm}, and the thickness of the shaft is 0·0050—0·0057^{mm}. A few developmental forms were seen, the youngest ones showed only a knob-shaped expansion at either end. 2. Birotulæ have a straight shaft, and at either end a circle of nine to fourteen narrow, inwardly curved teeth. As the number of teeth is upon the whole varying, it may also be different at the two ends. Some irregularity may also here be found in the form, as some teeth may be broader than others. The length is 0·015—0·018^{mm}, sometimes up to 0·021^{mm}, the breadth across the teeth is 0·004—0·006^{mm}, and the thickness of the shaft ca. 0·001^{mm}. The microsclera are found throughout the sponge, but are especially seen in the dermal membrane; birotulæ are the most numerous ones.

Locality: Station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms, a small fragment; 61° 09' Lat. N., 7° 54' Long. W., depth 180 fathoms, one specimen (Ad. Jensen, the cruise of the "Michael Sars" 1902). The two localities are situated in the Denmark Strait and south of the Faröe Islands.

2. I. oxeata n. sp.

Pl. VI, Fig. 6. Pl. XVIII, Fig. 2 a—f.

Thickly incrusting, massive or irregularly lump-shaped or roundish. The surface almost smooth. The dermal membrane a thin film, supported by penicillate, erect, or more or less recumbent bundles of *dermal spicules. Oscula scattered. The skeleton an irregular reticulation of spicula-bundles and single spicules. Spicula: Megasclera: the skeletal spicules oxea 0·56—0·68*$^{\text{mm}}$*; the dermal spicules tylota 0·32—0·42*$^{\text{mm}}$*; microsclera of two forms, isancoræ unguiferæ with nine to thirteen free teeth 0·048—0·065*$^{\text{mm}}$*, birotulæ with thirteen to ca. twenty teeth 0·015—0·020*$^{\text{mm}}$*.*

This species is of a quite irregular, most frequently tuberous or lumpy form; one specimen is more regularly roundish. Sometimes it forms thick incrustations, and one individual, presumably a very young one, forms a small, thin incrustation. The typical form evidently is from a tolerably thick incrustation to a more or less irregular lump. The largest specimen has a greatest extent of fully 40$^{\text{mm}}$, but I think it may grow larger, as we have specimens of similar sizes, which are not entire ones. It grows on shells of mollusca, on other sponges, and frequently on loose bottom material, as small shells or pebbles and gravel. The colour (in spirit) is a dirty brown of a lighter or darker shade. The consistency, as it seems, may be a little varying, from middle firm to somewhat firmer, most frequently, however, it is rather brittle. The *surface*, where it is undamaged, seems to be about smooth, or at most slightly shaggy. The *dermal membrane* is a thin, transparent film, which, when detached, has a tendency to contract. It is supported by bundles of dermal spicules. *Pores* were only seen here and there on the surface, gathered into pore-sieves, in which the single pores are only separated by thin strings of tissue. Their size was measured to 0·07—0·24$^{\text{mm}}$. *Oscula* are found scattered as circular apertures, sometimes the dermal membrane rises a little round them like a spout.

The *skeleton*. The *dermal skeleton* consists of more or less penicillate bundles of dermal spicules, which may be erect or more or less recumbent. The dermal skeleton is often very little developed, the bundles being placed with great intervals, and then the membrane seems to be resting on the skeleton below, the spicules of which may project; this feature, however, is perhaps due to contraction, but as the dermal membrane is highly damaged in all the specimens in hand, it cannot be decided with certainty. The *main skeleton* is an irregular reticulation of spicula-bundles and partly single spicules, forming quite irregular meshes. Fibres are not formed. The sponge is most frequently rather lacunous, on account of the many canals, chiefly running towards the surface. Spongin is found where the spicula join in the skeleton, but only to a rather slight amount. The sponge frequently embodies foreign bodies copiously, as foraminifera, gravel and the like.

Spicula: a. *Megasclera.* 1. The skeletal spicules are oxea, they are slightly curved, sometimes with a somewhat sharper bend in the middle, and then they show some resemblance to the oxea in *H. panicea.* They taper only very little from the middle outward, the point itself is middle long. Their length is 0·56—0·68$^{\text{mm}}$, and the thickness in the middle is 0·014—0·020$^{\text{mm}}$. Developmental forms, down to quite fine ones, occurred in small numbers. 2. The dermal spicules are tylota with tolerably well developed end-swellings; they are most frequently straight; sometimes they may be quite slightly curved; they are about cylindrical. Their length varies from 0·32—0·42$^{\text{mm}}$, in a few cases they may be still a little longer, but most frequently the length is about midway between the two sizes given, ca. 0·37$^{\text{mm}}$. The thickness is 0·006—0·0085$^{\text{mm}}$. In the fully developed tylota no difference or only a slight one is found between the two ends, but such a difference is found in the developmental forms; the finer they are, the thinner is one end, and its swelling is more longish than that of the other end; in the very finest developmental forms one end is pointed. b. *Microsclera;* these are of two forms, isancoræ unguiferæ and birotulæ. 1. The ancoræ are constructed quite as those of the preceding species, but they have from nine to thirteen free teeth at either end. Also here one or two teeth are found which are connected behind with the shaft; sometimes these teeth coalesce so completely with the shaft, that they are almost not to be traced, and otherwise there is the same irregularity as in the preceding species. In a few cases the shaft is attached in the middle, and the teeth are free all round, but the shaft is also then curved. The length of the ancora is 0·048—0·065^{mm}, in a few cases up to 0·074^{mm}, the thickness of the shaft is 0·004—0·0058^{mm}. Some developmental forms were seen, showing only a slight swelling at either end, even when the shaft has reached a rather considerable thickness; later slight ribs are formed, which develop into the teeth. 2. Birotulæ are of the same structure as in the preceding species, but they have more teeth, from thirteen to ca. twenty; how great the number may be, I cannot decide, as I have not been able to count them with certainty. The length is 0·015—0·020^{mm}, the breadth across the circle of teeth ca. 0·005^{mm}, and the thickness of the shaft 0·0010^{mm}. The microscleres are found throughout the sponge and especially in the dermal membrane, in which the ancoræ seem more particularly to occur; the birotulæ, otherwise, are present in far greater numbers than the ancoræ.

This species is peculiar by the fact that its skeletal spicules are oxea; another *Iotrochota*-species, *I. birotulata* Higgin, is stated to have diactinal skeletal spicules, which are not, however, oxea, but strongyla; and the fact seems to be that these spicules are really styli with rounded points. In the present species, on the other hand, the question is of real oxea with quite equal ends, neither show their developmental forms any trace of a monactinal origin.

Locality: We have a rather copious material of the species, but most specimens are damaged. Station 9, 64° 18' Lat. N., 27° 00' Long. W., depth 295 fathoms; station 10, 64° 24' Lat. N., 28° 50' Long. W., depth 788 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. W., depth 310 fathoms; station 94, 64° 56' Lat. N., 36° 19' Long. W., depth 204 fathoms; station 97, 65° 28' Lat. N., 27° 39' Long. W., depth 450 fathoms; station 98, 65° 38' Lat. N., 26° 27' Long. W., depth 138 fathoms; further it has been taken at 62° 29' Lat. N., 50° 17' Long. W., depth 160 fathoms, 61° 10' Lat. N., 5° 46' Long. W., depth 160 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). The localities are situated in the Denmark Strait and east of the Faröe Islands. The depths are 138—788 fathoms.

3. I. abyssi Cart.

Pl. XVIII, Fig. 3 a—d.

1874. *Halichondria abyssi* Carter, Ann. Mag. Nat. Hist., Ser. 4, XIV, 245, Pl. XIV, figs. 26—28, Pl. XV, fig. 40 a—c.

We have not this species in the Ingolf-material, but I have examined a preparation of Carter's type specimen kindly sent me by Dr. Kirckpatrick. Carter's description of the spiculation is chiefly correct. The megasclera are oxea and styli, and the dermal spicules are tylota. The oxea are curved, almost always with a rather sharp bend in the middle, sometimes irregularly; the points are rather long. The oxea have a length of 0·6—0·67^{mm} and a thickness of 0·010—0·014^{mm}. The styli are evenly curved, sometimes straight, with shorter points than the oxea; they are 0·408—0·49^{mm} long and ca. 0·014—0·016^{mm} thick, and are thus thicker than the oxea. To judge from the preparation there is no reason to doubt that both forms belong to the species. The dermal spicule has been figured incorrectly by Carter; it is a tylote, most frequently quite straight, about equally thick through its whole length, with a distinct swelling at either end. Its length is 0·298—0·357^{mm}, and the thickness is ca. 0·007^{mm}. The length of the ancoræ is 0·055—0·06^{mm} and the length of birotulæ 0·015—0·018^{mm}. On the other hand, I am not able to see from the preparation, how many teeth the ancoræ and birotulæ have; but it may be decided that Carter's statement of the ancora having six teeth is not correct; perhaps it may have six, but most frequently it has more, and, as usual, the number is not constant. Birotulæ, according to what I have been able to count when they were seen from the side have most frequently twelve to fourteen teeth. Both ancoræ and birotulæ are very similar to the same bodies in *oxeata*. The bows mentioned by Carter, which were only found in one of his specimens, are quite surely foreign bodies, neither are they found in the preparation I have examined.

This species is closely allied to *oxeata*, and it shows also conformity to *varidens*, but it is separated from both these species by the occurrence of both styli and oxea.

Locality: 61° 10′ Lat. N., 2° 21′ Long. W., depth 345 fathoms (bottom temperature ÷ 1·1 C.) (The Porcupine -Expedition).

4. I. dubia n. sp.

Pl. XVIII, Fig. 4 a—f.

Incrusting. The dermal membrane supported by recumbent bundles of dermal spicules. The skeleton consisting of irregularly situated single spicules, spicula-bundles, and here and there fibre-like parts. Spicula: Megasclera: the skeletal spicules styli 0·46—0·530^{mm}, the dermal spicules tylota 0·34—0·38^{mm}; microsclera of two forms, isancoræ unguiferæ with seven to nine free teeth 0·038—0·050^{mm}, birotulæ with eleven to fourteen teeth 0·018—0·021^{mm}.

Of this species we have only one specimen, a quite small incrustation, placed on a dead balanoid shell. The greatest extent of the incrustation is 14^{mm}, the thickness does not exceed 1^{mm}. The colour (in spirit) is somewhat dark brown. The *surface* seems to be smooth. *Oscula* and *pores* were not seen.

The *skeleton*. The *dermal skeleton*. In the dermal membrane recumbent bundles of dermal spicules are seen, supporting the membrane and forming the dermal skeleton. The *main skeleton*. As far as I have been able to examine from the slight material, the main skeleton consists of quite irregularly lying spicules, mostly single, and here and there bundles, which may form fibre-like parts, but meshes are not formed. A slight amount of spongin is found where the spicules are united.

Spicula: a. *Megasclera*. 1. The skeletal spicules are styli; they are slightly curved, and the curve is most frequently found nearest to the head-end; sometimes it is more even through its whole length, or a little irregular. They are evenly and middle long or rather long pointed. They show the peculiarity that they have almost always some slight spines or rather are slightly uneven at the upper end; this feature is exceedingly slight, often almost imperceptible, but only rarely quite wanting

It may, in a few cases, continue far down the style. The length of the styli is 0·46—0·536^{mm}, and the thickness 0·0078—0·011^{mm}. 2. The dermal spicules are straight or somewhat curved tylota; their length is 0·34—0·38^{mm} and the thickness ca. 0·0044^{mm}; one end is always somewhat thinner than the other, and the swelling of this thinner end is more distinctly marked, being as large as that of the opposite end. b. *Microsclera:* these are isancoræ unguiferæ and birotulæ. 1. The ancoræ are of a similar form as in the preceding species, but the teeth are comparatively longer; they have seven to nine free teeth, and one or two teeth united with the shaft. Their length is 0·038—0·050^{mm}, and the thickness of the shaft is 0·0037—0·0050^{mm}. 2. Birotulæ have eleven to fourteen teeth at either end; their length is 0·018—0·021^{mm}, quite few reached a length of 0·028^{mm}, the thickness of the shaft is ca. 0·0013^{mm}, the breadth across the circle of teeth is 0·0057—0·007^{mm}. The microscleres occur throughout the sponge, the ancoræ are numerous in the dermal membrane; birotulæ are found in predominant numbers.

Locality: Station 93, the Denmark Strait, 64°24′ Lat. N., 35°14′ Long. W., depth 767 fathoms.

5. **I. intermedia** n. sp.

Pl. XVIII, Fig. 5 a—d.

Incrusting. The surface smooth. The dermal membrane a thin film, supported by recumbent bundles of dermal spicules. The skeleton chiefly consisting of irregularly placed spicules and spicula-bundles. Spicula: Megasclera: the skeletal spicules styli 0·357—0·48^{mm}, the dermal spicules tylota 0·26—0·34^{mm}; microsclera of two forms, isancoræ unguiferæ with nine to eleven free teeth 0·040—0·050^{mm}, birotulæ with fourteen to fifteen teeth 0·018—0·021^{mm}.

We have only one specimen, forming a longish, irregular incrustation on a *Hornera lichenoides*; the length of the sponge is 17^{mm}, and the thickness does not exceed 2^{mm}. The colour (in spirit) is a dark grayish brown. The *surface* seems to be smooth. The *dermal membrane* is a thin film, supported by bundles of dermal spicules. *Pores* and *oscula* were not seen.

The *skeleton*. The *dermal skeleton* consists of penicillate bundles of dermal spicules, projecting and supporting the dermal membrane. The bundles seem always to be highly recumbent. The *main skeleton*, as far as I have been able to examine it, consists of irregularly placed spicules and spicula-bundles. It appears that short, loose fibres may be formed, but a net of meshes is not formed. A slight amount of spongin is found where the spicules are united.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they have a slight curve at the upper end, else they are straight; they are almost not tapering, and the point is short or rather short. The upper end is very frequently distinctly the thickest part of the style. Their length is 0·357—0·48^{mm} and the thickness 0·010—0·013^{mm}. 2. The dermal spicules are tylota; they are straight and are not thicker in the middle. Their length is 0·26—0·34^{mm} and the thickness 0·0050—0·0064^{mm}. One end is always a little thinner than the other. b. *Microsclera;* these are isancoræ unguiferæ and birotulæ. 1. The ancoræ are of about the same form as in *dubia;* they have nine to eleven free teeth, and one or two teeth united with the shaft; their length is 0·040—0·050^{mm}, and the thickness of the shaft is 0·004^{mm}. 2. Birotulæ; their number of teeth seems to be more constant than in the preceding species, varying only between fourteen and fifteen, and the number was almost always fourteen, only once fifteen teeth were counted. The length of birotulæ is 0·018—0·021mm, the thickness of the shaft is ca. 0·0014mm, and the breadth across the circle of teeth is ca. 0·006mm. The microscleres are found throughout the sponge, the ancoræ are especially numerous in the dermal membrane. Birotulæ, as usual, are by far the most numerous.

Locality: Between Iceland and the Faröe Islands, 64°56' Lat. N., 11°48' Long. W., depth 115 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). One specimen.

6. **I. rotulancora** n. sp.

Pl. XVIII, Fig. 6 a—g.

Form? The surface smooth or slightly shaggy. The dermal membrane a thin film, supported by highly recumbent, often quite horizontal, bundles of dermal spicules. The skeleton consisting of spicules and a few spicula-bundles, placed irregularly. Spicula: Megasclera: the skeletal spicules styli 0·40—0·55mm, the dermal spicules tylota 0·30—0·41mm; microsclera of two forms, isancoræ unguiferæ with twelve to seventeen teeth, of which either all are free, or one or two are united with the shaft, 0·030—0·040mm, birotulæ with nine to twelve teeth 0·018—0·032mm.

We have only one specimen, which is, moreover, a fragment, or, at all events, torn off from the underlayer; the sponge, I suppose, has formed a cushion-shaped incrustation, but its form cannot be decided with certainty, and the question might perhaps be of a fragment of a more or less leaf-shaped sponge. The specimen has a greatest extent of 22mm, and the thickness is ca. 4mm. The colour (in spirit) is light brown. The consistency is middle firm. The *surface* is smooth or at most slightly shaggy. The *dermal membrane* is a thin film, contracting when detached; it is supported by bundles of dermal spicules. *Pores* and *oscula* were not seen.

The *skeleton.* The slight material in hand has rendered it impossible to examine the skeletal structure as thoroughly as was to be wished. The *dermal skeleton* consists of bundles of dermal spicules, highly recumbent, often quite horizontal. The *main skeleton* seems to consist of spicules and, here and there, of spicula-bundles, placed irregularly, and forming neither meshes nor fibres, at most here and there arranged a little loosely in a band-like way. A distinct, but little copious amount of spongin is found where the spicules are united.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they have a curve near the head-end, and are evenly and long tapering, the outermost point itself is often somewhat stubby. Their length is 0·40—0·55mm, the thickness is ca. 0·010—0·0128mm. The longest ones are not the thickest ones. 2. The dermal spicules are tylota; they are straight, only rarely a little curved, and of about equal thickness throughout the length; they are somewhat varying in length, from 0·30—0·41mm, most frequently the length is midway between the given measures; the thickness is 0·004—0·007mm. The tylota taper a little towards one end, and this end, therefore, has a more distinctly marked swelling. b. *Microsclera:* these are isancoræ unguiferæ and birotulæ. 1. The ancoræ of this species are interesting by forming a distinct transition to birotulæ. They have many teeth, twelve to seventeen, when they are counted all round. When the ancora is seen from the end, the circle of teeth is quite, or almost quite, symmetrical with uniform teeth all round, and the shaft is frequently attached inside the circle of teeth, so that all the teeth are free, and then we have really a birotula with curved shaft; one or two teeth, however, are also often here prolonged and more or less united with the dorsal side of the shaft. Their length is 0·030—0·040^{mm}, and the thickness of the shaft is 0·0021—0·0035^{mm}. A few developmental forms were seen; the beginning teeth are seen in these, while the shaft is still rather thin. 2. Birotulæ; they have nine to twelve teeth at either end, the length is 0·018—0·032^{mm}, the latter length, however, is only rarely found, the thickness of the shaft is 0·0011—0·0014^{mm}, and the breadth of the circle of teeth is 0·0057—0·007^{mm}. The largest birotulæ may have up to thirteen teeth, also thereby showing that they form a transition to the ancoræ. A few developmental forms of birotulæ were seen; like those of the ancoræ they consist of a shaft with a knob at either end, and the knobs showed slight ribs as a beginning of the teeth. The microsclera occur throughout the sponge, the ancoræ are frequent in the dermal membrane; birotulæ are most numerous.

Locality: Rathbone Island off the Liverpool-Coast on the eastern coast of Greenland, ca. 70° 40' Lat. N., depth 94 fathoms (the Amdrup-Expedition).

7. **I. polydentata** n. sp.

Pl. VI, Fig. 7. Pl. XVIII, Fig. 7 a—e.

Erect, more or less irregularly leaf-shaped, or the leaf-shape effaced, passing into a more massive form. The surface somewhat grooved, not shaggy. The dermal membrane not especially thin, on the pore side supported by recumbent bundles or short fibres of dermal spicules, and also provided with scattered, horizontal spicules; on the opposite side only horizontal, scattered spicules are found. Oscula scattered on both surfaces. The skeleton an irregular, mostly polyspicular reticulation, with loose fibres running in the longitudinal direction. Spicula: Megasclera: the skeletal spicules styli 0·42—0·57^{mm}, the dermal spicules tylota 0·25—0·34^{mm}; microsclera two forms of birotulæ, large ones with twelve to twenty teeth 0·020—0·028^{mm}, small ones with nine to fourteen teeth 0·0128—0·018^{mm}.

The largest and finest developed specimen of this species is formed like an erect, rather thick leaf, another, smaller specimen is of a similar form, while a third, also smaller specimen is thicker and more irregular, still, however, with a tendency towards the leaf-shape. According to this, the typical form of the species must be supposed to be as an erect, more or less irregular leaf. The largest specimen has a height of 70^{mm}, a similar breadth, and a thickness of ca. 20^{mm}. The colour (in spirit) is grayish-brown. The consistency is somewhat elastic, but the sponge is rather brittle. The *surface* is somewhat grooved, but otherwise smooth; the grooves arise in the common way by the dermal membrane being sunk over the subdermal cavities, which shine through as dark areas. This construction is distinctly seen in one specimen, but not in the two others, which are more compact, presumably highly contracted. The *dermal membrane* is not especially thin, and in places where the sponge is contracted it becomes still a little thicker; it is supported by dermal spicules, partly in bundles, partly scattered. The *pores* are seen in sieve-like gatherings in the skin above the subdermal cavities, they are really found over the whole surface, but are not conspicuous where the membrane passes the parts of tissue separating the subdermal cavities; they are only found on one surface of the sponge. Their common size was measured to between 0·06 and 0·18$^{\mathrm{mm}}$, and they may be still larger. The pores, as mentioned, are confined to one surface of the sponge, but this is not the case with *oscula*; these are found scattered on both sides, they form almost circular openings, and the largest ones were measured to 2·5$^{\mathrm{mm}}$, these being found in the upper edge of the sponge. On the pore side several openings are seen, from whose sizes it cannot be decided whether they are pores or oscula; but, generally speaking, oscula and pores are separated by the size.

The *skeleton*. The *dermal skeleton* consists in the common way of dermal spicules. On the pore side they form bundles or short fibres reaching from the edge of the subdermal cavities into the membrane, and sometimes branching in between the pores. They are generally highly recumbent, often quite horizontal, and spicules are also found scattered and lying horizontally in the membrane. On the side that has no pores the dermal skeleton is less developed, and here horizontal spicules are especially seen scattered in the membrane, which, to a great extent, is resting on the skeleton below. The *main skeleton* is a quite irregular, mostly polyspicular reticulation, in which, however, also single spicules are seen. Fibres are found running chiefly in the longitudinal direction of the sponge; they may divide and unite again; they are polyspicular, but loose and little marked. Thus this species, the form of which is more marked than that of the other species, also shows a tendency towards a somewhat more differentiated skeletal structure. The fibres that are present represent primary fibres, while the scattered spicula-bundles and single spicules may be regarded as representing the secondary fibres. A distinct, but white and clear mass of spongin is found in the places where the spicules are united; in places it may be seen entirely to coat the fibres with a quite thin layer. The sponge frequently embodies sand and other bottom material.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are somewhat curved, and the curve is most frequently nearest the upper end; the point is short or rather short, sometimes a little longer; it is often distinctly marked off and bounded by straight lines. Their length is 0·42—0·57$^{\mathrm{mm}}$ and the thickness ca. 0·010—0·013$^{\mathrm{mm}}$. Developmental forms, down to quite fine ones, were seen singly. 2. The dermal spicules are tylota with well developed ends; they are most frequently straight and about cylindric; their length is 0·25—0·34$^{\mathrm{mm}}$, the thickness varies from ca. 0·0028—0·0045$^{\mathrm{mm}}$. While the fully developed tylota are of equal or about equal thickness in both ends, the singly occurring developmental forms have one end a little thinner than the other and with a more marked swelling. b. *Microsclera:* these are birotulæ of two sizes. 1. The large birotulæ have at either end a number of from twelve to twenty teeth, their length is 0·020—0·028$^{\mathrm{mm}}$, the thickness of the shaft is 0·0014—0·002$^{\mathrm{mm}}$, and the breadth across the circle of teeth is ca. 0·0057—[illegible]. According to what is stated above, the number of teeth is rather varying, but some difference may be found in different individuals; thus in one specimen the number is more frequently near or at the highest number, while in the two others it only rarely reaches the highest figure. 2. The small birotulæ have at either end nine to fourteen teeth; their length is 0·0128—0·018$^{\mathrm{mm}}$, the thickness of the shaft is ca. [illegible], and the breadth across the circle of teeth is ca. 0·0042$^{\mathrm{mm}}$. As is seen, the two sizes of birotulæ approach each other very closely, and quite singly forms are seen of a size midway between the two forms. The microscleres are found as well in the dermal membrane as throughout the sponge; the small birotulæ are everywhere numerous, the large ones scarce.

Locality: The Ingolf, station 1, 62° 30' Lat. N., 8° 21' Long. W., depth 132 fathoms, two specimens; 62° 29' Lat. N., 5° 17' Long. W., depth 160 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902), one specimen; 66° 54' Lat. N., 15° 35' Long. W., depth 58 fathoms (H. M. S. "Beskytteren" Gemzoe), one specimen. The localities are situated at the Faröe Islands and north of Iceland.

8. I. affinis n. sp.

Pl. XVIII, Fig. 8 a—e.

The form massive, somewhat erect? The dermal membrane a thin film, supported by bundles and short fibres of dermal spicules. The skeleton an irregular, polyspicular reticulation. Spicula: Megasclera: the skeletal spicules styli 0·47—0·57ᵐᵐ, the dermal spicules tylota 0·35—0·44ᵐᵐ; microsclera two forms of birotulæ, large ones with nine to thirteen teeth 0·037—0·051ᵐᵐ, small ones with eleven to fifteen teeth 0·018—0·025ᵐᵐ.

Of this species we have one highly damaged specimen. To judge from this, the sponge seems to have been erect, I suppose, of about a thick, irregular cylindric form. The height is ca. 70ᵐᵐ and the thickness ca. 50ᵐᵐ. The colour (in spirit) is grayish brown. The consistency is exceedingly loose and brittle, to which the bad state of preservation may partly be owing. Of the *dermal membrane* only a few fragments on the upper surface of the sponge are preserved; it is a rather thin film, showing here *pores* and *oscula*. The pores are gathered in groups; they are about circular, their size was measured to between 0·03 and 0·24ᵐᵐ. Oscula are scattered between the pores; they are also circular, of a size of ca. 0·5ᵐᵐ.

The *skeleton*. The *dermal skeleton* is formed in the usual way by dermal spicules partly forming erect bundles, partly passing under the membrane as fibres from which spicules project. The *main skeleton* is a chiefly polyspicular, quite irregular reticulation; meshes are formed, but they are quite irregular; longer fibres do not seem to be formed, or are only formed to a small degree; in sections, however, a tendency is seen towards fibres passing in the longitudinal direction, but they are generally rather short. In a few places the skeleton appears to be a little more regular. A distinct, but clear and white mass of spongin is found where the spicules are united. The sponge embodies sand and gravel to a rather high degree. The skeletal structure in this species seems, with regard to development, to occupy a position between the incrusting or massive species and a leaf-shaped species as the *polydentata* described above.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are somewhat curved, not rarely a little irregularly; the curve is most frequently situated nearest to the head-end. They are only little tapering outward, and the point itself is rather short. Their length is 0·47—0·57ᵐᵐ, and the thickness is ca. 0·011—0·015ᵐᵐ. A few developmental forms were seen. 2. The dermal spicules are tylota; their ends are more or less, most frequently rather slightly, swollen; the tylota are straight or quite slightly curved. Their length is 0·35—0·44ᵐᵐ, and the thickness is ca. 0·0035—0·0057ᵐᵐ. There is, as usual, a little difference between the two ends of the tylota, the shaft being somewhat thinner in one end than in the other, and this feature is the more marked, the younger the spicule is. b. *Microsclera;* these are birotulæ of two sizes. 1. The large birotulæ have at either end nine to thirteen teeth, comparatively long and directed much downward, so as to form a small angle with the shaft. Their lenght is 0·037—0·051^{mm}, the thickness of the shaft is ca. 0·002—0·0028^{mm}, and the breadth across the circle of teeth is about 0·010—0·0128^{mm}. A few smaller specimens are seen, down to a length of 0·030^{mm}. Not rarely the shaft is slightly rugged or spined, a feature that recalls the similar one in the amphidisci of the Hexactinellida. 2. The small birotulæ have at either end eleven to fifteen teeth. Their length is 0·018—0·025^{mm}, the thickness of the shaft is ca. 0·0011^{mm}, and the breadth across the circle of teeth ca. 0·0057^{mm}. The small birotulæ differ from those of *polydentata* not only by the size, but also by the fact that the thickening of the end of the shaft from which the teeth issue, is flatter and more disc-shaped in *affinis* than in *polydentata*. Both forms of microsclera occur throughout the tissue, the small ones being more numerous than the large ones; in the dermal membrane the large ones seem especially to occur.

Locality: Cape Tobin on the eastern coast of Greenland, 70° 23' Lat. N., 22° 00' Long. W., depth 57 fathoms, one specimen. (The Amdrup-Expedition 1900).

9. I. spinosa n. sp.

Pl. VI, Fig. 8. Pl. XIX, Fig. 1 a—c.

Erect, irregularly cylindric? The surface smooth or very slightly shaggy. The dermal membrane a thin film, supported by erect or recumbent bundles of dermal spicules. The skeleton an irregular, polyspicular reticulation. Spicula: Megasclera: the skeletal spicules acanthostyli with scattered spinulation 0·40—0·52^{mm}, the dermal spicules tylota 0·24—0·34^{mm}; microsclera two forms of birotulæ, large ones with eight to twelve teeth 0·031—0·045^{mm}, small ones with nine to thirteen teeth 0·018—0·022^{mm}.

Of this species, which is especially interesting on account of its spicules, we have only a fragment, no doubt the upper part of the sponge. Below, from the place where it has been broken off, and some way up, the sponge is a little compressed, but then it becomes about cylindric with a rounded upper end. According to this, the form might be supposed to have been erect and more or less irregularly cylindric. The height of the specimen is 27^{mm}, and the thickness above is 8^{mm}. The colour (in spirit) is yellowish gray. The consistency is rather brittle. The *surface*, in undamaged places, is smooth or very sligthly shaggy. The *dermal membrane* is a thin film, supported by dermal spicules. *Pores* are seen here and there on the surface in groups, they are rather large, up to 0·1^{mm}. *Oscula* were not seen.

The *skeleton*. The *dermal skeleton* consists of erect or more or less recumbent bundles of dermal spicules. The *main skeleton* is a quite irregular, polyspicular network; tolerably distinct fibres are formed, but they have an irregular course, some of them, however, seem to be running towards the surface. A distinct and fairly copious mass of spongin is found in the skeleton, in many places coating the fibres entirely with a thin layer.

Spicula. a. *Megasclera.* 1. The skeletal spicules are acanthostyli with a rather scattered spinulation; they are straight or, most frequently, slightly, not rarely irregularly curved. The point is a little varying, between rather short and middle long. Their length is 0·40—0·52^{mm}, and the thickness ca. 0·011—0·014^{mm}. A few developmental forms were seen, the finest ones are about smooth. 2. The

Dermal spicules are tylota with rather slightly swollen ends; they are about cylindric and straight or quite slightly curved. Their length is 0·24—0·34^{mm} and the thickness ca. 0·0053—0·0085^{mm}. b. *Microsclera*; these are birotulæ of two sizes. 1. The large birotulæ have at either end eight to twelve teeth, their length is 0·031—0·045^{mm}, the thickness of the shaft is ca. 0·0018—0·0028^{mm}, and the breadth across the circle of teeth 0·008—0·011^{mm}. A few developmental forms were seen; they consist of a shaft with a pyramidal swelling at either end, and on these swellings slight ribs are seen. 2. The small birotulæ have nine to thirteen teeth at either end, their length is 0·018—0·024^{mm}, the thickness of the shaft is ca. 0·001^{mm}, and the breadth across the circle of teeth 0·0057^{mm}. Both forms of microscleres occur throughout the sponge, the small ones are somewhat more numerous than the large ones.

Locality: Station 113, 69° 31′ Lat. N., 7° 06′ Long. W., depth 1309 fathoms (bottom temperature ÷ 1° C.), one specimen. While the preceding species were obtained on bottom with positive temperature, the present one is from the cold area. Among the hitherto described *Iotrochota*-species *I. abyssi* Cart. is the only one from cold bottom, having been obtained at 61° 10′ Lat. N., 2° 21′ Long. W., at a depth of 345 fathoms with a bottom temperature of ÷ 1·1 C.

I have here established eight new species of the genus *Iotrochota*, as it has been impossible to identify any of the species before me with any of the hitherto described ones, all of which, with the exception of *abyssi* Cart. and *magna* Lambe, are also exotic species. As will have been seen from the descriptions, several of the species are chiefly separated by characters found in the microscleres, especially the number of teeth in ancoræ and birotulæ. Now this feature is no constant one, but varies within certain limits; therefore the numbers of teeth of the different species may pass into each other, so that, for instance, the highest number in one species may be equal to, or a little higher than, the lowest number in another species. Nevertheless I think that the number gives a good specific character, and it is in my material always supported by other characters. Unfortunately, we have only a single specimen of most of the species; perhaps a richer material may somewhat alter the interpretation of the species I have established here, but at present the absolutely most correct thing is to keep the species here established distinct, and I am also inclined to believe that new and richer material will prove them to be constant. The view advanced by Dendy (Proceed. of the Roy. Soc. of Victoria, VIII, 1896, 23) under the mentioning of *I. coccinea* Cart., that the *Iotrochota*-species may all be mere local varieties of Bowerbank's *I. purpurea*, will, no doubt, prove to be erroneous, and the author himself so far contradicts it, as in the very place mentioned he establishes a new species.

To facilitate the general view of the species established or treated here, I give a table of the difference in the spiculation.

	Megasclera: Skeletal spicules	Megasclera: Dermal spicules	Microsclera	
			ancoræ	birotulæ, small
	styli	tylota	5–8 free teeth	9–14 teeth
varidens	0·51–0·608 mm	0·298–0·38 mm	0·054–0·0657	0·015–0·018
	oxea		9–13 free teeth.	13–ca. 20 teeth
oxeata	0·56–0·68 mm	0·32–0·42	0·048–0·065	0·015–0·020
	oxea and styli		more than 6 teeth	ca. 12–14 teeth
abyssi Cart.	0·6–0·67 mm 0·408–0·49 mm	0·298–0·357 mm	0·055–0·06	0·015–0·018
	styli		7–9 free teeth	11–14 teeth
dubia	0·46–0·536 mm	0·31–0·38 mm	0·038–0·050	0·018–0·021
	most frequently slight spines at the head-end.		9–11 free teeth	14–15 teeth
intermedia	0·357–0·48 mm	0·26–0·34 mm	0·040–0·050	0·018–0·021
			12–17 teeth	9–12 teeth
rotulancora	0·40–0·55 mm	0·30–0·41 mm	0·030–0·040	0·018–0·032
			birotulæ, large	
			12–20 teeth	9–14 teeth
polydentata	0·42–0·57 mm	0·25–0·34 mm	0·020–0·028	0·0128–0·018
			9–13 teeth	11–15 teeth
affinis	0·47–0·57 mm	0·35–0·44 mm	0·037–0·051 mm	0·018–0·025
			8–12 teeth	9–13 teeth
spinosa	0·40–0·52 mm spined.	0·21–0·34 mm	0·031–0·045	0·018–0·024

The ancoræ occurring in species of this genus form quite evidently a transition to birotulæ, what is seen especially distinctly in the species *rotulancora*. On the other hand, these ancoræ are evidently allied to such forms as those found in *Chondrocladia* and *Cladorhiza*, and these forms lead again, I suppose, to the other existing forms of ancoræ. Lindgreen (Zoologisch. Jahrbüch. XI, 1898, 355) says that the birotulæ occuring in *Iotrochota* must either be supposed to be only analogous to the ancoræ of the other Desmacidonidæ, or else to represent a more original form. I think the latter supposition the more correct one. Birotulæ have also in their structure so great resemblance to the amphidisci of the Hexactinellida, that it is difficult to divest one's mind of the idea of a relation between these bodies.

The *Iotrochota*-species may show some difference with regard to the spicules. As will have been seen, the species described here are separated into two groups, those having ancoræ and birotulæ, and those having only birotulæ; the separation is of no greater systematic importance, on account of the transition between ancoræ and birotulæ. Also with regard to the megascleres some difference may be found. The skeletal spicules are typically smooth styli; they may be spined (*spinosa*), sometimes they may be rounded at the pointed end (*birotulata*), further they may be oxea (*oxeata*), and finally they may be a mixture of styli and oxea (*abyssi*, [illegible]). The dermal spicules are typically tylota, but may be monactinal (*purpurea*, *birotulata*, *magna*, [illegible]); this fact, however, is of no real importance, as the dermal spicules are upon the whole only secondarily diactinal.

As far as I know, the following *Iotrochota*-species have hitherto been described:

	Megasclera: Skeletal spicules	Megasclera: Dermal spicules	Microsclera
Iotrochota (Halichondria) abyssi Cart. (Between the Faröe Islands and Scotland)	Styli and oxea	Tylota	Ancoræ and birotulæ
— *(Halichondria) purpurea* Bow. (Australia, Strait of Malacca)	Styli	Styli	Birotulæ
— *(Halichondria) birotulata* Higg. (Jamaica)	Styli to strongyla	Styli	Birotulæ
— *baculifera* Ridley (Aústralia, Amboina, Cochin China, Seychelles, Mascarene Isles, Madras)	Styli	Tylota	Birotulæ
— *(Phlœodictyon) birotulifera* Cart. (South-Australia)	Two forms of tylota (The place of the species is doubtful[1]).		Birotulæ
— *(Axinella) coccinea* Cart. (South-Australia)	Styli	Styli	Birotulæ
— *magna* Lambe. (Northern west-coast of America)	Styli	Styli	Birotulæ
— *acerata* Dendy (Australia)	Styli and oxea	Tylota	Birotulæ

Forcepia Cart.

The exterior varying, as a thick incrustation or thicker and more massive, or erect and formed as a thick, more or less irregular leaf. The skeleton a mostly polyspicular reticulation, in the incrusting or massive forms quite irregular, in the erect ones more differentiated with more or less distinct primary longitudinal fibres, between which transverse spicules most frequently single, irregularly placed. The dermal skeleton consisting of erect or recumbent bundles of dermal spicules, sometimes, moreover, scattered horizontal spicules. More or less spongin present. Spicula: Megasclera: the skeletal spicules smooth or spined styli, the dermal spicules tylota, sometimes strongyla; microsclera: the characteristic microsclera are spined forcipes of one or two sizes, to which almost always are added isochelæ arcuatæ of one or two sizes and often sigmata.

1. **F. forcipis** Bow.

Pl. XIX, Fig. 2 a—h.

1866. *Halichondria forcipis* Bowerbank, Mon. Brit. Spong. II, 244, 11.
1874. — Boverbank, ibid, III, 105, Pl. XLIII, figs. 7—13.
1874. Carter, Ann. Mag. Nat. Hist. Ser. 4, XIV, 246, Pl. XIV, figs. 29—32, Pl. XV, fig. 11 a—b.
1880. *Myxilla forcipis* Vosmaer, Notes from the Leyden Mus. II, 127, 12.

[1] Dendy has established for it the genus *Amphiastrella*.

Thickly incrusting or more massive. The surface slightly grooved. The dermal membrane a thin film supported by most frequently highly recumbent bundles of dermal spicules. The skeleton a quite irregular, polyspicular reticulation. Spicula: Megasclera: the skeletal spicules styli 0·488—0·62mm, the dermal spicules tylota 0·238—0·300mm; microsclera of four forms, isochelæ arcuatæ of two sizes, large ones 0·043—0·067mm, small ones 0·021—0·028mm, forcipes of two sizes, large ones 0·44—0·52mm, small ones 0·028—0·030mm.

Of this species we have only one, highly damaged specimen, growing as a thick incrustation on the carapace of a *Hyas coarctatus*, and a quite insignificant fragment. The specimen has a greatest extent of 36mm and a greatest thickness of 5mm. The specimens described by Bowerbank and Carter were of a similar form, but a little larger, having a greatest extent of respectively ca. 80 and 45mm, and Carter's specimen having a thickness of fully 12mm. The colour (in spirit) is gray. The consistency is rather firm, but somewhat brittle and little elastic. The *surface* is slightly grooved, the skeleton below causing small protuberances; otherwise it seems to be smooth. The *dermal membrane* is a thin, transparent film, supported by bundles of dermal spicules. *Pores* were not seen on my specimen. A few circular openings in the membrane I take to be *oscula*. Carter describes the surface and the dermal membrane in the same way, but his specimen showed also the pores gathered in sieves over the subdermal cavities. Also Bowerbank mentions pores gathered into a group.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules, issuing from the skeleton below and supporting the dermal membrane; they are, however, very little projecting, but highly, almost horizontally, recumbent; also scattered spicules are found here and there in the membrane. The *main skeleton* is a polyspicular, but quite irregular network; meshes are formed, but they have no definite form, and longer fibres are not formed. Here and there in the network single spicules are found, but otherwise it is polyspicular. The number of spicules alongside may vary rather much, most frequently it seems to be four to five, but it may also be greater, up to about ten. Spongin is found in the nodes of the skeleton, but it is very white and clear.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are evenly and slightly curved, the curve being most frequently found nearest to the rounded end; they are of about equal thickness troughout the length, and the point is rather short, it is most frequently distinctly limited and bounded by straight or almost straight lines. Their length is between 0·488 and 0·62mm, rarely at the lower limit. The thickness is from ca. 0·0128—0·021mm. Developmental forms at different stages, down to exceedingly fine ones, occurred rather frequently; the finest ones were long pointed. One of the finest forms was 0·47mm long. 2. The dermal spicules are tylota with slightly swollen ends; sometimes the ends are so little developed, that the spicules approach strongyla; they are cylindric and most frequently straight. Their length is 0·238—0·300mm, and the thickness is ca. 0·004—0·0057mm. In the fully developed spicule the two ends are about equal, the shaft being at most a little thinner in one end, and the swelling therefore a little more marked; the younger and finer the spicules are, the greater is the difference between the ends, and the finest developmental forms seemed to have one end pointed. Then the developmental forms show the peculiarity of being almost always polytylote with a series of swellings along the shaft, which swellings dissappear by degrees, as the spicule grows thicker. b. *Microsclera:* these are of four forms, two forms of isochelæ arcuatæ, large and small ones, and two forms of forcipes, also large and small ones. 1. The large chelæ have an evenly, but slightly curved shaft, the tooth is narrowly elliptical with a longish tuberculum, from which a continuation may be traced about to the end of the tooth; the alæ are of the same length as the tooth and are somewhat tooth-like, when viewed from the side. Their length varies from 0·043—0·067^{mm}, most frequently it is midway between these sizes; the thickness of the shaft is 0·004—0·007^{mm}. A few monstrosities with split tooth were seen. 2. The small chelæ are of a similar form, the only difference being that the tooth and the alæ are comparatively longer, and the tooth is broader; their length is 0·021—0·028^{mm}, and the thickness of the shaft is 0·0014—0·0021^{mm}. Developmental forms were found of both chelæ at different stages, but only sparingly. Quite singly chelæ were seen occupying, as to size, a middle place between the two forms. 3. The large forcipes are peculiar and beautiful spicules. They have a round curve above, and continue in two very long, more or less parallel, legs, one of which is always a little longer than the other; the legs may be a little diverging or converging, but always only to a slight degree; when converging they often touch each other. The forcipes are most frequently a little twisted, so that the legs intercross. They are spined, and the spines are all turned upwards towards the curve, and formed in such a way, that the legs may more properly be called serrated. The spines are almost exclusively found on the in- and outward turned sides of the legs only, that is to say, in the plane which includes both legs; they are generally more close-standing on the inward side of the leg than on the outward side, and on the inward side they are especially close-standing in the middle part of the leg. At the curve the spinulation becomes more rugged, and here some spines may be found all round. The length, measured from the curve to the point of the longer leg, is 0·44—0·52^{mm}, the thickness at the curve is 0·0058^{mm} and about the middle of the legs it is 0·0028^{mm}. An interesting thing it was to find the developmental forms of this spicule, and they are not especially rare; they are of the same, or about the same, length as the fully developed spicule, but they are finer, down to very fine; then they are quite smooth, only the more developed stages begin to get at little rugged in the upper part. 4. The small forcipes are of a peculiar form, one leg being more than three times the length of the other; the short leg is straight, while the long one with an arcuate curve bends towards the side where the short leg is found. The legs end in a little knob. When seen under slight magnifying powers these forcipes look as if they were rugged, but when the magnifying powers are higher, they are seen to be spined, and the spines are arranged in the same way as in the large forcipes. This spinulation and the terminal knobs of the legs, especially that of the long leg, are, however, only to be seen with great difficulty. Their length is 0·028—0·036^{mm}; they are exceedingly fine, the thickness at the curve not being more than 0·0007^{mm}. This small spicule is easily overlooked; it is Carter's merit first to have seen it, but according to his erroneous view of the growth of the spicules he called it "embryonic form" of the large forceps; neither has he been able to see their form correctly, nor their spines. The microscleres are found through the whole sponge and in the dermal membrane, where the large chela seems to be most frequent. The large forcipes occur in the tissue in bundles that may almost form fibres; the single forcipes in the bundles seem all to be turned one way.

Locality: Station 78, 60° 37′ Lat. N., 27° 52′ Long. W., depth 799 fathoms, a very small fragment the Faröe Islands, east of Sudero, depth ca. 150 fathoms, one specimen (Th. Mortensen).

Geogr. distr. The Shetland Islands (Bowerbank), between Scotland and the Faröe Islands, depth 363 fathoms (the "Porcupine"). Thus the species is only known from a rather limited territory. Strange to tell, the bottom temperature of the locality at which the "Porcupine" has obtained the species is given to ÷ 0.3 C., while the species is otherwise only known from localities with positive bottom temperatures.

Remarks: As I have examined a specimen sent by the Rev. Mr. Norman, the identification of this species, which is otherwise a very characteristic one, is sure. Norman's specimen shows no sigmata, neither were such found by Carter in his specimen. It is an obvious conclusion that the bodies which Bowerbank has supposed to be sigmata, have been developmental forms of the small chela.

2. **F. fabricans** O. Schmidt.

Pl. XIX, Fig. 3 a—g.

1874. *Esperia fabricans* O. Schmidt, Die zweite deutsche Nordpolarfahrt, II. 2, 433.

1885. *Forcipina bulbosa* Vosmaer (Synon. except.), Bijdrag tot de Dierk., 12te Afl., 3die Gedeelt., 26, Pl. I, fig. 11, Pl. V, figs. 60—68.

1903. *Hamigera (Forcipina) fabricans* Thiele, Arch. für Naturgesch., 1903, I, 385, Taf. XXI, Fig. 15 a—c.

Massive, sometimes somewhat erect. The surface slightly shaggy. The dermal membrane a thin film, supported by projecting bundles of dermal spicules. The upper surface of the sponge set with papillæ, in the points of which oscula open. The skeleton a rather irregular network with irregular, loose, polyspicular primary fibres and transverse spicules placed singly. Spicula: Megasclera: the skeletal spicules styli 0.53—0.715^{mm}*, the dermal spicules tylota 0.31—0.45*^{mm}*; microsclera of four forms, isochelæ arcuatæ 0.042—0.057*^{mm}*, forcipes of two sizes, large ones 0.060—0.077*^{mm}*, small ones 0.025—0.034*^{mm}*, sigmata quite or almost quite plane 0.12—0.14*^{mm}*.*

Vosmaer's figure of the exterior of this species, which is evidently drawn from a damaged specimen, shows an about massive sponge with papillæ on the surface, and the specimens before me have a similar appearance. None of the specimens in hand are entire. One is attached to a stone, another to a Bryozoon. To judge from the material, the species has a massive, sometimes, perhaps, a little erect form. The surface, chiefly in the upper part of the sponge, is set more or less closely with papillæ, which may vary somewhat in size. The largest specimen before me is about 60^{mm} high, and Vosmaer's specimen was of a similar size. The consistency is rather loose, but somewhat elastic; some specimens seem to be more brittle, others more elastic, which is, perhaps, dependent on the degree of contraction. The colour (in spirit) is grayish white or yellowish white. The *surface* is dispersedly and rather slightly shaggy. The *dermal membrane* is a thin and transparent film, supported by projecting bundles of dermal spicules. *Pores* and *oscula:* Unfortunately, the surface and the dermal membrane are highly damaged in the specimens in hand, and consequently some uncertainty is left with regard to the pores and oscula. On the upper part of the sponge some papillæ are found; in one specimen they are scattered and small, not above 1.5^{mm} high, and closely shut in the point; in another specimen they are close-set and larger, and also somewhat irregular; in this latter specimen most of the papillæ have a wide opening in the point. While in the former specimen the papillæ are conical, they form in the latter a cylindric limb round the aperture. These papillæ, no doubt, are oscula. Besides these papillæ, however, some other papillar formations are found; they are most frequently broader, but lower than the oscular papillæ, and consist of a low ridge surrounding a shallow groove. In the membrane coating the groove pores are found more or less close-set; outside these formations I have found no pores. Now the question is whether pores and oscula are thus restricted, each to a set of papillæ of their own, or all the papillæ have a pore membrane, which is torn off in the papillæ showing an opening; in the latter case the low pore papillæ would then be less contracted stages of the higher or quite closed papillæ. Then again the question would be whether the papillæ acted as incurrent or excurrent openings, or in both ways. It is, however, most probable that there are two kinds of papillæ, one kind with oscula, the other with pores; the construction indicates especially that the low pore papillæ cannot be closed as the closely shut oscular papillæ.

The *skeleton*. The *dermal skeleton* consists of bundles of dermal spicules projecting from the skeleton below; they are oftenest erect, sometimes a little recumbent. They may be more or less close-standing; where they are farther from each other, comparatively large parts of the membrane are thus found having no dermal spicules, and only provided with microscleres. In the mentioned papillæ which are formed by the skin, the skeleton is altered. The spicules are lying horizontally in the wall of the papilla, and consequently they do not rise over the surface; they are parallel to the longitudinal axis of the papilla, and are gathered into bands; the general arrangement of the dermal skeleton in projecting bundles passes at the papillæ by degrees into the band-shaped arrangement; the spicules are numerous and very close-lying, towards the point the bands converge; the closed oscular papilla is somewhat spirally twisted. In the pore papillæ the same construction is found, the only difference being that the band-shaped arrangement is less distinct, but the spicules are lying close together in the low ridge; besides some fibres, at all events in the larger pore papillæ, pass under the membrane of the groove, and send off spicula-bundles supporting the membrane and projecting a little. The *main skeleton* consists of a rather irregular network. Primary fibres are found, running in the longitudinal direction or towards the surface, but they are somewhat irregular and loose; transverse fibres are not formed, but transverse spicules are found, most frequently placed singly and very irregularly. The longitudinal fibres are polyspicular, and have generally three to six spicules alongside. Spongin is found where the spicules are united, but it is present only to a slight amount, and is white and clear, so that it is only to be seen with difficulty.

Spicula: a. Megasclera. 1. The skeletal spicules are styli; they have a more or less marked, most frequently rather slight, curve, generally situated near the head-end. The point may be a little varying, but may best be described as middle long, it is oftenest distinctly bounded. Their length is 0·53—0·715^{mm}, and the thickness is 0·0128—0·021^{mm}. Some developmental forms were seen, the youngest ones are long pointed. 2. The dermal spicules are tylota; they are straight, and their ends are most frequently rather slightly swollen. Their length is 0·31—0·45^{mm}, and the thickness 0·007—0·012^{mm}. The shaft is a little thicker in one end than in the other, and the swelling of this thicker end is most frequently so slight, that the spicule might be called a tylostrongyle; the swelling of the thinner end, on the other hand, is larger and more distinctly marked. The younger the tylotes are, the more marked this difference is. The shaft of the tylotes often shows slight, irregular thickenings, so that they may approach polytylota. b. *Microsclera:* these are of four forms, isochelæ arcuatæ, forcipes of two sizes, and sigmata. 1. The arcuate chelæ have an even and not much curved shaft; the tooth is narrowly elliptical, and there is a longish, pointed tuberculum; the alæ are tooth-like and of about the same length as the tooth. The chela may be of a somewhat varying form, the tooth and alæ especially may be shorter or longer in proportion to the total length. The length is 0·042—0·057^{mm}, the thickness of the shaft is 0·0042—0·0057^{mm}. A few developmental forms were seen. 2. The large forcipes are of a form quite like that figured by Vosmaer l. c. They have a round curve above and two parallel, or quite slightly converging or diverging legs; only rarely the legs are more diverging. The legs are of equal length, or there may be a quite slight difference in this respect; they end in a little swelling. The forcipes are spined; under small magnifying powers the spinulation looks somewhat rugged, but by sufficient enlargement (ca. × 1000) it is seen to consist of well developed spines directed backward and somewhat compressed; they are, moreover, rather distinctly arranged in rows. By this enlargement the swelling at the end of the legs is seen to be a semiglobular knob attached to the leg by the flat side; this knob is somewhat spined or indented in the edge. The forcipes are frequently a little twisted. Their length is 0·060—0·077^{mm}, and the thickness in the middle of the legs is ca. 0·0029^{mm}. Of forcipes a few developmental forms were found, the finest ones are quite smooth, and the ends of the legs are finely tapering without any swelling. 3. The small forcipes have a quite similar form as the large ones, only they are much smaller, and the difference between the lengths of the legs is most frequently a little more marked; they are also spined, quite in the same way as the large forcipes. Their length is 0·025—0·034^{mm}, and the thickness in the middle of the legs is about 0·001^{mm}. 4. Sigmata; these are rather large, they are of the common sigma-form, and are plane or a little contort. Their length is rather constant, 0·12—0·14^{mm}, and the thickness is 0·005—0·007^{mm}. Of the sigma a rather great number of developmental forms were seen, the youngest stages were very fine and had as yet no recurved ends. The microscleres are found through the whole sponge, as well in the skin as in the other parts of the body; in the membrane coating the bottom of the pore grooves, the chelæ are found very abundantly, but none of the other forms.

Note. In the skin »cellules sphéruleuses« are found in great abundance; they appear as more or less distinctly limited crowdings of refracting granules; often the boundaries of the cells are effaced, so that the dermal membrane appears closely filled with refracting granules more or less gathered in groups.

Embryos. Round in the tissue some embryos were found scattered. They are globular, of an average size of 0·35^{mm}. Most of the examined specimens showed no spicules, some exceptions were, however, found. These latter had microsclera, but only chelæ, which is thus the first occurring form; they occurred abundantly at all stages of development, from fine staves to almost quite developed spicules. They are smaller than the chelæ of the developed sponge, being from 0·030—0·035^{mm} long.

Remarks: From Schmidt's description cited above, this species would not be recognisable at all, and the two figured chelæ do not even belong to it. Thiele, however, has examined the type specimen, and from his description and figures I have been able to identify the species with certainty, although

Thiele has not seen the small forcipes or has paid no attention to them. With regard to Thiele's referring of the species to *Hamigera* see p. 211. Also Vosmaer's description and figures, as well of the exterior as of the spicules, agree in all details with my specimens. The spicule figured by Vosmaer fig. 66 is a developmental form of a forceps; he has overlooked the small forcipes. The species cited by Vosmaer under the synonymy, do not belong here, *F. forcipis* being a quite distinct species, which holds good also of *F. bulbosa* Cart. The *F. bulbosa* mentioned by Topsent (Résultats des Camp. scient. du Prince de Monaco, Fasc. XXV, 179, Pl. I, fig. 13) is not Carter's species, but a new, independent one, and when Topsent mentions Vosmaer's species under it, it is a mistake, as it is not identical with this species either, but differs as well by its spiculation as by the want of the papillæ characteristic of *F. fabricans* (= *bulbosa* Vosm.). The present species is a native of the cold bottom, while as well Carter's species as that of Topsent are natives of the warm bottom, respectively from Cape S. Vincent and the Azores. For further particulars see under the account of the species of the genus p. 210.

Locality: 62° 30′ Lat. N., 1° 56′ Long. E., depth 275 fathoms (bottom temperature ÷ 0°12 C.) (Ad. Jensen, the cruise of the "Michael Sars" 1902); East-Greenland, Forsblad's Fjord, depth 50—96 fathoms (the Amdrup-Expedition); East-Greenland, without any more particular statement (the East-Greenland Expedition 1891—92).

Geogr. distr. The species has been taken before at East-Greenland, North Shannon (zweite deutsche Nordpolarfahrt, Thiele l. c.), and by the Willem Barent-Expedition off North Cape, 72° 36′ Lat. N., 24° 75′ Long. E., depth 140 fathoms. To judge from the localities it is probable that the species is a native of the cold bottom.

3. **F. Topsentii** n. sp.

Pl. VII, Fig. 3. Pl. XIX, Fig. 4 a—g.

Massive, cushion-shaped. The surface set with conical papillæ, and slightly shaggy. The dermal membrane a thin film with horizontal dermal spicules and here and there erect bundles. Oscula open into the papillæ of the surface. The skeleton an irregular reticulation, partly polyspicular, partly unispicular. Spicula: Megasclera: the skeletal spicules styli 0·62—0·74^mm^, the dermal spicules strongyla to tylota 0·357—0·45^mm^; microsclera of four forms, isochelæ arcuatæ 0·034—0·047^mm^, forcipes of two sizes, large ones 0·086—0·104^mm^, small ones 0·022—0·035^mm^, sigmata, plane or almost plane, 0·12—0·14^mm^.

Of this species we have one large specimen and some quite small ones. The species is formed like a cushion. The large specimen is torn off from its substratum, which, to judge from the form of the surface of attachment, may have been a shell; the small specimens are attached to bottom material of various kinds, foraminifera, gravel, etc. The sponge is set with rather close-standing, conical, pointed papillæ of an average length of ca. 4^{mm}. The papillæ are numerous in the large specimen, while in the small ones only some few papillæ are found. The largest specimen is somewhat longish, it has a length of 60^{mm}, a greatest breadth of ca. 45^{mm}, and a height of fully 20^{mm}. The small specimens are evidently quite young ones, they are 5—6^{mm} long. The consistency is only little elastic, on the contrary, it is rather hard, almost cartilaginous. The colour (in spirit) of the surface is brown, the papillæ are whitish, the inside of the sponge is grayish white or quite white. The *surface* is slightly and dispersedly shaggy. The *dermal membrane* is a rather thin, easily separable film, resting on the skeleton below and provided with horizontal dermal spicules. *Oscula:* the papillæ described above are oscular papillæ; some of them are closed, others show a little opening at the apex of the cone. If a papilla is cut off, a canal appears under it passing more or less perpendicularly into the sponge, which is consequently set through with a number of more or less perpendicular canals. *Pores* were not seen.

The *skeleton.* The *dermal skeleton* consists of dermal spicules, which are mostly horizontal and irregularly scattered in the membrane; the membrane seems to be resting on the main skeleton below, the spicules of which may project here and there. The dermal spicules, however, form also, here and there, bundles passing from the skeleton below and supporting the membrane. In the walls of the oscular papillæ the dermal spicules are close-lying, all of them parallel to the longitudinal axis and thus forming a close spiculation in the wall. When the papilla is contracted and closed, the spicules form a compact mass. The *main skeleton* is a quite irregular, partly polyspicular, partly unispicular reticulation. Meshes are formed, but they are quite irregular. Fibres are only seen to a quite slight degree, and, when found, they are only short and little marked. The spicules are united by a slight amount of white and clear spongin.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are somewhat curved, the curve is sometimes situated at the upper end, but sometimes they are more evenly curved, and they may also be somewhat irregularly curved. They are in some degree fusiform, tapering distinctly towards the upper end. The point is even and middle long. Their length is 0·62—0·71^{mm}, and the thickness in the middle is 0·021—0·028^{mm}. Developmental forms occurred quite singly. 2. The dermal spicules may most properly be called strongyla, but most frequently they have end-swellings so as to approach tylota; they are somewhat fusiform. Their length is 0·357—0·45^{mm}, and the thickness 0·0114—0·015^{mm}; sometimes they show a tendency to the polytylote form. In the fully developed spicule the ends are equal; only few developmental forms were seen, showing that the spicules are begun as monactinal. b. *Microsclera:* these are of four forms, isochelæ arcuatæ, forcipes of two forms and sizes, and sigmata. 1. The chelæ arcuatæ resemble the chelæ in the preceding species, *F. fabricans;* they have an evenly, sometimes rather highly curved shaft; the tooth is narrow, lanceolate, and has a short tuberculum, the alæ are somewhat tooth-like and of about the same length as the tooth. Their length is 0·034—0·047^{mm}, and the thickness of the shaft is ca. 0·004—0·0057^{mm}. 2. The large forcipes have two legs of equal length, ending in a small, button-like swelling; the curve may be varying, it may be so strong, that the legs are parallel, and then it may be more and more slight, until the legs form an obtuse angle; the forcipes are spined, and the spines are compressed and directed backward. No serial arrangement of the spines is found here; the terminal knobs of the legs are, as in *F. fabricans*, indented or spined at the edge. Their length, measured from the curve and to the end of one of the legs, is 0·086—0·104^{mm}, and the thickness at the curve is 0·007—0·008^{mm}. A few developmental forms were seen; they are smooth, and the legs do not end in a swelling: they reach a comparatively considerable thickness, 0·004^{mm} at the curve, before they begin to get spines. 3. The small forcipes have about parallel legs, one of which is almost always somewhat longer than the other; the legs end in a small, button-like swelling. These forcipes are spined in the same way as the large ones; sometimes they are somewhat twisted. Their length is 0·022—0·035^{mm}, and the thickness at the curve is about 0·001^{mm}. Quite few specimens of forcipes are seen, forming, as to size, a transition between the two forms. 4. Sigmata; they are of the common sigma-form, and are plane or only very little contort; their length is 0·12—0·14^{mm}, and the thickness 0·007—0·008^{mm}. The microscleres occur throughout the sponge and copiously in the dermal membrane; in the points of the oscular papillæ the chelæ are found abundantly.

This interesting species is a distinct one, and is well distinguished from the other *Forcepia*-species. The form of the large forcipes might lead one to think of *F. bulbosa* Cart., but there is, in other respects, great difference between these two species, thus with regard to the sizes of all the spicules and especially of the forcipes and sigmata, and also with regard to the form of several of the spicules; finally Carter's species is from Cape San Vincent, whereas the present species is a native of the cold bottom.

Locality: Station 113, 69° 31′ Lat. N., 7° 06′ Long. W., depth 1309 fathoms (bottom temperature ÷ 1·0 C.), six very small specimens; station 119, 67° 53′ Lat. N., 10° 19′ Long. W., depth 1010 fathoms (bottom temperature ÷ 1·1 C.), one specimen. Thus the species is a native of deep water and of the cold area. The two stations are situated between Jan Mayen and Iceland.

4. **F. Thielei** n. sp.

Pl. VII, Figs. 1—2. Pl. XIX, Fig. 5 a—f.

Erect, formed like an irregular, thick leaf, attached below. One surface oscular surface, the other pore surface. The oscular surface even with rather close-standing oscula, the pore surface with more or less deep grooves separated by sinuous walls; the surface slightly shaggy. The dermal membrane a thin film, supported by bundles of dermal spicules. The skeleton a rather irregular, polyspicular network: primary fibres are found, bending towards the surface, but irregular, between them close-set, single spicules. Spicula: Megasclera: the skeletal spicules styli 0·57—0·72^{mm}, the dermal spicules tylota 0·34—0·40^{mm}; microsclera of three forms, isochelæ arcuatæ 0·021—0·033^{mm}, forcipes 0·037—0·060^{mm}, sigmata, plane or about plane, 0·11—0·13^{mm}.

This species is formed as an erect, thick, somewhat irregular leaf. Below it is expanded and attached with a thick, lumpy base. The species seems to have grown directly on the bottom, a great deal of gravel and other bottom material being found in the basal surface, and bottom material being also embodied in all the lower part of the sponge. Most of the specimens in hand are only fragments, only one of them is about entire; this latter specimen has a height of 180^{mm}, a breadth of 120^{mm}, and a thickness of ca. 25^{mm}, farther down towards the base the thickness is about 50^{mm}. The fragments seem upon the whole to have belonged to specimens of similar dimensions. The consistency is rather firm, but little elastic and somewhat brittle. The colour (in spirit) is grayish white or whitish yellow to light brown. The *surface* is different on the two sides of the sponge, of which one is the oscular side, the other the pore side. The oscular surface is tolerably even; when oscula are shut, however, the entrance to them are seen as rather deep, circular grooves. The pore surface, on the other hand, is most frequently closely grooved, and the grooves are separated by curling or meandering walls. Sometimes the walls run chiefly in the longitudinal direction of the sponge, and the surface may get an appearance, as if longitudinal fibres were running below it. Sometimes the pore surface is fairly even, the walls not being raised; this, I suppose, is owing to the degree of contraction of the sponge. The surface is otherwise finely shaggy from projecting spicules. The *dermal membrane* is a rather thin film, supported by dermal spicules. *Oscula* and *pores:* As mentioned above, one surface is the oscular surface, the other the pore surface. On the oscular side rather close-set, circular openings of various sizes are seen. When the dermal membrane is removed, oscular canals are seen, of an average width of 3^{mm}; this size, therefore, is the largest one attained by the oscula, but they are seen in all degrees of closing. When they are closed or almost closed, the closing membrane is generally somewhat sunk into the canal, so that a more or less deep, about circular groove is seen. From the oscular apertures canals pass into the sponge, partly tolerably horizontally through the leaf, partly also running in other directions. In the upper part of the sponge they may often be seen rather distinctly to run downward and inward in the leaf. On the pore side the pores are found in groups over the subdermal cavities or the openings of the incurrent canals; they were measured from quite small ones up to a diameter of $0{\cdot}12^{mm}$.

The *skeleton.* The *dermal skeleton* consists of penicillate bundles of dermal spicules supporting the dermal membrane. The bundles are partly erect, partly more or less recumbent. On the pore side especially, erect bundles are found in the tissue or the walls between the canals or the subdermal cavities; from the edges of these cavities fibres of dermal spicules pass under the membrane distended over the mouth, and these fibres are then more or less horizontal, but send off spicules into the membrane; by this arrangement the structure arises again here which has been mentioned repeatedly in other species, viz. that the membrane or pore sieve distended over the mouths of the canals, is by the mentioned fibres divided in areas, in which the pores are then lying. On the oscular side the structure is about the same; short fibres of dermal spicules likewise stretch from the edge of the oscular canal, radiating into the membrane and pointing towards the oscular aperture. The *main skeleton* is a mostly polyspicular network, which is, however, rather irregular. Longitudinal fibres are found, passing up through the leaf and bending towards the surface, but their course is somewhat irregular. The spicules placed between them are mostly single. They are placed rather closely and quite irregularly, so that the meshes are irregular, by which means the whole network gets a very irregular appearance. Sometimes the longitudinal fibres may be seen especially distinctly to bend towards the oscular side, which is, perhaps, owing to the fact that they partly follow the course of the canals. Sometimes, on the other hand, the skeleton is far more irregular, so that longitudinal fibres are almost not to be traced. In the nodes of the skeleton a rather copious, but white and clean mass of spongin is found.

Spicula: a. *Megasclera.* 1. The skeletal spicules are styli; they are slightly curved, sometimes through their whole length, but most frequently the curve is nearest to the head-end; more rarely the spicules are straight. The point is rather short or middle long, it is sharp and oftenest bounded by straight lines. Their length is $0{\cdot}57$–$0{\cdot}72^{mm}$, and the thickness is $0{\cdot}014$–$0{\cdot}018^{mm}$; most frequently the longest ones are not the thickest ones. Developmental forms occurred singly; the finer ones had a longer point. 2. The dermal spicules are tylota with rather slightly swollen ends; they are oftenest straight, more rarely a little curved. Their length is 0·34—0·40mm, and the thickness ca. 0·0043—0·0086mm. The fully developed spicules have almost equal ends; the swelling of one end, however, is most frequently a little more marked than that of the other; the finer the spicule is, the more distinct is this feature, and the very finest ones are quite monactinal. b. *Microsclera:* these are of three forms, isochelæ arcuatæ, forcipes, and sigmata. 1. Chelæ arcuatæ are of a similar structure as in the preceding species, *F. Topsentii*, but they are smaller; they have an evenly curved shaft, a more or less broad oval tooth with a triangular tuberculum, and the alæ are of the same length as the tooth. Their length is 0·021—0·033mm, and the thickness of the shaft is ca. 0·0021—0·0028mm. 2. Forcipes; these are of only one form, and they are rather characteristic; they have a round curve above, and one leg is considerably longer than the other; the legs are slightly diverging in their upper part, then the shorter leg bends a little more outward, and the longer leg does the same, but this latter bends again inward, so that it forms an even, slight curve with the convexity turned outward. This is the typical form (Pl. XIX, Fig. 5 d), but various deviations may be found. Thus they may be somewhat twisted, and the legs may be of equal, or about equal, length, and in this case they are often more or less uniform, both forming a curve. By slight enlargement the forcipes appear to be slightly spined, but under higher magnifying powers they are seen to be rather finely, but densely spined; the legs end in a button-shaped swelling. Their length, measured from the curve to the end of the longer leg, is 0·037—0·060mm, and the thickness at the curve is ca. 0·0014—0·0028mm. A few, quite fine and smooth developmental forms were seen. 3. Sigmata are of the common sigmaform and are plane or almost plane; they vary in length from 0·11—0·13mm, and in thickness from 0·0057—0·007mm. A few fine developmental forms were found, not yet provided with recurved hooks. The microscleres occur throughout the sponge and in the dermal membrane; in the pore sieves chelæ seem especially to be found.

Note. In the dermal membrane and in the membranes of the canals granulous cells, (cellules sphéruleuses), are found abundantly. They are roundish or longish, of an average size of 0·015mm, and filled with rather large, refracting granules, in spirit their colour is white. Frequently the walls of the cells have disappeared, so that the membrane is seen to be filled with granules, more or less gathered in groups.

Embryos. In some of the specimens embryos were found in great numbers in the tissue. They are globular, of a white colour, and their average diameter is 0·23mm. Some of the examined specimens showed no spicules, others had spicules, and then both megascleres and microscleres were found. The megascleres are somewhat interesting; they are slightly curved, somewhat club-shaped styli, sometimes with a slightly marked head; they attain a length of up to 0·12mm. The most interesting feature is, however, that they are slightly rugged-spined; as *Forcepia*-species with spined spicules exist, one is led to suppose that the spinulation may possibly be a primary character, and that species with spined spicules may be more primitive than those with smooth spicules. A fact leading to the same conclusion has been mentioned under some of the species treated above; thus *M. pedunculata* has smooth styli, but its embryos have spined styli, and *M. pluridentata* has smooth styli, but the fine developmental forms are slightly rugged. — The microscleres are only chelæ, they are of the same structure as the chelæ of the grown sponge, but reach at most a length of 0·025^{mm}. The specimens in question were obtained in the beginning of June.

Locality: Station 57, 63° 37′ Lat. N., 13° 02′ Long. W., depth 350 fathoms; station 73, 62° 58′ Lat. N., 23° 28′ Long. W., depth 486 fathoms. Both stations are situated south of Iceland.

F. groenlandica Frstdt.

Pl. XX, Fig. 3 a—e.

1887. *Forcepia groenlandica* Fristedt, Vega Exp. vetensk. Iakttag. IV, 452, Pl. 25, figs. 40—46.

1904. ? *Trachyforcepia groenlandica* Topsent, Résultats des camp. scient. du Prince de Monaco Fasc. XXV, 181, Pl. XV, fig. 14.

Thickly incrusting or massive. Spicula: Megasclera: the skeletal spicules acanthostyli 0·42—0·55^{mm}, the dermal spicules tylota 0·40—0·447^{mm}; microsclera of three forms, isochelæ arcuatæ 0·025—0·035^{mm}, forcipes 0·035—0·0520^{mm}, sigmata, more or less contort, 0·114—0·15^{mm}.

This species has not been obtained by the Ingolf-Expedition, and I have only before me a small fragment of the type specimen; therefore I only mention the spicules more particularly. a. *Megasclera.* 1. The skeletal spicules are acanthostyli; they are slightly curved, either evenly through their whole length, or with the curve nearer to the upper end. The point is rather short, at most middle long. The spinulation is rather scattered, but in this feature some variation may be found; the spines continue out on the very point; at the head-end they are generally more closely gathered. The length of the acanthostyli is 0·42—0·55^{mm}, and the thickness 0·011—0·014^{mm}. 2. The dermal spicules are slender, straight tylota with slightly swollen ends; their length is 0·40—0·447^{mm}, the thickness is ca. 0·007^{mm}. b. *Microsclera:* these are of three forms, isochelæ arcuatæ, forcipes, and sigmata. 1. Chelæ arcuatæ are of a similar form as in the preceding species, *F. Thielei;* their length is 0·025—0·035^{mm} by a thickness of the shaft of 0·0028—0·004^{mm}. 2. Forcipes are of a form reminding much of the forcipes in *F. Thielei:* the shorter leg, however, is generally straight, and the longer leg forms a more curved bow; they are finely spined but not so densely as in *F. Thielei,* and the legs end in a little button. Their length to the end of the longer leg is 0·035—0·0520^{mm}, and the thickness in the curve is ca. 0·0014—0·0021^{mm}. 3. Sigmata are of the common form, and are more or less contort; their length is 0·114—0·15^{mm}, and the thickness ca. 0·005—0·007^{mm}.

Locality: The species was taken by the Sophie-Expedition 1883, at East-Greenland, depth 125 fathoms. Topsent mentions it from the sea at the Azores at a depth of [illegible] fathoms.

Note. This species seems to be closely allied to *F. Thielei;* like this it has only one form of forcipes, and the forcipes of the two species resemble each other and are of a characteristic form. It is doubtful whether the *F. groenlandica* mentioned by Topsent is identical with the present species, as its styli are very slightly spined and often smooth, and both styli and tylota are [illegible], as also its sigmata are plane. Also Topsent's species must be closely allied to *F. Thielei,* especially as the sizes of the spicules are rather equal, but in *F. Thielei* spines are never found on the styli; accordingly there is some possibility that Topsent's species is an independent one. Topsent establishes on it the genus *Trachyforcepia*; he establishes it with some hesitation, and I cannot, in the spinulation of the styli, find sufficient reason for the formation of a genus, so much the less, as transitions are always found, and this is also here the case.

The genus *Forcepia* is a well characterized genus, and now it contains a rather great number of distinct species. As in several other places among the sponges, the authors have not originally had an eye for the characteristic specific differences, and have regarded the occurrence of forcipes, even if they were somewhat different, as a sign of specific identity. Carter and Vosmaer, therefore, have blended different species. As mentioned under *F. fabricans*, the *F. bulbosa* Cart. mentioned by Topsent, is not Carter's species, but a new one, what is seen distinctly from the spiculation, which is as follows:

	Styli	Tylota	Chelæ	Forcipes	Sigmata
F. bulbosa Cart.	0·56mm	0·308mm	0·038mm	0·038mm	0·067mm
F. bulbosa Tops.	0·71mm	0·36–0·415mm	0·033mm	0·037—0·057mm	0·11—0·12mm

Further Topsent's species has sometimes some spines on the styli, and forcipes seem to be of two or three forms. I propose for Topsent's species the name of *F. azorica*. Thus the result will be that Carter's species *F. bulbosa* keeps its name, Vosmaer's *F. bulbosa* is identical with *F. fabricans* Schmidt, and Topsent's *F. bulbosa* gets the name *F. azorica*.

According to this, the genus *Forcepia* contains at present the following species:

1866. *Forcepia (Halichondria) forcipis* Bow.
1874. — *(Esperia) fabricans* O. Schmidt.
1876. — *(Halichondria) bulbosa* Cart.
1885. — *crassanchorata* Cart.
1887. — *groenlandica* Frstdt.
1895. — *Carteri* Dendy. (This species occupies a special place, as, according to the description, it does not seem to have skeletal spicules, but only dermal spicules. The main skeleton is chiefly composed of sand.)
1904. — *imperfecta* Tops.
— *Topsentii* n. sp.
— *Thielei* n. sp.
— *azorica* nom. n. (= *bulbosa* Tops. l. c. 1904, nec Carter).

It is still to be added that Carter in 1874 (Ann. Mag. Nat. Hist. Ser. 4, XIV, 248, Pl. XV, fig. 47) has established a species, *F. colonensis*. At the time of the establishing only the forceps was known, which had been found isolated; it was very large, 0·26mm. In 1885 he (ibid. Ser. 5, XV, 110, Pl. IV, fig. 2 a—e) refers a species to this one, the forcipes of which are of a similar form, but only attain a length of 0·093mm; according to the description the megasclere of this latter species [illegible] only one kind, viz. tylota. In 1895 the species is again mentioned by Dendy (Proceed. Roy. Soc. of Victoria VIII, 24), who says of the examined specimens that their forcipes are somewhat smaller than those of the type; I suppose that by the type he means the isolated forcipes upon which the species was originally established. The question must, according to this, be of two different species, but as to the former, the one with the large forcipes, nothing definite can be said, as only the forcipes are known, but I think there is some reason to suppose that it is a *Forcepia*, and with regard to the latter, which has of megasclera only tylota, it is at present doubtful whether it belongs to *Forcepia*.

Finally it is to be remembered that the *F.* (*Trachyforcepia*) *groenlandica* enumerated by Topsent l. c. is perhaps an independent species.

As to *Forcepia versatilis* Tops. see under the genus *Asbestopluma* p. 75.

Thiele (Arch. für Naturgesch. 1903, I, 384) says that Carter's generic name cannot be used, as one of the species, by Carter referred to *Forcepia colonensis*, of megasclera has only tylota; I think, however, that Carter's name is to be kept, as his original type, to judge from what is stated above, may be supposed to be a *Forcepia*-species. — When Thiele, in the place quoted, will refer *Forcepia* to *Hamigera*, and at most regard it as a subgenus under this genus, this is surely erroneous; for further particulars regarding this fact see under *Lissodendoryx stipitata* p. 173.

Melonanchora Carter.

The form thickly incrusting or massive, sometimes somewhat lobate. The surface closely set with wart-shaped papillæ. The skeleton chiefly polyspicular, but rather irregular, with fibres running [illegible] towards the surface, and between them irregularly scattered spicules or [illegible]. The dermal skeleton consists of very close-lying, horizontal spicules and of fibres supporting the [illegible]. A [illegible] amount of spongin is found in the skeleton. Spicules: the megasclera are either [illegible] the skeletal spicules are styli, the dermal spicules tylota to strongyla, [illegible] are tylota to strongyla; microsclera: the characteristic microsclera are sphærancoræ[1] consisting, when fully developed, of two elliptical rings, intersecting each other at a right angle; to these are added spatuliferæ of two sizes.

1. M. elliptica Carter.

Pl. VII, Figs. 4—6. Pl. XX, Fig. 1 a—o.

1874. *Melonanchora elliptica* Carter, Ann. Mag. Nat. Hist., Ser. 4, XIV, 210, Pl. XIII, figs. 6—12, Pl. XV, fig. 35 a—b.

[1] The characteristic, melon-shaped ancora was by Carter called "melon-shaped anchorate" [illegible] it "mel.", but an established term did not exist. Therefore it was a very natural thing that Topsent [illegible] give a fixed name to this form, and he chose "sphæranciste r", finding in the individual [illegible] of the ancora [illegible] to the dianeistra in *Hamacantha*. The chosen term, however, is very unfortunate, as these ancoræ have [illegible] with dianeistra, but are real ancoræ, and this fact ought to be expressed in the name. The most [illegible] would be, therefore, to designate this form as melonancora, but by this name there is the drawback that it [illegible] genus, and so it may give rise to confusion. I therefore choose to designate these ancoræ as sphærancoræ [illegible] by its ending that the question is of real ancoræ.

1880. *Melonanchora elliptica* O. Schmidt, Spong. des Meerbus. von Mexico, II, 85, Taf. IX, Fig. 8 A—F.
1887. — — Fristedt, Vega Exp. vetensk. Iakttag. IV, 454, Pl. 25, figs. 51—55.
1892. — — Herdman, Trans. Liverp. Biol. Soc. VI, 85.
1892. — — Topsent, Résultats des Camp. scient. du Prince de Monaco, Fasc. II, 101.
1903. — — Arnesen, Spong. von der norweg. Küste, Berg. Mus. Aarb. 1903, No. 1, 17, Taf. II, Fig. 4, Taf. V, Fig. 4.
1904. — — Topsent, l. c. Fasc. XXV, 177, Pl. IV, fig. 10.

Massive, sometimes somewhat roundlobed. The surface closely set with higher or lower, wart-shaped pore papillæ, otherwise smooth. The dermal membrane hyaline, very solid, with close-lying, horizontal dermal spicules, supported by fibres of dermal spicules. Oscula spout-shaped, few, scattered between the pore papillæ. The skeleton an irregular, chiefly polyspicular network of fibres passing towards the surface, and between them scattered spicules and spicula-bundles. Spicula: Megasclera: the skeletal spicules styli, often with rounded point, 0·68—0·86mm, the dermal spicules tylota to strongyla 0·41—0·62mm; microsclera of three forms, sphærancoræ 0·054—0·068mm, ancoræ spatuliferæ of two forms, large ones 0·047—0·075mm, small ones 0·021—0·028mm.

This species is of a massive form; the smaller specimens are more or less roundish, the larger ones may be more expanded and somewhat roundlobed. The species has a very characteristic exterior, being rather closely set with wart-shaped papillæ of a peculiar structure, which will be more particularly described below. The specimens in hand which are not torn off from the substratum, are attached to stones and shells. The largest specimen, which is of an irregular, massive form, but is no entire one, has a greatest extent of ca. 100mm and a greatest thickness of 55mm. This specimen shows three flat, round eminences or lobes (Pl. VII, fig. 4). Another, tolerably entire specimen is higher and more lump-shaped, it has a height of ca. 65mm and a similar breadth. The smallest specimen is irregularly roundish, of a diameter of ca. 25mm. The colour (in spirit) is whitish or yellowish white. The skin is firm and solid, but the consistency of the inner body is rather brittle. The *surface* is smooth without projecting spicules. The *dermal membrane* is a hyaline, very solid, and easily separable membrane, provided with close-lying spicules. *Oscula* and *pores*: As mentioned above, the surface is set with close-standing papillæ; these papillæ, in their fully developed state, are formed as high warts, being cylindric and with rounded ends. They are not rarely broadest in their upper part, and the part below is narrowed somewhat like a neck. In their fully developed state they have generally a height of 4—5mm, and a breadth above of 3—4mm; in some specimens, however, they may be somewhat larger. These papillæ, which are supported by a network of spicules, have pores in the meshes of the net. The pores are close-standing, so that the membrane, which is here thin and transparent, becomes a sieve; they are round or a little oval, and their diameter was measured to 0·037—0·18mm. The pores are not only found in the upper part of the papillæ, but also down on their sides. The close spiculation of the dermal membrane ceases at the base of the papillæ, and from this point polyspicular fibres issue passing up into the wall of the papilla and forming a net of meshes, the single meshes of which may again be subdivided by thinner fibres or single spicules. In these meshes the pores are situated. This description holds good of the papillæ, when they are fully developed. Besides these, however, papillæ occur in all degrees of contraction, down to quite small, knob-shaped projections; the somewhat contracted papillæ show only the net of meshes and pores at the top, and the entirely contracted, low knobs have neither the net of meshes nor pores. It is, of course, impossible to tell whether these different stages of the papillæ represent stages of expansion and contraction, or they are stages of development, when they have not been observed to open or close. There is, however, every probability that the question is of contraction and expansion, as the quite low knobs show a compact, more or less confuse accumulation of spicules, filling the knob entirely; then by degrees a beginning of a net of meshes appears at the point, and the larger the papillæ become, the more expanded and regulated the net of meshes becomes. If the question was of a development of new papillæ, it was to be expected that the net of meshes was formed immediately, and that the papillæ only grew in size. Carter says: "Pores and vents respectively situated in the cribriform tubercles", and Vosmaer supposes that the tubercles have nothing to do with pores, but are exclusively oscula. Now there can be no doubt that the papillæ, to judge from their structure upon the whole, exclusively carry pores, neither are pores found anywhere else in the skin. The real oscula have been overlooked both by Carter and by Vosmaer, and they have not been mentioned by later authors either. These oscula are formed as conical spouts, which are formed by the dermal membrane; they may be higher or lower, sometimes they are very low, scarcely projecting, and then they are easily overlooked. The dermal spicules are lying in the oscular wall parallelly to the longitudinal direction of the spout. Oscula are only few in numbers in proportion to the pore papillæ, thus on the largest specimen ca. eight were counted.

The *skeleton*. The *dermal skeleton* consists of very close-lying dermal spicules, all horizontal and situated in several layers. They are not scattered, but form groups in which the spicules are parallel to each other. On account of the dense spiculation the membrane is very solid. The skeletal structure of the pore papillæ and of the wall of the oscular spout has been mentioned above. To the dermal skeleton belong further fibres of dermal spicules rising perpendicularly from the skeleton below and supporting the membrane. The *main skeleton* is an irregular, to a great extent polyspicular, network. Some fibres are found, running towards the surface; they are polyspicular, but may be of rather varying thickness. When one succeeds in getting a section parallel to the direction of the fibres, they are seen to run rather regularly, especially near the surface; in their outer part they consist of dermal spicules, and pass out to and support the dermal membrane. Transverse fibres are not found, but between the fibres a great many spicules are found, placed singly or a few together; they are scattered quite irregularly between the fibres, so that the whole thing conveys a quite irregular impression. A feature contributing to the irregularity of the skeleton is also the many, rather large canals, between which the fibres must bend. Spongin is found in the nodes of the skeleton and in the fibres, but it is white and clear. In the skeleton of the dermal membrane no spongin was observed.

Spiculæ: a. *Megasclera*. 1. The skeletal spicules are monactinal, most frequently styli, but often with the point so much rounded as to become strongyla, in which case, however, they preserve their monactinal character, one end being thinner than the other. They are slightly curved, oftenest with the curve nearest the head-end, sometimes the curving is a little irregular. The point, as mentioned, may be varying, but is always short; from a distinct point, bounded by straight lines, but short, all transitions are found through shorter and more stubby forms to a broad rounding of the pointed end. In this respect there may be some difference in different individuals; in some, and perhaps in most, styli with quite rounded end are rare, while in a few specimens they are most numerous. Their length varies from 0·68—0·86^{mm}, and the thickness from 0·014—0·021^{mm}, in some individuals they scarcely reach this thickness. A few developmental forms occurred, the finest ones are all pointed, but they may be rounded already when rather thin. 2. The dermal spicules are tylota with very slightly swollen ends; not rarely almost no swelling is found, so that they become strongyla; they are straight or quite slightly fusiform. Their length may be rather varying, from 0·41—0·62^{mm}, not varying so much, however, in one individual, the thickness is ca. 0·008—0·017^{mm}. The developed tylota have equal, or about equal ends, but a few quite fine forms were found, indicating that they are begun as monactinal. b. *Microsclera* are sphæranecoræ and ancoræ spatuliferæ of two sizes. 1. The sphæraneoræ are the wellknown ancoræ described by Carter as "melon-shaped anchorates". Carter supposed the common ancoræ to be developmental forms of the sphæraneoræ, which was in accordance with his general view of the growth of these bodies. Levinsen (Vidensk. Meddel. fra Nat. For. Kobenhavn for 1893, 1894, 13 seq. Tab. I, Fig. 31—49) has already pointed out the error in this view, and he is the only author, who has given a complete, and, apart from a single mistake, correct description of the sphæraneoræ and their mode of growth. The sphæraneora consists of four arcs, connected with each other at the ends, and forming right angles with each other, so that they form an ellipsoidal body. Each of the arcs consists of a principal part or axis and of a thin plate-shaped brim issuing from the outward-turned dorsal side of this axis; this brim folds round on eiter side of the axis and lies as a thin plate on either side of it; it is of about the same breadth as the axis of the arc, and it is seen to be finely and transversely striated. The sphæraneoræ are typical ancoræ, as is shown by their development. The youngest stage observed consists of a thin shaft with three thin, rather long beginnings of teeth at each end; in contradistinction to the common ancoræ no falx is developed here. The teeth now become longer during the growth, and at the same time both they and the shaft become broader in the radiate direction; finally the ends of the teeth meet and coalesce, and the body that was begun as an ancora, consists now of four narrow arcs whose ends are joined, or of two ellipses intersecting each other at a right angle. The body now formed consists only of the middle or axial parts of the arcs, and as yet no striation is seen; in older stages the striation is seen to begin first along the dorsal side of the arc, but reaching by degrees farther inward, until the striated lateral plates or brims are formed in their full breadth, and the sphæraneora is complete. The striated brims correspond completely to the alæ and tooth-plates of a common ancora. Strictly spoken, the term striated brims or plates is not quite correct, as it is seen distinctly by sufficient enlargement that the question is not of a brim with striæ, but, on the contrary, of a series of close-standing, fine teeth; in developmental forms with beginning brims it is seen especially distinctly that the teeth are free, later they become a little broader, and then they adjoin each other closely, only their somewhat pointed end is then seen to be free. When the ancora is fully developed, the four arcs are quite equal; it may, however, generally be decided, which of the arcs is the original axis; on the three arcs formed by the coalesced teeth, there is generally found, in the middle of the inner side of the axial part, a little rounded tooth, often bounded on either side by a small spur; on the fourth arc, on the other hand, the [illegible] original axis, only a spur or a few spurs are found. The sphæranceoræ may be somewhat varying in appearance: they may especially be more or less highly arcuate, so that the ellipse may be longer or shorter; the shorter and more highly arcuate ones are upon the whole more robust, and have broader arcs than the longer and more slender ones. These variations of the sphæranceoræ are generally found in different individuals, while in one individual the variation is most frequently slight. Further some more or less monstrously or irregularly developed forms are seen: thus the ancoræ may be somewhat twisted, and the consequence then is that the teeth do not meet: in this case they either coalesce in an oblique way, or are left free. Sometimes the teeth do not reach their full length, so that the coalescing remains incomplete, or does not take place at all, while in other respects the ancoræ are fully developed.

The description of the construction and mode of growth of the sphæranceora given here is quite agreeing with Levinsen's observations, with the only exception of a few points. Levinsen's opinion is that two independent forms of sphæranceoræ are found, smooth ones and striated ones; but the smooth ancoræ, as has been advanced here, are developmental stages of the striated ones, only they have not yet got the striated lateral brims, which grow forth as the last feature, and may be followed in their growing to greater breadth, so that we get a continuous series from the first stage to the finished sphæranceoræ (Pl. XX, fig. 1 c—k). The reason why Levinsen has supposed two independent forms to exist, is that he regards the forms with free, not coalesced, but otherwise fully developed, striated teeth mentioned above as the developmental forms of the striated ancora. According to what has been stated above, there can be no doubt, however, that these ancoræ are quite complete and their growth finished; they have only a little shorter teeth than the other sphæranceoræ, which leads to the fact that the teeth do not coalesce; they are, accordingly, to be regarded as monstrous forms. Levinsen is also surprised that he finds only very few of the developmental forms of the striated ancora and no young ones, as he refers all the younger developmental forms to the smooth ancora; these latter developmental forms are rather frequent, although the smooth ancora is far less frequent than the striated one; this latter fact is a matter of course, as the smooth ancora is a developmental form. Levinsen, it must be added, says himself that it is the finding of the striated ancora with not-adjoining teeth, which causes him to suppose two forms, while he should otherwise have been inclined to regard the smooth ancora as a developmental form of the striated one.

The length of the sphæranceoræ varies from 0·054—0·068mm, and the breadth, measured across two opposite arcs, varies from 0·024—0·038mm. 2. The ancoræ of the large form are of the common structure; they have a slightly curved shaft and three lanceolate teeth at each end, and a narrow ala of the same length as the teeth. The ancoræ are somewhat varying in size, the length from 0·047—0·075mm; the variation, however, is not so large in one individual, as instances may be given 0·047—0·061mm, and 0·057—0·075mm. The breadth is ca. 0·01[illegible]—0·021mm. A few developmental forms occurred; these, as already mentioned, may easily be distinguished from the developmental forms of the sphæranceora, as their beginning teeth at an early stage become high and narrow, i. e. develop a falx, while such is not the case with the sphæranceoræ. 3. The small ancoræ are of a similar form, their length is $0{\cdot}021-0{\cdot}028^{mm}$, and the breadth is ca $0{\cdot}007^{mm}$. The three forms of microsclera are found through the whole sponge; in the dermal membrane the small ancora may be seen, and on the lower side of this membrane the sphærancoræ are found; in the pore sieves the sphærancoræ and the small ancoræ are of frequent occurrence, while the large ancoræ are scarce. The sphærancoræ are frequently, but not always, seen in the membranes of the canals in large numbers; they are placed perpendicularly with one end towards the lumen of the canal, and between them both forms of the ancoræ are seen. The sphærancoræ and the small ancoræ are upon the whole most frequent, while the large ancoræ are present in far smaller numbers.

In this species cellules spheruleuses occur so abundantly, that the tissue seems almost exclusively to be formed by them; they are roundish or irregular, filled with rather large, clear, somewhat refracting granules. Their average size is ca. $0{\cdot}017^{mm}$. They are seen in large numbers in the dermal membrane and especially in the canals of the membranes.

Locality: Station 78, 60°37′ Lat. N., 27°52′ Long. W., depth 799 fathoms; station 81, 61°44′ Lat. N., 27°00′ Long. W., depth 485 fathoms; station 90, 64°45′ Lat. N., 29°06′ Long. W., depth 568 fathoms; further it has been taken at the Faröe Islands, southwest of Myggenæs, depth 135 fathoms (Ditlevsen); north of Iceland, depth 58 fathoms (H. M. S. «Beskytteren», Gemzoe), and at 62°29′ Lat. N., 5°17′ Long. W, depth 190 fathoms (Ad. Jensen, the cruise of the »Michael Sars« 1902). Six specimens in all. The localities are situated in the Denmark Strait, north and southwest of Iceland, and at the Faröe Islands.

Geogr. distr. The species seems to be very widely distributed; it has hitherto been obtained between Scotland and the Faröe Islands (the »Porcupine«), Reksten Fjord, depth 200—300 fathoms (the »Argo«), Bergen, 53—96 fathoms (Arnesen l. c.), the eastern coast of Greenland, depth 130 fathoms (Fristedt l. c.), in the Caribbean Sea (Schmidt l. c.), and at New Foundland, depth 673 fathoms, and the Azores, depths from 278—724 fathoms (Topsent l. c.).

2. M. emphysema O. Schmidt.

Pl. XX, Fig. 2 a—d.

1875. *Desmacidon emphysema* O. Schmidt, Jahresber. der Comm. zur wissenschaft. Unters. der deutsch. Meere in Kiel, für 1872—73, 1875, 118.

1885. ? *Melonanchora elliptica* Vosmaer, Bijdrag tot de Dierk., 12. Afl., 3. Gedeelt., 31, Pl. I, figs. 14 et 22, Pl. IV, figs. 23—34, Pl. V, figs. 69—72.

1903. *Melonanchora emphysema* Thiele, Archiv für Naturgesch. Jahrg. 1903, I, 392.

Incrusting or massive. The surface set with wart-shaped pore papillæ, otherwise smooth. The dermal membrane solid, with close-lying horizontal spicules, supported by perpendicular fibres. Oscula scattered, spout-shaped. The skeleton chiefly polyspicular, consisting of fibres passing towards the surface and sparsely connected by scattered spicules. Spicula: Megasclera of one form only, uniform throughout the skeleton; they are tylota with transitions to strongyla $0{\cdot}44-0{\cdot}61^{mm}$; *microsclera of three forms, sphærancoræ* $0{\cdot}050-0{\cdot}056^{mm}$, *ancoræ spatuliferæ of two forms, large ones* $0{\cdot}057-0{\cdot}078^{mm}$, *small ones* $0{\cdot}024-0{\cdot}030^{mm}$.

This species is incrusting, or, when growing thicker, of a more massive form. In the exterior it is somewhat similar to the preceding species, being set with papillæ of a similar structure as in *M. elliptica*. In the quite incrusting individuals the papillæ seem to be wanting, and in those only little thicker to be present in rather slight number. The species grows on various bottom material, stones, shells, or more loose material. The largest specimen has a greatest extent of fully 30mm, and is provided with many papillæ, two smaller, about incrusting, specimens have few papillæ, and an incrusting specimen with an extent of 15mm and a thickness of ca. 2·5mm shows no papillæ. Schmidt describes the exterior of the species as "Unregelmässige Knollen und Fladen", and Vosmaer figures a specimen, which probably belongs to this species and seems to be regularly cushion-shaped, with an extent of fully 50mm. Accordingly the species does not seem to equal the preceding one in size. The colour (in spirit) is grayish. The consistency is as in the preceding species or a little looser. The *surface* is smooth, without projecting spicules. The *dermal membrane* is also here a solid, easily separable membrane with close-lying spicules. *Oscula* and *pores*: What was said with regard to oscula and pores in the preceding species, holds also good of the present one; also here pore papillæ are found of different sizes and stages of development, and conical, spout-shaped oscula.

The *skeleton*. The *dermal skeleton*, as in the preceding species, consists of spicules lying horizontally in the membrane and arranged in more than one layer. In the present species they are generally not so close-lying as in the preceding one, but with regard to this fact some variation may be found in the present species; where they are least close-lying they are scattered without any order, and the membrane may everywhere be seen between them; where they are most close-lying, a tendency to an arrangement in bundles may be observed. The skeletal structure in the pore papillæ and the oscular walls is like that in the preceding species. The *main skeleton* is almost exclusively polyspicular; some rather powerful fibres are found passing from the base towards the surface and towards the dermal membrane, which they support. The fibres are only mutually connected to a very slight degree, and generally only by single spicules which are irregularly scattered and only found sparingly. The polyspicular fibres may attain a thickness of 0·09—0·12mm. In the lower part of the sponge, which is turned towards the underlayer, sand and gravel is generally embodied copiously. Spongin is found in the nodes and in the fibres, it is white and clear and therefore not easily observed; it is not copious although distinctly present, and it seems often to coat the fibres completely, but with a scarcely perceptible layer.

Spicula: a. *Megasclera* are of one kind only, and consequently of the same form in the dermal membrane and the other parts of the skeleton. They are tylota with slightly swollen ends, sometimes the ends are so slightly swollen, that the spicules approach to or are strongyla. They are straight or slightly, most frequently a little irregularly, curved, and they are slightly fusiform. Their length varies from 0·44—0·61mm, and the thickness in the middle is 0·010—0·014mm. A few developmental forms were found: they showed that the spicules are begun as monactinal; the finest one had one end rounded, the other short pointed; as long as the spicules are not fully developed, they show a rather distinct difference between the two ends, one being thicker, the other a little thinner with a most frequently more marked swelling; still in the fully developed forms this difference may often be seen.

It is a surprising fact that in this species only one form of megasclera is found, composing both the dermal and the main skeleton. The question, it is to be remembered, is not of the skeletal spicules having become equi-ended and of the same size as the dermal spicules, but it is a real fact that only one kind is found. According to both form and development it is evident that the megasclera here correspond to the dermal spicules in the preceding species, and thus the skeletal spicules have disappeared. It would be interesting to examine embryos of the present species, for, the skeletal spicules being generally the megascleres occurring as the first in the embryos of the Myxillinæ, they might possibly be found to be represented in the embryos of the species.

b. *Microsclera:* these are of three forms, sphærancoræ and ancoræ spatuliferæ of two sizes 1. The sphærancoræ are of the same construction as in *M. elliptica*, but they have a peculiar form that may best be described as quadrangular-elliptical; their length is 0·050—0·056^{mm}, and the breadth, which is rather constant, the sphærancora being almost unvarying as to form, is ca. 0·028^{mm}. A few developmental forms were found, showing the same kind of development as in the preceding species. On account of the difference as to size and the peculiar form of the sphærancora, its younger developmental forms may easily be distinguished from the corresponding developmental forms of the large ancora. 2. The large ancoræ are also similar to the ancoræ in *M. elliptica*, but they are a little more robust. Their length is 0·057—0·078^{mm}, and the breadth is 0·021—0·025^{mm}. 3. The small ancoræ are of a similar form, their length is 0·024—0·030^{mm}, and the breadth 0·007—0·010^{mm}. Quite singly ancoræ may be found which seem, as to size, to form transitions between the two sizes of ancoræ. Of both forms developmental forms were seen, but only in slight numbers. All the microscleres occur throughout the sponge and in the dermal membrane; here, again, the sphærancoræ are seen in large numbers in the membranes of the canals. The large ancoræ occur in this species in larger numbers than in the preceding one, and the three forms are about equally frequent.

In the dermal membrane "cellules spheruleuses" are found copiously; they are seen, partly as distinctly limited cells of a size of about 0·015^{mm}, partly gathered to heaps of granules. They are colourless in spirit, with large, round, highly refracting granules.

Remarks: This species was established by Schmidt l. c. as *Desmacidon emphysema*, but with a description that rendered it impossible to recognize it; the sphærancora he took to be a diatom. As I have examined Schmidt's type specimen, I have been able to identify the species with certainty. Thiele l. c. has also examined Schmidt's species and has already shown it to be a *Melonanchora*, but another species than *elliptica*. Thiele supposes that Fristedt's species is also *emphysema*, which might also be indicated by Fristedt's description and figure; by examining his specimen I have seen, however, that it is *elliptica*. On the other hand it is to be supposed from Vosmaer's description and figure l. c. that he has had the present species before him. — In Bronn's "Klassen und Ordnungen der Spongien" Vosmaer, at p. 127, mentions *Melononchora* n. sp., and says in a foot-note: "Wird näher beschrieben in den zool. Resultaten der dritten und vierten holländischen Nordpolexpedition". In Vosmaer's work on the sponges of the Willem Barents expedition 1880—81, however, only *M. elliptica* is mentioned, so that the author presumably has arrived at the conclusion that the species was not different from this latter, what it must, accordingly, be supposed to have been nevertheless.

Locality: Station 78, 60° 37' Lat. N., 27° 52' Long.W., depth 799 fathoms; station 89, 64° 45' Lat. N., 27° 20' Long. Long W., depth 310 fathoms; station 94, 64° 56' Lat. N., 36° 19' Long.W., depth 204 fathoms; station 97, 65° 28' Lat. N., 27° 39' Long. W., depth 450 fathoms; further it has been taken east of the Faröe Islands, depth 250 fathoms (Ad. Jensen, the cruise of the "Michael Sars" 1902). The Ingolf stations are situated in the Denmark Strait and southwest of Iceland.

Geogr. distr. The species has hitherto been taken west northwest of Haugesund and southwest of Bukenfjord, Norway, in both places at a depth of 106 fathoms (Schmidt l. c.), and (if Vosmaer's species be identical with the present one) off the northern coast of Norway at depths of 140 and 145 fathoms (Vosmaer l. c.).

Plate I.

Plate I.

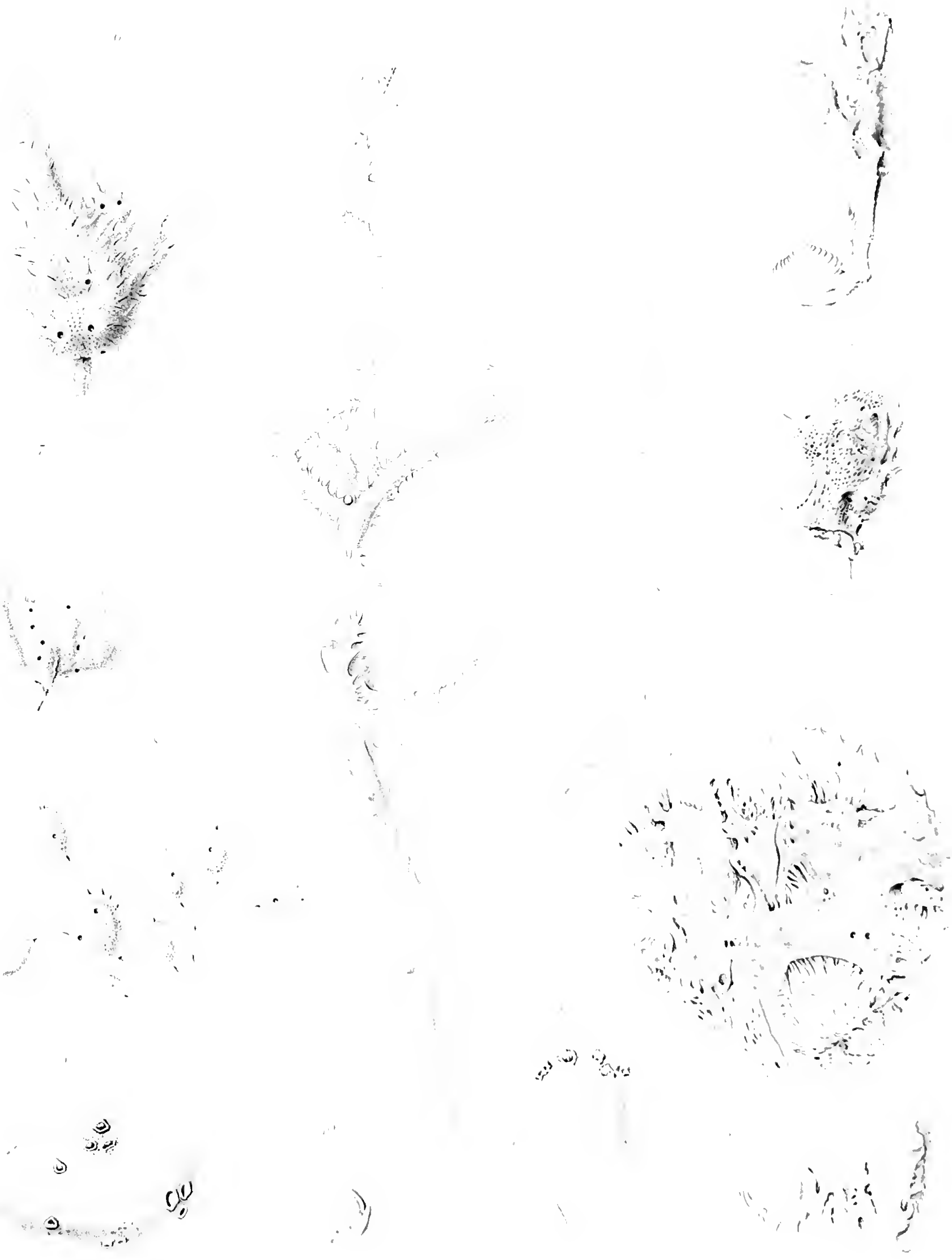


Plate II.

Plate II.

Page

Fig. 1. *Asbestopluma pennatula* O. Schmidt. The largest specimen, the lateral branches are long above but grow shorter downward; below the stalk-coating is seen; at the lower end the sponge is broken off. In the axis embryos are seen, above in a single row, farther down in a larger crowding. 1/1 44

— 2. *Asbestopluma pennatula* O. Schmidt. A specimen with almost all the lateral branches long; below the stalk-coating is seen, it is rather thick. At the lower end the specimen is broken off. 1/1 44

— 3. *Asbestopluma pennatula* O. Schmidt. A small specimen with root; the stalk irregularly bent in an angular way, the stalk-coating is seen reaching about up to the ramigerous part. 1/1 44

— 4. *Asbestopluma pennatula* O. Schmidt. A somewhat twisted specimen with all the lateral branches short and showing a swelling with embryos; the lower part is wanting. 1/1. 44

— 5. *Asbestopluma pennatula* O. Schmidt. A root-part. 1/1 44

— 6. *Asbestopluma pennatula* O. Schmidt. A fragment showing the proportion between the length and thickness of the lateral branches. The canals of the axis are seen to shine through. ca. 10/1 44

— 7. *Asbestopluma bihamatifera* Cart. A specimen with all the lateral branches long, viewed in such a position that the longest lateral branches are turned to the sides; the stalk-coating is seen reaching about up to the lateral branches. The specimen is broken off below. 1/1 51

— 8. *Asbestopluma bihamatifera* Cart. A specimen with very short lateral branches; the specimen is almost entire and show a long root-part, which is angularly bent. The stalk-coating is seen about up to the lateral branches. 1/1 51

— 9. *Asbestopluma furcata* n. sp. The largest specimen; only one branch is entire, the others are broken off. Only the entire branch shows the small lateral branches. The upper bounding of the stalk-coating is seen on most of the branches. 1/1 54

— 10. *Asbestopluma furcata* n. sp. At the base of the branch to the right a row of embryos is seen, in the branch to the left a cavity, in which two embryos have been situated, is seen. Below the stalk-coating is wanting; at the very base the surface of attachment is seen. 1/1 54

— 11. *Asbestopluma cupressiformis* Cart. A specimen with indistinct, coalescing lateral branches; above a leaf-shaped part. 1/1 58

— 12. *Asbestopluma cupressiformis* Cart. A leaf-shaped specimen. 1/1 58

— 13. *Asbestopluma cupressiformis* Cart., on *Astarte* sp.; a large specimen with more or less indistinct lateral branches; from the Kara-Sea. 1/1 58

— 14. *Asbestopluma cupressiformis* Cart. A small specimen with distinct, lateral branches arranged in a somewhat row-like manner. 1/1 58

— 15. *Asbestopluma lycopodium* Levins. The lateral branches at the top coalesced to longitudinal keels. 1/1 62

— 16. *Asbestopluma lycopodium* Levins., on *Pectinaria hyperborea*; from the Kara-Sea. 1/1 62

— 17. *Asbestopluma lycopodium* Levins. The upper end of a specimen, showing distinct longitudinal keels. ca. 10/1 62

— 18. *Asbestopluma hydra* n. sp., on a little stone, ca. 7/1 66

— 19. *Asbestopluma hydra* n. sp., on a little stone. It is a specimen without branches, the upper surface of the end-swelling has projecting spicules and quite short protuberances, and the swelling is slightly ribbed. ca. 7/1 66

— 20. *Asbestopluma infundibulum* Levins. The calyx compressed, the edge a little damaged; from the Kara-Sea. 1/1 68

— 21. *Asbestopluma infundibulum* Levins. A smaller specimen with the calyx slightly compressed; from the Kara-Sea. 1/1 68

— 22. *Asbestopluma comata* n. sp., on a sponge-spicule. ca. 3/1 72

— 23. *Asbestopluma comata* n. sp. The upper part of the sponge. ca. 20/1 72

Plate III.

Plate III.

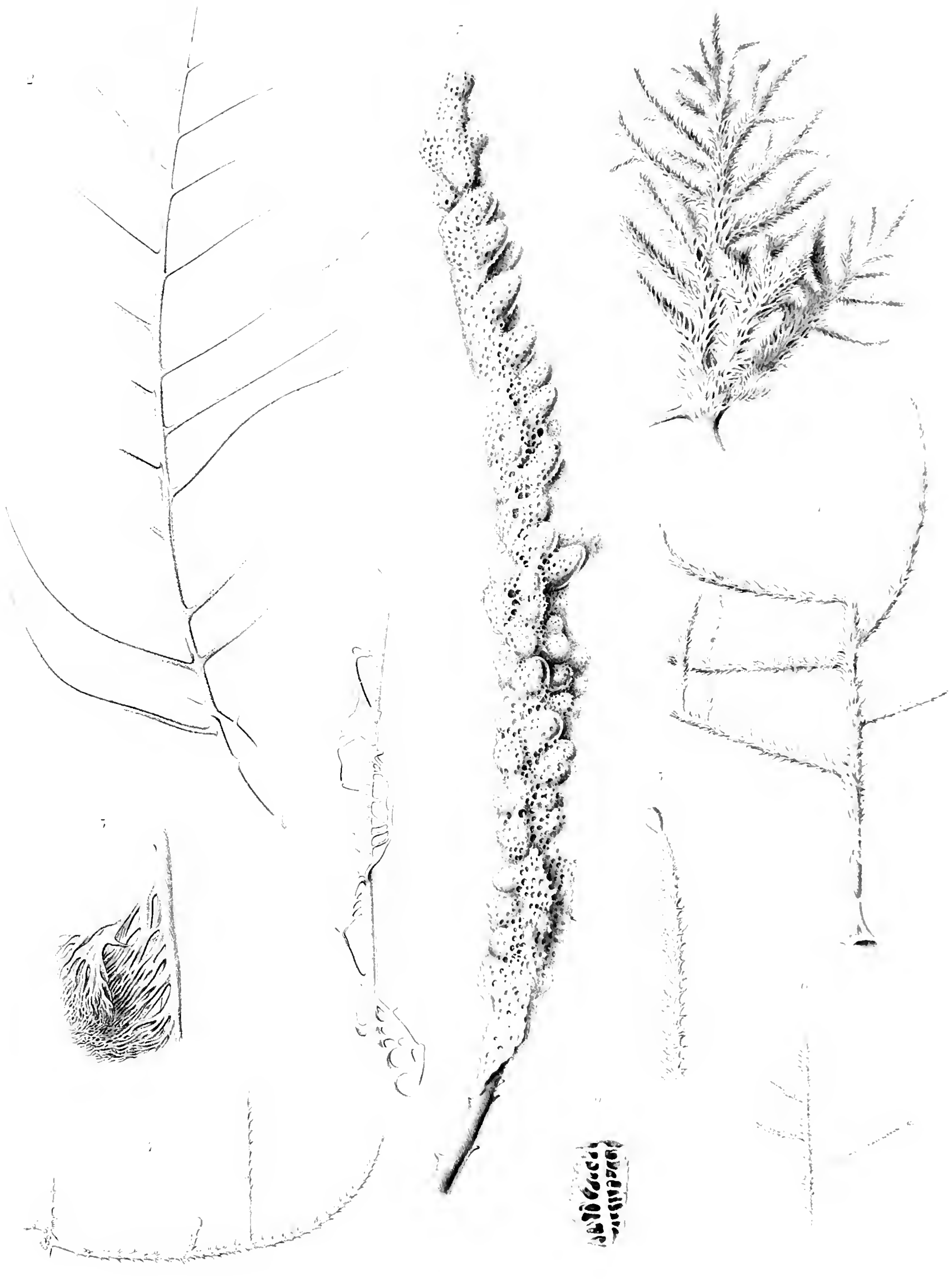


Plate IV.

Plate IV.

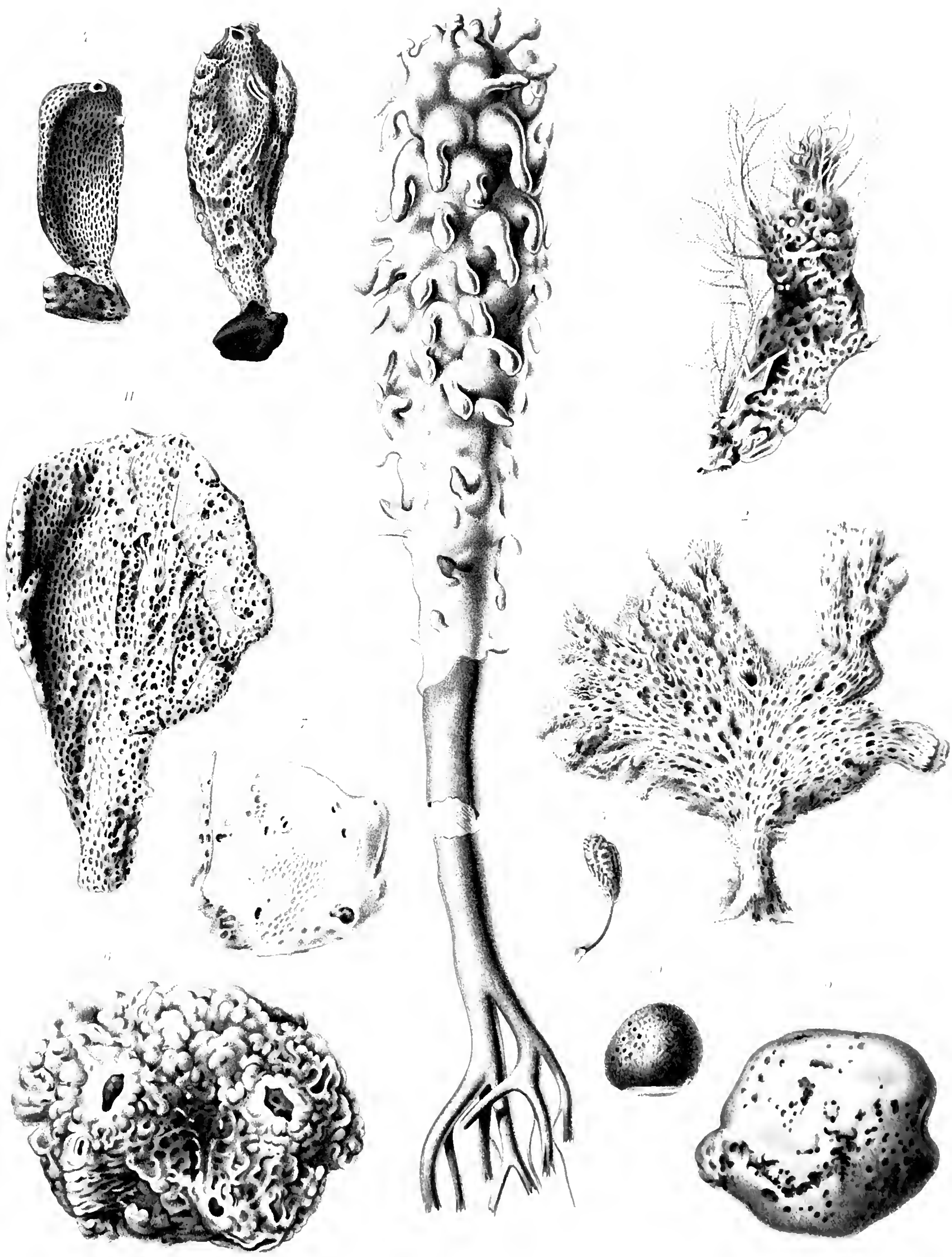


Plate V.

Plate V.

		Page
Fig. 1.	*Myxilla perspinosa* n. sp., growing on a Hydroid. 1/1	147
— 2.	*Myxilla pedunculata* n. sp., growing on *Arca* sp. 1/1	148
— 3.	*Myxilla diversiancorata* n. sp., somewhat damaged and broken off below. 1/1	150
— 4.	*Myxilla pluridentata* n. sp. The largest specimen, seen from the side and somewhat from above. 1/1	151
— 5.	*Lissodendoryx lobosa* n. sp. At the base two shells of Foraminifera are seen. 1/1	154
— 6.	*Lissodendoryx Sophia* Frstdt., somewhat damaged, the dermal membrane wanting in a few places; below the place of attachment is seen. 1/1	156
— 7.	*Lissodendoryx fragilis* Frstdt. Fragment of the lower part of a specimen, above a surface of fracture. 1/1	158
— 8.	*Lissodendoryx fragilis* Frstdt. Leaf-shaped fragment. 1/1	158
— 9.	*Lissodendoryx diversichela* n. sp., somewhat damaged, the lower, forward-turned surface is the surface of attachment. 1/1	160
— 10.	*Lissodendoryx indistincta* Frstdt. A somewhat compressed specimen, seen from above; the dermal skeleton more conspicuous in some places than in others. 1/1	162
— 11.	*Lissodendoryx complicata* Arm. Hans. A very richly branched specimen. 1/1	166
— 12.	*Lissodendoryx vicina* n. sp. A fragment. 1/1	169
— 13.	*Lissodendoryx stipitata* n. sp., attached to a stone, the dermal membrane wanting. 1/1	170

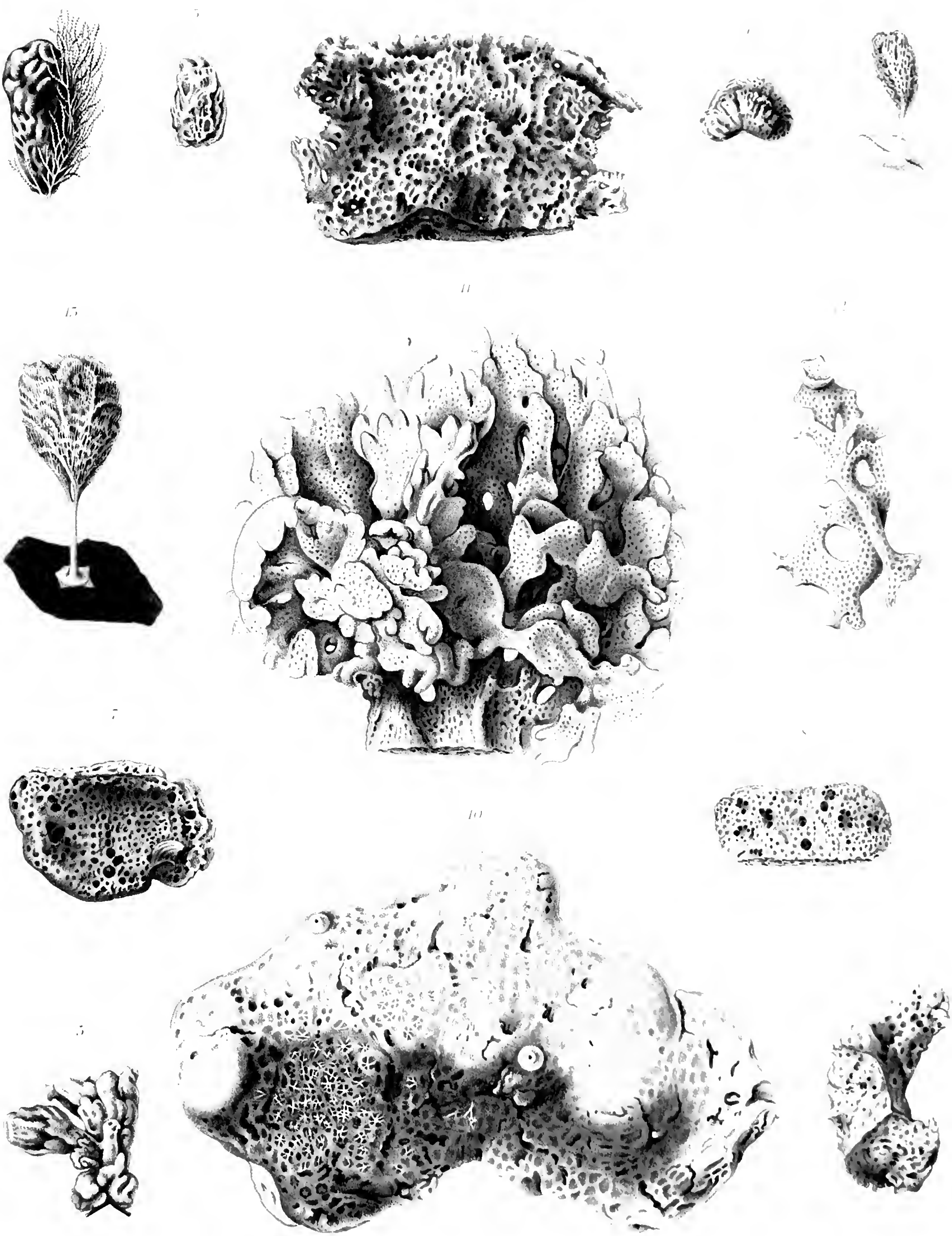

13
11
7
10

Plate VI.

Plate VI.

Page

Fig. 1. *Iophon piceus* Vosm. A very typical specimen, seen from the pore side; on the ridges the dermal membrane is mostly wanting. $^1/_1$ 175

— 2. *Iophon piceus* Vosm. A somewhat irregular specimen, seen from the oscular side. $^1/_1$ . . 175

— 3. *Iophon dubius* Arm. Hans., growing on *Plumularia* sp. $^1/_1$ 180

— 4. *Iophon dubius* Arm. Hans. A specimen with free branches, broken off below. $^1/_1$ 180

— 5. *Iophon dubius* Arm. Hans. A specimen with partly coalesced branches. $^1/_1$ 180

— 6. *Iotrochota oxeata* n. sp. An about lump-shaped specimen, growing on a fragment of *Thenea muricata*. $^1/_1$ 186

— 7. *Iotrochota polydentata* n. sp., seen from the pore side, somewhat damaged. $^1/_1$ 192

— 8. *Iotrochota spinosa* n. sp. Broken off below. $^1/_1$ 195

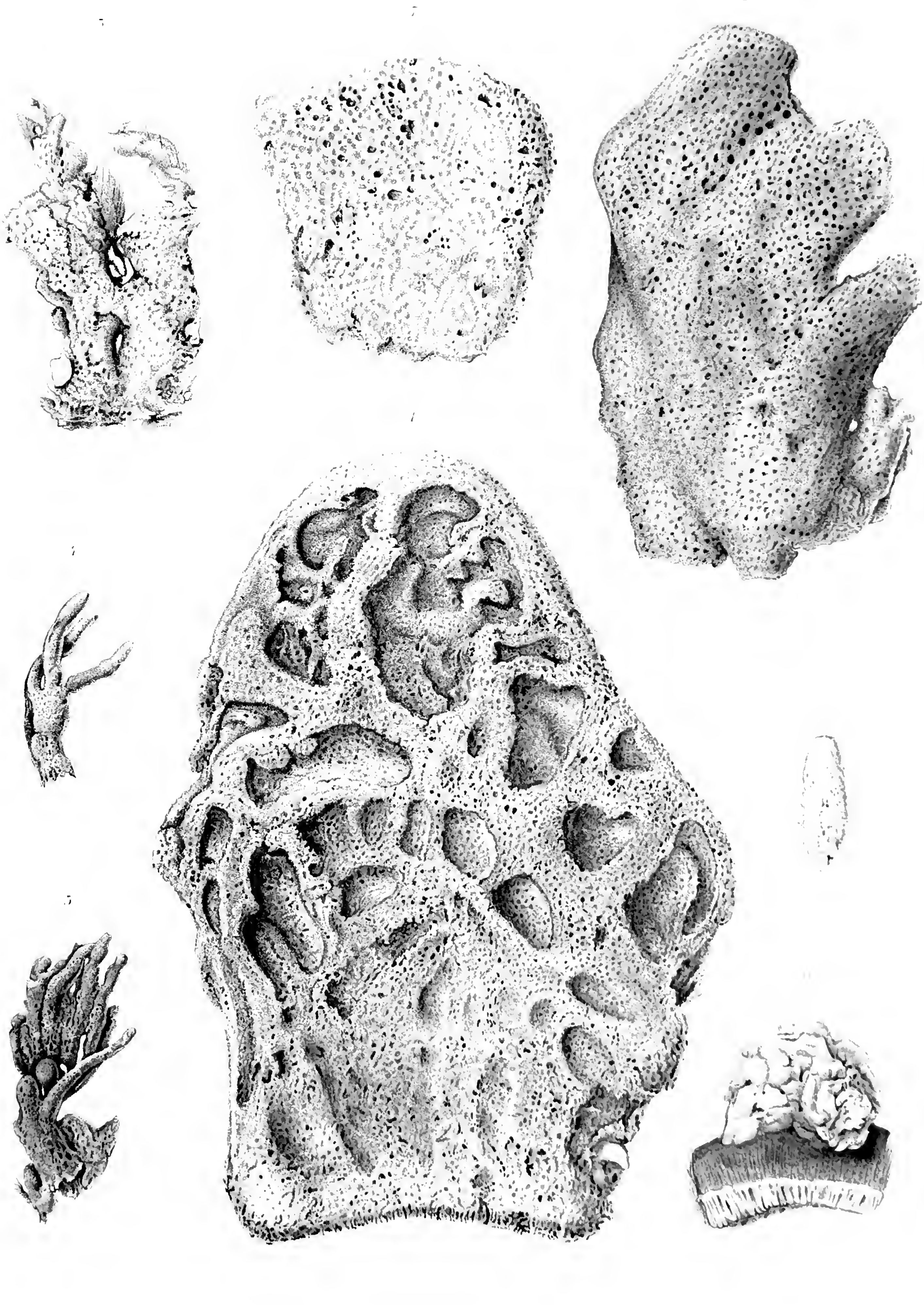


Plate VII.

Plate VII.

		Page
Fig. 1	*Forcepia Thielei* n. sp. Seen from the pore side; the surface damaged in a few places. $^2/_3$	206
— 2.	*Forcepia Thielei* n. sp. Seen from the oscular side, showing oscula, partly quite open, partly quite closed, and in different degrees of closing. $^2/_3$	206
3.	*Forcepia Topsentii* n. sp. The papillæ damaged in a few places, so that the canal at their base is seen. $^1/_1$	204
— 4.	*Melonanchora elliptica* Cart. The contour somewhat damaged; five oscula are seen. $^1/_1$	211
— 5.	*Melonanchora elliptica* Cart. Pore tubercle, seen from the side. ca. $^{11}/_1$	211
— 6.	*Melonanchora elliptica* Cart. Pore tubercle, seen from above. ca. $^{11}/_1$	211

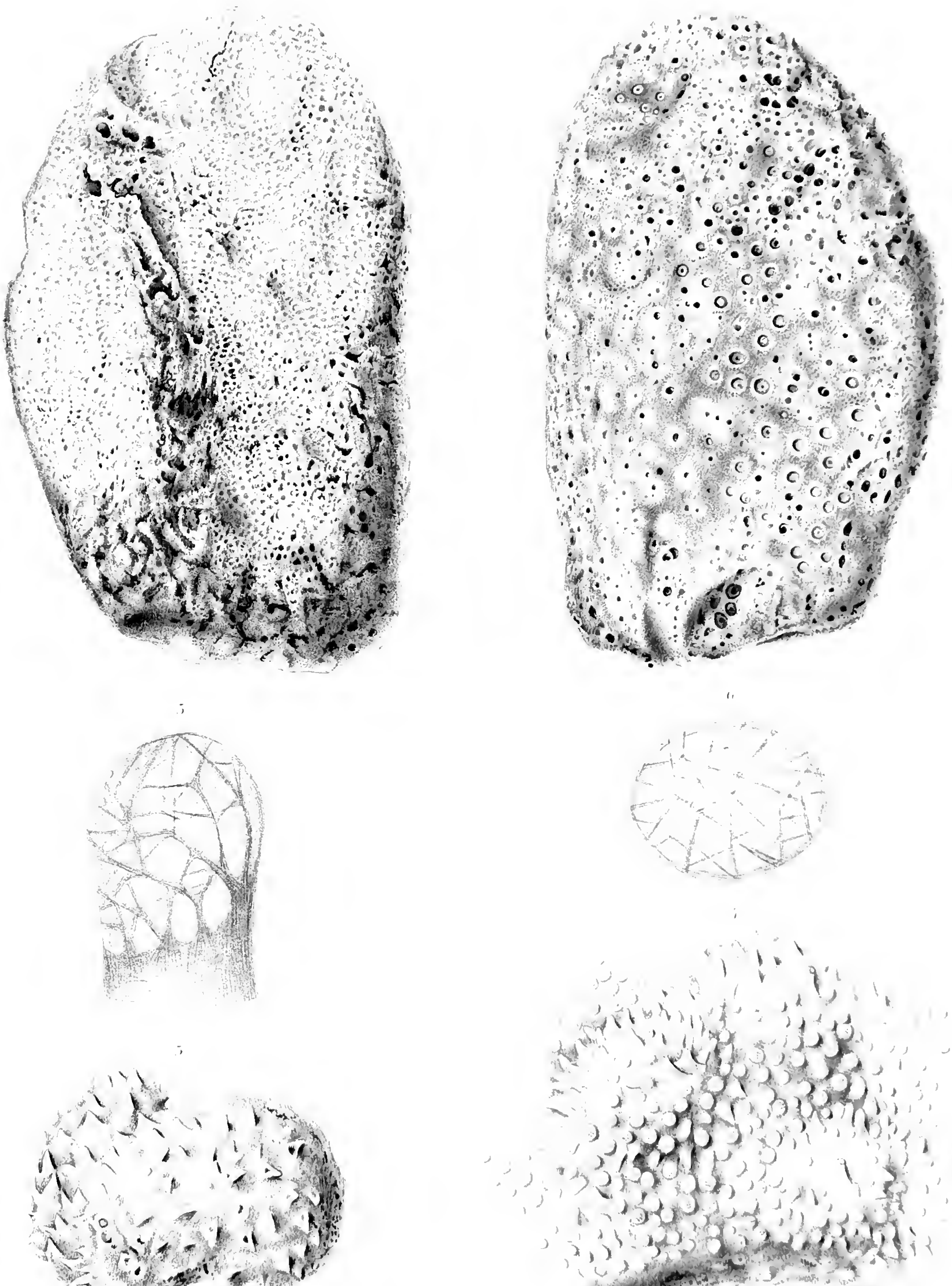


Plate VIII.

Plate VIII.

Plate IX.

Plate IX.

Page

Fig. 1. *Esperiopsis flagellum* n. sp. *a* styli, *b* a developmental form, × 165, *c* large isochelæ palmatæ of different sizes, front view and side view, × 585, *d* small isochela palmata, front view and side view, × 1000; *e* sigmata of different sizes, *f* a developmental form, × 255, *g* flagellate sigmata of different sizes, *h* a developmental form, × 255 20

— 2. *Esperiopsis typichela* n. sp. *a* styli, × 165, *b* large isochela palmata, front view and side view, × 585, *c* small isochela palmata, front view and side view. × 1000 22

— 3. *Esperiopsis typichela* n. sp. A piece from the surface, showing the conical projections, pores, and the lower part of one of the flagelliform appendices, × 32 22

— 4. *Esperiopsis typichela* n. sp. The lower part of one of the flagelliform appendices, showing the central fibre, the layer of tissue with large and small chelæ and rosettes, × ca. 54 22

— 5. *Mycale placoides* Cart. *a* styli of different sizes, *b* typical form of the shorter styli acting as transverse spicules, × 165, *c* upper end of different styli, showing the handle-like form in different degrees, × 380, *d* dermal spicules, showing the different length of the point and consequently of the whole spicule, × 165, *e* anisochela palmata, front view and side view, *f* chela with other dimension of the parts, side view, a little from behind, *g* chela seen from the smaller end, a little from behind, *h* chelæ of smaller forms, front view and side view, *i* developmental form of a smaller and a larger chela, × 585, *k* sigmata of different sizes, × 585, *l* trichodragmata, × 380 24

— 6. *Mycale lingua* Bow. *a* styli of different sizes and with different ends, *b* two typical forms of the shorter styli, acting as transverse spicules, × 165, *c* isochela palmata, side view and front view, *d* chelæ of smaller forms, front view and side view, × 585, *e* sigmata of different forms, × 585, *f* trichodragmata, × 380 29

Plate X.

Plate X.

Page

Fig. 1. *Mycale ovulum* O. Schmidt. *a* styli of different sizes, *b* three developmental forms, × 165, *c* anisochelæ palmatæ of different sizes and with different dimensions of the parts, front view and side view, *d* chela with almost uniform ends, *e* younger and older developmental form, side view and front view, × 585 34

— 2. *Mycale thaumatochela* n. sp. *a* styli, × 165, *b* anisochela palmata, front view and side view, × 585; *c—g* the peculiar anisochela, *c* side view, the axis to the right, *d* front view, *e* from behind, *f* seen from the small end in optical section showing the tooth in front, the lateral alæ on each side, the ala of the axis behind, and in the middle the lower part inscribed, this latter part seen with the highest focal distance, × 1400, *g* the chela in side view, × 585 39

— 3. *Mycale titubans* O. Schmidt. *a* styli of the large form, *b* styli of the small form, × 165, *c—g* chelæ, *c* front view, *d* turned a quarter of a turning to the right, *e* turned a quarter of a turning to the left, *f* larger chela in the same position as *d*, showing the serrated expansion of the lower tooth, *g* larger chela, from behind, × 1000, *h* sigmata of different sizes, plane and contort, × 380 41

— 4. *Asbestopluma pennatula* O. Schmidt. *a—b* styli from the axis, *a* of the slender, straight ones, *b* of the thicker, curved ones, *c* subtylostyli from the lateral branches, × 120, *d* the head-end of two of the subtylostyli from the lateral branches, × 485, *e* finely spinulous tylostrongyla of different sizes, from the stalk-coating, *f* one of the almost smooth developmental forms, × 485, *g* the characteristic anisochela palmata, front view and side view, *h* seen from the small end, × 1400, *i* anisochelæ palmatæ of the large form in different variations, front view and side view, *k—n* seen from the small end, *k* with irregularly split middle tooth, *l* regular, with intact middle tooth, *m* with a split lateral tooth, *n* with regularly split middle tooth, × 585, *o* sigmata, × 700 44

— 5. *Asbestopluma pennatula* O. Schmidt. Transverse section of the axis, going through two lateral branches, in a place where these are short, the canals of the axis are seen, × 32. 44

— 6. *Asbestopluma pennatula* O. Schmidt. Transverse section of the axis some way below the lateral branches, showing canals and the stalk-coating, × 32 44

— 7. *Asbestopluma pennatula* O. Schmidt. Fragment of a transverse section through the thickened part of the stalk with canals and stalk-coating, a little diagrammatic, × 20 44

Plate XI.

Plate XI.

Page

Fig. 1. *Asbestopluma bihamatifera* Cart. *a—b* styli from the axis, *a* from the upper part, *b* from the lower part, *c* subtylostyli from the lateral branches, × 120, *d* spinulous tylostyli from the stalk-coating, × 485, *e* the characteristic anisochela palmata, front view and side view, × 1400, *f* anisochela palmata of the large form, front view and side view, × 585, *g* sigmata, × 700 51

— 2. *Asbestopluma bihamatifera* Cart. Transverse section of the axis in the ramigerous part, the lateral branches rather short, spicula-bundles and canals are seen, × 32 51

— 3. *Asbestopluma furcata* n. sp. *a* styli from the axis of different sizes, *b* subtylostyli from the lateral branches, × 120, *c* head-end of a subtylostylus, × 485, *d* finely spinulous tylostrongyla from the stalk-coating, × 485, *e* the characteristic anisochela palmata, front view and side view, × 1400, *f* anisochelæ palmatæ of the large form, front view and side view, partly with split, partly with intact small tooth, × 585, *g* sigmata, × 700, *h* subtylostyli from embryo, × 255 54

— 4. *Asbestopluma cupressiformis* Cart. *a* subtylostyli, *b* styli from the lower part of the axis, × 120, *c* anisochela palmata, side view and front view, *d* seen from the small end, × 1400, *e* forcipes, × 700, *f* spicula of different forms, from embryo, × 255 58

— 5. *Asbestopluma cupressiformis* Cart. Embryo showing the spicula-bundle, × 100. 58

— 6. *Asbestopluma lycopodium* Levins. *a* styli of different sizes, *b* styli from the base of the stalk, × 120, *c* anisochela palmata, side view and front view, × 1400, *d* forcipes, × 700 62

— 7. *Asbestopluma lycopodium* Levins. Transverse section, showing the fibres of the axis, the spicula of the lateral branches, and embryos in different sizes, × 32 62

— 8. *Asbestopluma hydra* n. sp. *a—c* subtylostyli, *a* from the stalk, *b* from the branches, *c* an intermediate form, × 120, *d* head-end of a subtylostylus from the stalk, *e* head-end of a subtylostylus from the branches, × 485, *f* anisochela palmata, side view and front view, × 1400 66

— 9. *Asbestopluma infundibulum* Levins. *a—e* styli and subtylostyli, *a* from the calyx and the upper part of the stalk, *b* from the lower part of the stalk, *c* two of the projecting spicules with distinct head-swelling, *d* from the refolded edge of the calyx, *e* two of the long, fine spicules, projecting from the wall of the calyx, × 120, *f* anisochelæ palmatæ of different sizes and with different dimensions, side view and front view, *g* half front view, *h* seen from the small end, *i* tooth of the small end, seen from the inside, × 1400, *k* forceps, × 700, *l* spicula of different forms from embryo, × 255, *m* chela from embryo, × 1400 68

Plate XII.

Plate XII.

Plate XIII.

Plate XIII.

Page

Fig. 1. *Cladorhiza oxeata* n. sp. *a—b* oxea, *a* from the axis, *b* from the tissue and the branchlets, × 120, *c* anisancora unguifera, front view and side view, × 1000, *d* sigmata of the large form, *e* a developmental form, *f* sigmata of the small form, × 460 97

— 2. *Chondrocladia gigantea* Arm. Hans. *a—b* styli, *a* from the axes, *b* from the tissue, × 77, *c* styli from the stalk-coating, × 340, *d* fragment of a stylus from the stalk-coating, showing the fine spinulation, × 1000, *e* isancora unguifera of the large form, side view and front view, the latter seen a little from the lower end, × 585, *f* ancoræ of the small form, one with six, the other with eight teeth; the former in side view a little from the front, the alæ are not seen; the latter in half front view, not all the teeth are to be seen, × 1000, *g* ancora of the small form with seven teeth, side view, × 585, *h* ancoræ of the small form with eight and with seven teeth, from the end, × 1000, *i* sigmata, × 460, *k* ancora of the large form, from embryo, a little contort, so that the lower end shows four teeth, *l* ancora of the transitional size, from embryo, × 585 102

— 3. *Artemisina arcigera* O. Schmidt. *a—b* subtylostyli, *a* from the main skeleton, *b* from the dermal skeleton, × 165, *c* isochela palmata, front view and side view, × 1400, *d* toxa of different sizes, *e* developmental form of a large and a small toxon, × 255, *f* end of a large and a small toxon, × 1000 110

— 4. *Artemisina apollinis* R. and D. *a—b* styli, *a* from the main skeleton, *b* from the dermal skeleton, × 165, *c* head-end of a dermal stylus, *d* head-end of a skeletal stylus, × 700, *e* isochela palmata, front view and side view, × 1400, *f* toxa of both forms, × 255, *g* the middle part and the end of a toxon, thickened by abnorm apposition of silicium, × 255 114

— 5. *Homœodictya flabelliformis* Arm. Hans. *a—b* oxea, *a* from the skeleton, *b* from the dermal membrane, × 165, *c* isochela arcuata of common form, side view and front view, *d* isochela arcuata of strongly curved form, side view and front view, *e* a younger and an older developmental form, × 700 118

— 6. *Homœodictya palmata* Johnst. *a* oxea, × 165, *b* isochela palmata, front view and side view, *c* an older and a younger developmental form, the latter only consisting of the axis, × 1000 121

Plate XIV.

Plate XIV.

Plate XV.

Plate XV.

Page

Fig. 1. *Myxilla pedunculata* n. sp. *a* styli, *b* tornota, *c* a developmental form of tornote, × 255, *d* ancora spatulifera, front view and side view, × 700, *e* stylus from embryo, × 585 . . 148

— 2. *Myxilla diversiancorata* n. sp. *a* styli, *b* developmental form, × 200, *c* piece of developmental form, showing the small spines, × 700, *d* tornota, *e* developmental form, × 200, *f* ancora of the large form, front view and side view, the former a little contort, *g* younger and older developmental form, *h* one end of this ancora seen from the inside, *i* ancora of the small form, half side view and front view, not all teeth are seen, × 700 150

— 3. *Myxilla pluridentata* n. sp. *a* styli of different sizes, *b* tornota, *c* developmental form, × 255, *d* the ends of two tornota, one slightly swollen and spined, the other more swollen and spined and with ribs, × 700, *e* ancora, front view and side view, × 700 .

— 4. *Lissodendoryx lobosa* n. sp. *a* acanthostyli, *b* tylota, × 255, *c* chela arcuata, front view and side view, × 1000 154

— 5. *Lissodendoryx Sophia* Frstdt. *a* acanthostyli, *b* strongyla, *c* developmental form, × 255, *d* the ends of one of the most spined strongyla, 700, *e* chela arcuata, front view and side view, × 1000 156

Plate XVI.

Plate XVI.

Page

Fig. 1. *Lissodendoryx fragilis* Frstdt. *a* styli, finely spined and smooth, × 255, *b* upper part of a developmental form, showing the small spines, from an individual with chiefly smooth styles, × 700, *c* tornota, *d* developmental form, × 255, *e* both ends of a tornote, × 700, *f* chela arcuata, front view and side view, × 1000, *g* sigmata × 460 158

— 2. *Lissodendoryx diversichela* n. sp. *a* acanthostyli, *b* tornota, *c* a young tornote, × 255, *d* chela arcuata of the large form, front view and side view, *e* a quite young developmental form and a little older one, the latter showing the flat form of the shaft, × 1000, *f* chela arenata of the middle form, front view and side view, *g* chela arcuata of the small form, front view and side view, × 1400, *h* sigmata of different sizes, × 460 160

— 3. *Lissodendoryx indistincta* Frstdt. *a* styli, more and less spined, and one quite smooth, *b* tornota or tornostrongyla, × 255, *c—e* chelæ arcuatæ of different sizes, *c* front view and side view, *d* from the side and a little from the front, *e* from the side and somewhat from behind, the alæ of the down-turned side are seen, they appear in this situation as lobes, while the alæ of the up-turned side appear clawformed, × 1000, *f* the peculiar chela in different sizes, side view and front view, *g* from the end, × 1400, *h* sigmata of different sizes, × 460 162

— 4. *Lissodendoryx complicata* Arm. Hans. *a* styli, *b* younger and older developmental form, the youngest with a head-swelling, × 200, *c* the upper end of a style, showing axial canal with a little swelling, × 585, *d* tornota, × 200, *e* chela arcuata, front view and side view, × 1000, *f* sigmata of the small form, *g* sigmata of the large form, × 460. 166

Plate XVII.

Plate XVII.

Page

Fig. 1. *Lissodendoryx vicina* n. sp. *a* styli, × 200, *b* the upper end of a style, showing the axial canal with a little swelling, × 585, *c* tylota × 200, *d* chela arcuata, front view and side view, × 1000, *e* sigmata of the small form, *f* sigmata of the large form, × 460 . 169

— 2. *Lissodendoryx stipitata* n. sp. *a* styli, *b* styli from the stalk, *c* tornota, × 200, *d* chela arcuata, front view and side view, *e* developmental form, the incipient alæ are seen as edges turned towards the beholder, × 1000 170

— 3. *Iophon piceus* Vosm. *a* acanthostyli of different sizes and differently spined, *b* tylota, *c* a not quite young developmental form, × 255, *d* both ends of a tylote, × 700, *e* chelæ palmatæ of different sizes and different dimensions of the various parts, front view and side view, × 1000, *f*—*k* bipocilla of different sizes, *f* side view, *g* half front view, *h* from behind, *i* from the upper end, *k* from the lower end, × 1400, *l* acanthostylus from embryo, × 585 175

— 4. *Iophon dubius* Arm. Hans. *a* acanthostyli, *b* tylota, × 255, *c* chelæ palmatæ of different sizes, front view and side view, *d* a not quite young developmental form, × 1000, *e* bipocilla, front view and side view, × 1400 180

— 5. *Iophon frigidus* n. sp. *a* acanthostyli, *b* the upper end of acanthostyli, one with distinctly marked, the other with slightly marked spines, *c* tylota, *d* developmental form, × 255, *e* both ends of a tylote, × 700, *f* chelæ palmatæ of different sizes, front view and side view, × 1000 183

Plate XVIII.

Plate XVIII.

Page

Fig. 1. *Iotrochota varidens* n. sp. *a* styli, *b* tylota, × 200, *c* ancora unguifera, half front view, *d* younger and older developmental form, × 1000, *e* birotulæ, × 1400 185

— 2. *Iotrochota oxeata* n. sp. *a* oxea, *b* tylota, *c* developmental form, × 200, *d* ancora unguifera, nearly front view and side view, *e* developmental form, × 1000, *f* birotula, × 1400 186

— 3. *Iotrochota abyssi* Cart. *a* oxeum and stylus, *b* tylotum, × 200, *c* ancora unguifera, side view, × 1000, *d* birotula, × 1400 188

— 4. *Iotrochota dubia* n. sp. *a* styli, × 200, *b* upper end of stylus with small, but distinct spines, × 700, *c* tylotum, × 200, *d* ancora unguifera, about from behind and side view, the former showing the long teeth connected with the shaft, × 1000, *e* birotula, *f* birotula from the end, × 1400 189

— 5. *Iotrochota intermedia* n. sp. *a* styli, *b* tylotum, × 200, *c* ancora unguifera, side view, a little from the front, × 1000, *d* birotula, × 1400 190

— 6. *Iotrochota rotulancora* n. sp. *a* styli, *b* tylotum, × 200, *c* ancora unguifera, side view, showing a tooth connected with the shaft, *d* the same, side view a little from behind with all teeth free, *e* an older developmental form, × 1000, *f* birotula, *g* an older developmental form, × 1400 191

— 7. *Iotrochota polydentata* n. sp. *a* styli, *b* tylotum, × 200, *c* birotula of the large form, × 1000, *d* birotula of the small form, *e* optical section of one end, showing the difference from the same spiculum in *I. affinis*, × 1400 192

— 8. *Iotrochota affinis* n. sp. *a* styli, *b* tylotum, × 200, *c* birotulæ of the large form, one with spined shaft, × 1000, *d* birotula of the small form, *e* optical section of one end, showing the difference from the same spiculum in *I. polydentata*, × 1400. 194

Plate XIX.

Plate XIX.

Page

Fig. 1. *Iotrochota spinosa* n. sp. *a* acanthostyli, *b* tylotum, × 200, *c* birotula of the large form, *d* developmental form, × 1000, *e* birotula of the small form, × 1400 195

— 2. *Forcepia forcipis* Bow. *a* styli, *b* tylotum and polytylote developmental form, × 200, *c* chela arcuata of the large form, front view and side view, *d* chela arcuata of the small form, front view and side view, × 1000, *e* forceps of the large form, *f* developmental form, × 255, *g* a piece of one of the legs, about from the middle, × 1000, *h* forceps of the small form, × 1400 198

— 3. *Forcepia fabricans* O. Schmidt. *a* styli, *b* tylota, one slightly, the other distinctly polytylote, × 200, *c* chela arcuata, front view and side view, × 1000, *d* forceps of the large form, *e* developmental form, × 1000, *f* forceps of the small form, × 1400, *g* sigma, × 460 201

— 4. *Forcepia Topsentii* n. sp. *a* styli, *b* tylotum, × 200, *c* chela arcuata, front view and side view, × 1000, *d* forceps of the large form, × 675, *e* the same of obtuse-angled form, × 460, *f* forceps of the small form, × 1400, *g* sigma, × 460 204

— 5. *Forcepia Thielei* n. sp. *a* styli, *b* tylotum, × 200, *c* chela arcuata, front view and side view, × 1000, *d* forceps, × 1000, *e* sigma, × 460, *f* spined stylus from embryo, × 585. 206

Plate XX.

Plate XX.

Page

Fig. 1. *Melonanchora elliptica* Cart. *a* styli, one with rounded point, *b* tylota, × 200, *c* sphæerancora of long elliptical form, *d* the same of broad elliptical form, both with the original axis to the right, *e* young developmental form, *f* older developmental form, *g* developmental form with nearly connected teeth, *h* developmental form with the four arcs formed, but without the striated brims, the original axis to the right, *i* form with beginning striated brims, *k* arc with nearly fullgrown striated brims, *l* transverse section through fully developed arc, showing the median part and the side-brims, × 700, *m* ancora of the large form, front view, a little oblique, and side view, *n* developmental form, *o* ancora of the small form, front view and side view, × 700 211

2. *Melonanchora emphysema* O. Schmidt. *a* tylota, × 200, *b* sphærancora, × 700, *c* ancora of the large form, front view and side view, *d* ancora of the small form, side view, × 700 216

3. *Forcepia groenlandica* Frstdt. *a* acanthostylus, *b* tylotum, × 200, *c* chela arcuata, front view and side view, × 1000, *d* forceps, × 1000, *e* sigma, × 460 209

THE DANISH INGOLF-EXPEDITION

VOLUME VI.

4.

HEXACTINELLIDA.

BY

MAURICE BURTON.

WITH 9 FIGURES IN THE TEXT, AND A LIST OF STATIONS

COPENHAGEN.
PRINTED BY BIANCO LUNO
1928

Ready from the Press August 28th 1928.

The present collection although consisting of about a hundred specimens contains few new species. This is an excellent sign that in some localities at least we are reaching the point where the species of sponges may be catalogued with the knowledge that the list will be tolerably complete. The Ingolf Hexactinellida have been a source of great interest and although they may have contributed little to our knowledge in the form of new species, an opportunity has been afforded for bringing our present knowledge of the distribution of the Atlantic species up-to-date, and of correlating our knowledge of these forms generally. It may be of interest to state here that I have searched all the literature dealing with the Hexactinellida known to me so that my lists of authors' references under each species, and my geographical and bathymetrical distribution tables are, so far as I am aware, absolutely complete.

One of the most important conclusions which can be drawn from the study of the present collection is that the spicules in the Hexactinellida are much more subject to variation than is usually supposed. And not only is the actual form variable but the ease with which whole categories may disappear from individuals surpasses even that with which one is familiar in the Tetraxonida. I have repeatedly called attention to this fact in the following pages, as in Asconema setubalense, etc. Although I have established several new varieties on the very slender pretext of differences in the shape of certain spicules, a fact which must appear inconsistent with the opinions voiced above, it is rather the geographical separation between the holotype and the present specimens which has influenced in the formation of these new varieties.

List of species obtained.

1. *Euplectella suberea* Thomson.
2. *Malacosaccus unguiculatus* Schulze, var. *arctica* var. nov.
3. *Malacosaccus floricomatus* Topsent.
4. *Leucopsacus ingolfi* sp. n.
5. *Caulophacus arcticus* (Hansen), var. *grœnlandica* var. nov.
6. *Asconema setubalense* Kent.
7. *Rossella mortenseni* sp. n.
8. *Schaudinnia rosea* (Fristedt).
9. *Trichasterina borealis* Schulze.
10. *Hyalonema kentii* (Schmidt).
11. *Pheronema carpenteri* Kent.
12. *Farrea occa* Bowerbank.
13. *Aphrocallistes beatrix* Gray.
14. *Hexactinella grimaldii* Topsent.

Species 1. **Euplectella suberea** Wyville Thomson 1877

Other references to this species are:—

Milne-Edwards 1881; Filhol 1885; Perrier 1886; Schulze 1886, 1887, 1895, 1899 A, 1904; Topsent 1892, 1904 A.

The species is represented by a large specimen, practically complete, standing about 22 cms. high, two smaller specimens and a few fragments. They are quite typical in every way and since our knowledge of this species is fairly extensive nothing need be added here concerning the anatomy of the present specimens. They do, however, add to our knowledge concerning the geographical distribution of the species, the present instance being the most mortherly record we have. This deep-water sponge is now known to extend throughout practically the whole of the Atlantic Ocean.

Previously known distribution:— N. Atlantic (Milne-Edwards, Filhol, Perrier); Cape Bojador, W. of Gibraltar, Between Pernambuco and Bahia, N. W. of Guadeloupe, E. of Bahia, Sansibar, (Schulze); Azores (Topsent).

Bathymetric distribution:— 818—3000 fathoms.

Registered Nos. and localities:— R. N. 3. ii, iii, iv, stn. 78, 60°37′ N, 27° 52′ W, 799 faths., bottom temp., 4·5°; R. N. 15. i, stn. 37, 60°17′ N, 54°05′ W. 1715 faths., bottom temp. 1·4°.

Fig. 1
[illegible]
Sch. var. [illegible]

Species 2. **Malacosaccus unguiculatus** Schulze
Var. **arctica** var. nov.

A very handsome specimen measuring about 18 cms. in total length and consisting of an elongated sac-like body surmounted on a stout stalk is the sole representative of the genus from Greenland. The differences between the present specimen and the holotype of the species are so small that they might almost be ignored. They are: — the differences in the external form, difference of locality and the slightly longer distal rays of the hypodermal hexacts of the present specimen.

Registered No. and locality: — R. N. 6, 59°12′ N, 51°05′ W. 1870 faths., bottom temp. 1·3°.

Species 3. **Malacosaccus floricomatus** Topsent 1901, 1904 A.

Also Arnesen 1920.

The characteristic external form of this species renders it readily recognisable. One specimen only is present. It is stalked and stands 4.5 cms. high. The colour, in spirit, is pale yellow. The remarks made by Arnesen (1920, p. 7) concerning this species are applicable to the present specimen but, all things considered, I am of the opinion that the specimens from the Azores, Bay of Biscay and Greenland may be regarded as representing a single species.

Previously known distribution:— Azores (Topsent); Bay of Biscay (Arnesen).

Bathymetric distribution:— 2300—2500 faths.

Registered No. and locality:— R. N. 15. ii, stn. 37, 60°17′ N, 54°05′ W, 1715 faths., bottom temp. 1.4.

Species 4. **Leucopsacus ingolfi** n. sp.

(Figs. 2 and 2a).

It is of interest to record a species of this genus from the Greenland Seas which differs from the species described by Ijima (1903) from Japan in very small details only. There are two specimens present, the larger measuring about 1 cm., the smaller about 5 cm. in diameter. Both agree in all details so that it will suffice to describe only the holotype, R. N. 70. The disposition of the spicules in the skeleton is exactly the same as that figured by Ijima (l. c. Pl. III, fig. 37), and the same categories of spicules are present as in *L. scoliodocus* Ij. In fact, the only differences between that species and the present one are slight differences in the structure of the spicules. The external form is sac-shaped, as in the Japanese forms. R. N. 78 contains a large number of ripe ova and embryos at an advanced stage of development.

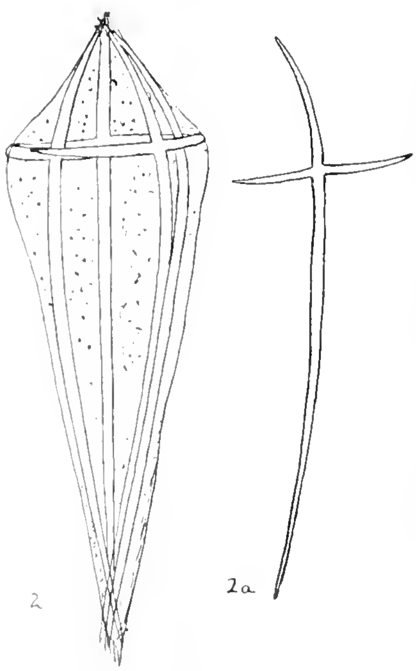


Fig. 2.
Embryo from *Leucopsacus ingolfi* n. sp.
Fig. 2 a.
Stauractin from same. × 440.

The wall is supported in the following manner. The dermal surface is smooth and is supported by a layer of *oxypentacts* whose proximal rays measure .4 mm. and whose tangential rays measure .18 mm. in length. The ends of these rays are slightly microspined and, in addition, there is the vestige of a distal ray.

Oxyhexacts: Immediately beneath the dermal layer of pentacts are several layers of long-rayed oxyhexacts differing little from the oxypentacts except that the six rays are present and all of the same length. These spicules are very variable in size, each ray of a typical spicule measures on an average .3 mm. in length and is slightly microspined, especially at the end. They form the main skeleton of the sponge and extend from the line of the pentacts to the gastral surface. There are no small gastral hexacts as in *L. scoliodocus*.

Oxydiacts: Smooth oxydiacts with microspined ends occur in the choanosome in [illegible] arranged with no apparent order but lying for the most part parallel with the dermal and gastral surfaces.

Microscleres. 1) Hexactinose discohexasters: These spicules are very similar to the corresponding spicules of *L. scoliodocus* except that the terminal anchor teeth are only two in number. They are somewhat rare and confined to the inner half of the choanosome. Axial length, .07 mm.

2) Hexasterose discohexasters: These are much more abundant than the preceding, especially in the periphery of the wall. The number of terminal or secondary rays on a single primary or principal ray is usually 4, but as few as 2 or as many as 6 may be found. The total diameter of the spicule varies a little but an average diameter is about .44 mm.

The reproductive elements present in one of the specimens, R. N. 78, are of two kinds. The first consists of single cells about .030 mm. in diameter, whose nuclei contain conspicuous nucleoli. They are rarely met with but the few seen had every appearance of the typical sponge ovum. The second type of reproductive body present is, to all intents and purposes, a fully-grown larva. Examples of these are of a peculiarly modified spindle shape which can be best appreciated by reference to the diagram (fig. 1). They are about .2 mm. long and about .055 mm. across at the thickest point. The state of preservation does not permit of minute histological examination. There is a certain amount of similarity between these larvae and those of *Vitrollula fertilis* Ijima (1904, Pl. III, figs. 20 and 21). The only spicules present in the larvae at this stage of development are oxystauractins composed of a long proximal ray running almost the whole length of the larva and ending in three shorter rays set each at right angles to each other. No other developmental stages were found.

The present species differs from the only other Atlantic species of the genus, *L. scoliodocus* Ij. var. *retroscissus* Topsent (1904C) in the smaller size of the spicules and the fewer number of categories of microscleres.

Registered Nos. and localities: — R. N. 70, 65°14' N, 30°39' W, 752 faths., bottom temp. 2°1; R. N. 78 61°32' N, 11°36' W, 720 faths., bottom temp. 2°4.

Species 5. Caulophacus arcticus (Hansen)
Var. grœnlandica var. nov.

Numerous stalks are present from various localities some of which bear at the end the remains of the sponge-body. Only one specimen is complete and it is on this that the identification of the variety is based. Presumably, the stalks and other fragments belong to the same species as the complete specimen referred to. This bears a strong resemblance to *C. arcticus* (Hansen), as re-described and figured by Schulze 1903, both in external form and spiculation. The actual points by which the present examples differ from the type of the last-named species are very slight and certainly not sufficient to justify our regarding the Ingolf specimens as representatives of another species. Indeed, it is doubtful whether these differences are sufficiently important to warrant the formation of a variety.

The following point is the only one on which the holotype of Hansen's species and the present variety from Greenland do not agree, viz.: — the number of secondary or terminal rays to the discohexasters. In the holotype, according to Schulze's figures (l. c. Pl. 1, fig. 3—7), these vary from 7—18 in number, while in the present forms the number varies from 4—12.

C. latus, the South Atlantic representative of the genus, is very similar to the more northerly species in many respects. In fact, it differs from it only in the presence of small, smooth-rayed hexasters. Nevertheless, R. N. 7 is so like *C. latus* in external form that I am tempted to suspect that the North and South Atlantic species, so called, are no more than geographical varieties.

Registered Nos. and localities:— R. N. 7, stn. 113, 69°31′ N, 7°06′ W, 1309 faths., bottom temp. —1°0; R. N. 10, stn. 112, 67°57′ N. 6°44′ W, 1267 faths., bottom temp. —1°1; R. N. 30, stn. 19, 60°29′ N, 34°14′ W, 1566 faths., bottom temp. 2°4, R. N. 39, stn. 118, 68°27′ N, 8°20′ W, 1060 faths., bottom temp. —1°0; R. N. 64, "Michael Sars" Stn. 102, 29/8 1902, 63°13′ N, 6°32′W, 975 faths., bottom temp. —0°51.

Species 6. **Asconema setubalense** Savile Kent 1870.

Other references to this species are:—

Marshall 1876; Schulze 1886, 1887, 1899, 1897; Agassiz 1888; Topsent 1892, 1904A; Brondsted 1916; (for further references vide Schulze 1887, p. 113).

By far the most conspicuous in the collection, numerically this species affords some interesting data on variations in the Hexactinellida. Altogether the collection contains some thirty specimens, many of which are extremely fragmentary but others are complete or nearly so. In the complete specimens the external form may be either cup- or goblet-shaped, attached directly by the base or carried on a short, stout peduncle. The smallest is more or less sperical, about 5 mm. in diameter and in appearance very like the various species of *Leucopsacus*. This lends support to the view expressed by various authors that the species of *Leucopsacus* are but young forms of sponges belonging to other genera. The largest is about 12 cms. high. The colour varies from white to grey, brown and green, in spirit.

It was a matter of no small surprise to me to find, as I eventually did, that these thirty specimens were all members of one and the same species for not only did they differ in colour but the size of the oscules and pores and the texture of the sponges themselves were by no means constant. These all again were determined by the variations in the structure of the skeleton and the varying sizes of the spicules composing it. In some cases the diacts of the skeleton are not numerous and but sparsely present while in others they are abundant and form the most conspicuous part of the skeleton. Sometimes the pentacts are relatively few in number. According as to whether the spicules are numerous or sparse so the texture of the sponge itself varies and since the former may vary considerably, so must the latter since it is dependent on the former. One other point may be recognised in this connection, that the size of spicules, varying considerably as it does in a species, influences the texture of the sponge. If we imagine two sponges, one in which the spicules are few in number and comparatively slender the resulting skeleton will be by no means so stout and well-knit as that of a second in which the spicules are not only more numerous but thicker. Two such sponges, representing these extremes, would present marked differences in appearence when placed side by side. I have little doubt that the fact that some of the present specimens are fragmentary while others are whole and unbroken is due in no small measure to these causes. I emphasize the question of texture and its variability because it has so often been used as a specific character and in my opinion, it is one of the least reliable that may be chosen. We know that the size of spicules varies considerably as also the proportions in which they may be present and since the texture of a sponge depends so largely on the skeleton it also must vary proportionately. Especially is this so when we remember that other factors also influence preserved specimens, such as the age of the specimen, the mode of preservation, etc.

The skeleton, when examined microscopically, exhibits a wide range of variation in the proportions in which the various spicules are present, in addition to the variations in the size of the spicules themselves. For example, in one specimen the hypodermal pentacts were few in number and altogether masked by the enormous numbers of diacts present. In another the small pentacts were few in number. The actual dimensions of the various spicules varied enormously from one to the other of the thirty specimens examined. Regarding the microscleres, while the actual dimensions did not vary to any great extent it was noticeable that frequently one or other of the categories would be partially or even completely absent. This latter point recalls a similar condition found in *Aphrocallistes beatrix* (q. v.). The spining of the rays of the diacts and the larger pentacts was also found to vary from, on occasion, completely absent to abundantly present.

Previously known distribution:— Coast of Portugal (Kent, Jeffreys, Thomson); Bay of Biscay (Norman); East Coast of North America (Schulze); Azores (Topsent); North East Greenland (Brondsted).

Bathymetric distribution:— 93—800 faths.

Registered Nos. and localities:— R. N. 3.i, stn. 78, 60°37′ N, 27°52′ W, 799 faths., bottom temp. 4°5; R. N. 9, 84, stn. 25, 63°30′ N, 54°25′ W, 582 faths., bottom temp. 3°3; R. N. 11, 75, stn. 28, 65°14′ N, 55°42′ W, 420 faths., bottom temp. 3°5; R. N. 12, stn. 7, 63°13′ N, 15°41′ W, 600 faths., 4°5; R. N. 14, 38, 70, stn. 90, 64°45′ N, 29°06′ W, 568 faths., 4°4; R. N. 17, stn. 28, 65°14′ N, 55°42′ W, 420 faths., 3°5; R. N. 18, stn. 94, 64°56′ N, 36°19′ W, 204 faths., 4°1; R. N. 25, 43, stn. 143, 62°58′ N, 7°09′ W, 388 faths., ÷0°4; R. N. 32, 50, stn. 54, 63°08′ N, 15°40′ W, 691 faths., 3°9; R. N. 37, stn. 53, 63°15′ N, 15°07′ W, 795 faths., 3°08; R. N. 46, stn. 59, 65°00′ N, 11°16′ W, 310 faths., ÷0°1; R. N. 47, stn. 76, 60°50′ N, 26°50′ W, 806 faths., 4°1; R. N. 57, 67°16′ N, 11°15′ W, 192 faths.; R. N. 61, "Michael Sars", stn. 35, 1902, 62°58′ N, 1°56′ E, 620 faths.; R. N. 63, "Michael Sars", stn. 85, 1902, 62°53′ N, 9°6′ W, 245 faths.; R. N. 80, stn. 57, 63°37′ N, 13°02′ W, 350 faths., 3°4; R. N. 86, "Michael Sars", stn. 85, 1902, 62°53′ N, 9°6′ W, 245 faths.; R. N. 87, "Michael Sars" stn. 74, 1902, 60°19′ N, 5°39′ W, 620 faths.; R. N. 88, 66°16′ N, 20°8′ W, 330 faths.; R. N. 89, "Ryders Exp." E. Greenland.

Species 7. Rossella mortenseni n. sp.

(Figs. 3—9).

The two specimens referred to this species are of the usual Rossellid type and have the appearance somewhat of *Acanthascus*. R. N. 58, the holotype, is sub-spherical with a central gastral cavity opening at the apex. There is a well-developed basal tuft of long spicules and the general surface of the body is beset with long diacts projecting singly or in tufts. The colour is a dark brown throughout. The total diameter of the specimen is about 5 cms. The second specimen is slightly larger than the first and, but for the fact that the surface has been very badly worn away in places, there is no essential difference between the two. The third is a young form, about 1.5 cms. in diameter and resembles the young forms of *Pheronema carpenteri* so much that I had at first mistaken it for a young *Pheronema*.

The skeleton is quite typical in structure. By far the most conspicuous element is the collection of diacts which fill the choanosome, many projecting at right-angles to the surface. The dermal spicules are pentacts and hexacts. The microscleres are of two sorts only, oxyhexasters and discohexasters. In one of my preparations a few large smooth-rayed hexasters were present, with rays .15 mm. long, which I regard as extraneous since a similar spicule has not been found in the other specimens.

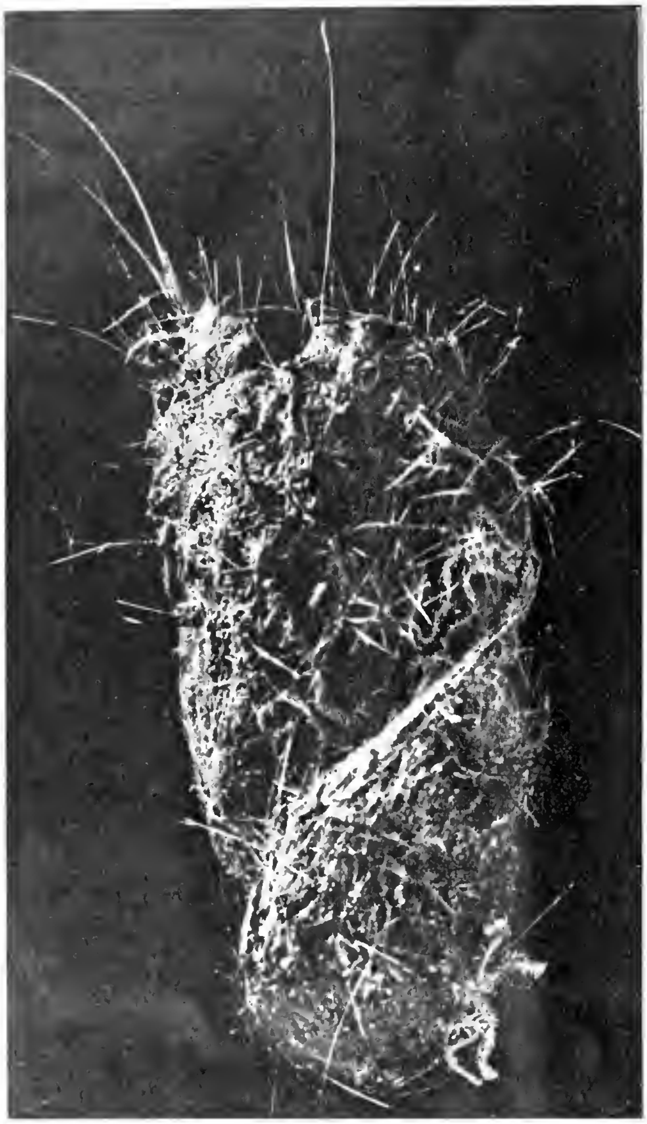


Fig. 3. *Rossella mortenseni* n. sp. Slightly enlarged.

Spicules:— 1) Diacts: These are of the usual *Rossella*-type with spiny ends, of various sizes. They form the main skeleton, the majority of them being distributed in loose bundles in the choanosome while others project beyond, and at right-angles to, the surface.

2) Dermal pentacts and hexacts: The dermal tissues abound with spined pentacts whose rays measure .12 mm. in length. Often these spicules are represented by hexacts or, more rarely, tetracts (figs. 4—6).

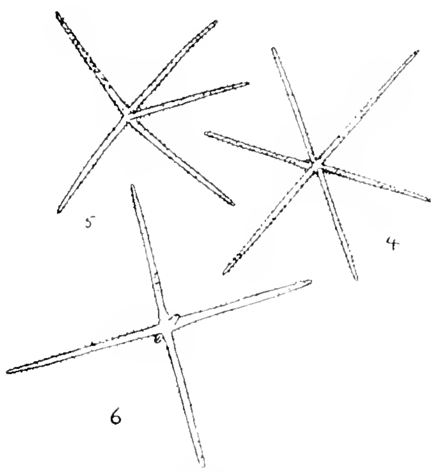
3) Hypodermal Oxypentacts: Schulze (1887) in his description of *Acanthascus grossularia*, says, "In the dermal skeleton, medium- sized, smooth, hypodermal oxypentacts occur, in which the proximal ray is radially disposed, while the four long tangentials, intersecting at right angles, follow the superficial curvature of the sponge in being slightly curved inwards". The smooth-rayed hexasters referred to above as being possibly extraneous may be spicules corresponding to those described by Schulze in the passage quoted. Certainly their tangential rays are curved and flexuous while occasionally the distal ray is absent so that the spicule is in effect a pentact. The apparent absence of this spicule from the second specimen may be due to the fact that the dermal tissues have been seriously damaged and torn.

4) In addition to the diacts, the choanosome contains a few large smooth-rayed hexacts, the rays of which may measure 10 mm. or more in length.

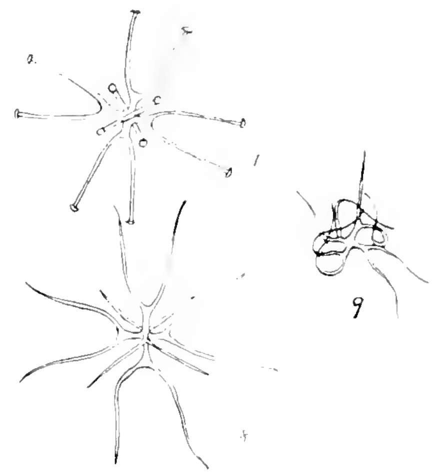
5) At certain parts of the surface of the sponge, pleuralia may be seen projecting at right angles to

it for a distance of about 1 cm. At the distal end these bear a variable number of rays, usually [illegible], disposed parallel to the general surface each ray usually being nearly 1 cm. in length. Over the greater part of the surface, these spicules are wanting and where they do occur one may not be sure that the variation in the number of rays may not be due to damage in which some of the rays were broken. A few of these spicules show up well in the photograph (vide fig. 3).

Microscleres:— 1) Oxyhexasters: Of the usual type with six short primary rays about .005 mm. long which bifurcate into two divergent, slightly flexuous rays about .028 mm. long. (figs. 8, 9). The rays



Figs. 4–6.
Dermal hexact, pentact and tetract of *Rosella Mortenseni.* × 48.



Figs. 7–9.
Discohexaster, Oxyhexaster, and Oxyhexaster with distorted rays from *Rosella Mortenseni.* × 48.

of these spicules are frequently irregular or distorted. This reaches its height in the young specimen referred to where about 30 % of these spicules are distorted as in fig. 9.

2) Discohexasters: Of the same size and shape as the oxyhexasters but with a slight disc at the end of each ray (fig. 7). This type of microsclere is much less common than the previous form.

Registered Nos. and localities.: — R. N. 58, stn. 166 "Thor", 957 metres, 62 57' N. 10 58' W, 14 July '03. R. N. 2, 63 04' N, 9 22' W, 262 faths.

Species 8. Schaudinnia rosea (Fristedt).

Synonymy:— *Hyalonema rosea* Fristedt 1887.
Schaudinnia arctica Schulze 1899B, 1900A.
Schaudinnia rosea Lundbeck 1909.
Schaudinnia rosea Brøndsted 1914.

There are two examples of this species present in the collection. R. N. 51 consists of a single tube somewhat flattened, about 10 cms. long and from 2 to 3 cms. in diameter. R. N. 52 consists of a number of fragments which, when pieced together, form a sponge similar in appearance to the larger of the two tubes in the specimen figured by Schulze (l. c. pl. 1, fig. 1). Undoubtedly these two specimens belong to the same species, for, although there are a number of minor differences between them they agree in the essential features.

If a comparison be made between the descriptions and figures given by Fristedt and Schulze for *Hyalonema rosca* and *Schaudinnia arctica* respectively, it is apparent that the only points of difference between the two species are: a) the external form; b) the absence of discohexasters in the former; c) the absence of spines on the hypodermalia. Taken altogether, these points seem sufficiently important to mark a separation into two species, but I think it can be shown that they are not so significant as may appear and that the two species are, in reality, one and the same species.

a) The external form. The external form of *Hyalonema rosca* as figured by its author (l. c. Pl. 26, fig. 5) resembles almost exactly any one of the fragments of R. N. 52. In other words, the specimen described by Fristedt was not, as its author supposed, a complete example of a "round", "compressed" sponge but a fragment of a tubular sponge. The fact that the "lower surface is a little concave" in Fristedt's type-specimens only goes to strengthen the view that they were portions of a tubular sponge such as that described by Schulze.

b) The absence of the discohexasters. The discohexasters are rare in this species and it is not impossible that Fristedt may have overlooked them. On the other hand, their total absence from his specimen would not prove an insurmountable obstacle to the present view expressed above (cf. the presence or absence of the microscleres in *Aphrocallistes beatrix* and *Asconema setubalense*).

c) The absence of spines on the hypodermalia. The spining of the rays of the Hypodermalia appears to be a variable feature for in R. N. 52 they are practically all smooth while in R. N. 51, 75% of them are strongly spined (cf. my remarks on *Asconema setubalense*).

The British Museum possesses a fragment of Schulze's holotype of *S. arctica* and a comparison of it with the two present specimens leaves no doubt in my mind as to the synonymy with Fristedt's *Hyalonema rosca*.

Previously known distribution:— East Coast of Greenland (Fristedt, Lundbeck, Brondsted); North of Spitzbergen (Schulze).

Bathymetric distribution:— 50—500 faths.

Registered No. and locality:— Forsblads Fjord, E. Greenland, 50—90 faths.

Species 9. Trichasterina borealis Schulze 1899 B, 1900 A.

The species is represented by a single sac-shaped specimen about 1 cm. high and two bottles full of small fragments. The agreement between the single complete specimen and the holotype is very close in practically all respects both macro- and microscopic. So far as the fragments are concerned, it is impossible to compare anything but the details of the skeleton. In this the agreement with the holotype is again evident except in one respect, viz:— the presence of a discohexaster. No discohexasters were found in the holotype but in two of the specimens of the present collection assigned to this species these spicules, almost identical with those of *Asconema setubalense* (vide Schulze 1887, Pl. XXI, fig. 11), were found to be present, abundantly in one but sparsely in the other. Leaving aside the question of the discohexasters, for the moment, the three specimens from Greenland are quite obviously individuals of a single species, if we are to judge by the other details of the skeleton. All possess the extremely characteristic trichasters and the single complete specimen is so like the holotype as to leave no doubt as to their identity with Schulze's species. Assuming this to be the case, the presence of the discohexasters in two of the specimens need afford no obstacle. These microscleres are absent in one, sparingly present in another, plentiful in the third but absent in the holotype. Obviously we have yet another case of the sporadic occurrence of a form of microsclere, similar to that which obtains in *Asconema setubalense*, *Aphrocallistes bocagei*, etc., upon which I have already remarked. One may suppose that the holotype happened to be devoid of this particular category of spicule which, in reality, should be normally present in all members of the species. On the other hand, it is quite conceivable that the discohexasters belong properly to *Asconema setubalense*, which is apparently present in the Greenland seas in large quantities, and not to the sponges in which they were found. In either case the value of the species, and of the identification is unaltered.

Previously known distribution: — Arctic (Schulze).

Registered Nos. and localities:— R. N. 55—56, No. 21, "Ryder Exp." 74° 27′ N., 15° 20′ W., 127 faths.; R. N. 67, "Belgica" Exp., 77° 31′ N., 18° 24′ W., stn. 45.

Species 10. Hyalonema kentii (Schmidt).

Asconema kentii Schmidt 1880.

Hyalonema kentii Schultze 1886, 1887, 1893, 1899A.

There are two specimens which I propose to assign to this species. Unfortunately both are dry and one (R. N. 29) badly damaged. R. N. 83 can be identified as belonging to this species with a fair amount of certainty. The spicules are very clearly like those figured by Schulze (1887) but the external form is slightly different to that so far recorded for the species. The sponge consists of a spindle-shaped body about 1.75 cms. long and .9 cm. in diameter at the thickest part, which is approximately at the centre. The lower pole bears a short tuft of long slender spicules about 1 cm. long. At the other is a shallow depression surrounded by a thin margin and bearing in the centre a conical protuberance. The external appearance resembles that of *H. apertum* (vide Schulze 1887, Pl. XXXVII, figs. 2 and 3). R. N. 29 consists of a spindle-shaped body about 3 cms. long and about 1 cm. in diameter at the centre. I have been unable to find any trace of the dermal layer or its spicules. There is no cup-shaped depression at the distal pole but the end of the sponge is sharply pointed in a manner which suggests the conical protuberance of the other specimen. The sponge is anchored at the proximal end by a tuft of spicules 1.5 cms. long. From the incomplete spiculation of this damaged specimen there can be little doubt that it is a *Hyalonema* and very near to *H. kentii*.

Previously known distribution: G. of Mexico and the Caribbean Sea.

Registered Nos. and localities: — R. N. 29, 83, 61° 44′ N., 27° 00′ W., 485 faths., bottom temp. 6.1.

Species 11. Pheronema carpenteri Savile Kent 1870.

Other references to this species are:—

Gray 1870; Marshall 1876; Schulze 1886, 1887, 1893, 1904.

Synonymy: *Holtenia carpenteri* Wyville Thomson 1869.

— — Carpenter and Thomson 1896.

— — Barboza du Bocage 1871.

This species appears from all accounts to be a very prolific member of the sponge fauna of the Atlantic Ocean. Thomson (l. c.) reports having obtained some 40 specimens at a depth of 500 faths. to the north of Scotland. The present specimens are ten in number including two very fine sponges 10 cms. high. The rest are of varying sizes, four of them being quite young, the smallest no more than 1 cm. in diameter. From the point of view of their spiculation all ten specimens belong without doubt to the above species but after having noted the slight differences in external form met with in even this small collection of sponges, I feel very strongly inclined to suggest that *P. grayi* represents nothing more than a variety of the present species. In fact, I am inclined to regard it as standing in the same relation to *P. carpenteri* as the various subspecies of *Aphrocallistes beatrix* do to *A. beatrix* itself, in which latter case, although for the purposes of this report I have recognised the four separate subspecies, it is a very debatable point whether such action is entirely justifiable and whether we ought not abandon all names but that of the type species *beatrix*. Topsent (1904A) sums up very clearly and concisely what he considers the essential differences between the two species *P. carpenteri* and *P. grayi*, but I suggest that there is not one of the supposed differences which may not be due to the variations normal to a sponge species. In the Greenland specimens the colour varies from yellow to a greyish-brown, in spirit, while the shape is usually globular or slightly ovoid. The spicules of which the basal tuft is composed vary in the manner in which they emerge from the base of the sponge. In some cases they are collected in tufts, in others it is difficult to see any sign of tufts at all. In one specimen the base of the sponge was entirely devoid of a basal tuft and the projecting spicules were disposed in a manner regarded by Topsent (l. c.) as characteristic of *P. grayi*. The very small specimens were exactly the same, in appearance, as the young forms of *P. grayi* figured by Topsent (1892, Pl. V, fig. 8). Despite my strong convictions on this question of the validity of the species *P. grayi*, I do not wish to commit myself to a decided opinion without having first examined more material than it has been my good fortune to obtain, hitherto.

Previously known distribution:— Atlantic Ocean, North of Zanzibar (Kent, Schulze).

Bathymetric distribution:— 340—1600 faths.

Registered Nos. and localities:— R. N. 1, stn. 81, 61°44′ N, 27°00′ W, 485 faths., bottom temp., 6°1; R. N. 49, stn. 84, 62°58′ N, 25°24′ W, 633 faths., bottom temp., 4°8; R. N. 59—65, "Michael Sars", stn. 70, 61°5′ N, 9°46′ W, 450 faths., 1902; R. N. 60, 66, stn. 76, 59°29′ N, 7°51′ W, "Michael Sars", 687—580 faths., 1902.

Species 12. Farrea occa Bowerbank

The following is a list of the references to this species:

Bowerbank 1862, 1869, Gray 1867; Kent 1870; Carter 1873, 1874, 1885, Marshall 1876, Priest 1884, Schulze 1886, 1887, 1899A, 1900B, 1902, 1904; Topsent 1892, 1901A, 1901C, 1904A.

There are several fragments belonging to the genus *Farrea* which I assign with some hesitation to this species. In all cases little more than the main skeleton is left, often coated with incrustations of *Hamacantha johnstoni*, while the loose spicules have in most cases disappeared entirely so that there can be no certainty about the identification of these fragments. However, since the main skeleton is very like that of *F. occa*, and since the latter species is found abundantly in neighbouring seas it may be fairly safely assumed, I think, that the Greenland fragments are of the same species.

Previously known distribution:— Cosmopolitan. The following is a comprehensive list of localities recorded for this species, given for the first time: Coast of Portugal, Japan (Carter), Japan, Manila, California, Indian Ocean generally (Schulze); Azores, Antarctic (Topsent). (Topsent 1892D gives the Antilles in addition to those recorded above but at the moment I am not clear as to the source of his information on this point).

Bathymetric distribution:— 130—775 faths.

Registered Nos. and localities:— R. N. 8, stn. 81, 61° 44′ N, 27° 00′ W, 485 faths., bottom temp. 6°1; R. N. 27, 28, 33, 42, 45, 82, stn. 78, 60° 37′ N, 27° 52′ W, 799 faths., bottom temp. 4°5.

Species 13. Aphrocallistes beatrix Gray 1858.

In 1904, Schulze showed that the six known species of *Aphrocallistes* represented nothing more than two real species *A. beatrix* and *A. vastus*, and that all the others were but varieties of one or other of these two. A concise and lucid résumé of the conclusions reached by that author are given by Arnesen (1920, p. 10). The result of Schulze's work was, in effect, to establish this fact, that the species might be conveniently divided into four subspecies, the basis for distinction between them being the external form. Since then Ijima (1916) has described a fifth, subsp. *orientalis*. Before proceeding further I propose to tabulate a complete list of the references to the various subspecies.

Species Aphrocallistes beatrix Gray.

Subspecies 1. A. beatrix beatrix Gray

Gray 1858; 1867; Carter 1874; Marshall, 1876; Priest 1884; Schulze 1886, 1887, 1895, 1900B, 1902, 1904; Stephens 1915; Ijima 1916; Arnesen 1920.

Subspecies 2. A. beatrix bocagai Wright

Wright 1870; Kent 1870; Schmidt 1870, 1880; Carter 1874, Marshall 1876, Schulze 1886, 1887, 1895, 1899A, 1900B, 1902; Agassiz 1888; Kirkpatrick 1889; Topsent 1892, 1904A.

Subspecies 3. A. beatrix ramosus Schulze

Schulze 1886, 1887, 1895, 1902; Topsent 1892.

Subspecies 4. **A. beatrix azoricus** Topsent.

Topsent 1901 B, 1904 A.

Subspecies 5. **A. beatrix orientalis** Ijima. 1916.

The Ingolf material consists of a number of fragments of various sizes belonging to the *subsp. bocagei* Wright.

Previously known distribution:— Subsp. 1, Indian Ocean; subsp. 2, cosmopolitan; subsp. 3, Pacific Ocean; subsp. 4, Atlantic; subsp. 5, Pacific.

Bathymetric distribution:— 70—600 faths.

Registered Nos. and localities:— R. N. 5, 44, stn. 89, 64°45′ N, 27°20′ W, 310 faths., bottom temp. 8°4; R. N. 10, 26, 77, 85, stn. 9, 64°18′ N, 27° 00′ W, 295 faths., bottom temp. 5°8; R. N. 34, stn. 73, 62°58′ N, 23°28′ W, 486 faths., bottom temp. 5°5′; R. N. 69, stn. 10, 64°24′ N, 28°51′ W, 788 faths., bottom temp. 3°5; R. N. 72, stn. 81, 61°44′ N, 27°00′ W, 485 faths., bottom temp., 6°1; R. N. 74, stn. 97, 65°28′ N, 27°39′ W, 450 faths., bottom temp. 5°5.

Species 14. Hexactinella grimaldii Topsent 1890, 1892, 1904 A, 1904 B.

The species is represented by a number of fragments of what were presumably lamellar or semiinfundibular sponges. One fairly large fragment bears what might conceivably have been a stout stalk but the fragments are too small to say anything definite concerning the external form. The agreement with the holotype is very close in all details except that the rays of the large hexacts are longer, a very minor point, and the scopulae appear to have 4 rays, invariably.

Previously known distribution:— N. Atlantic (Topsent).

Bathymetric distribution:— 275—800 faths.

Registered Nos. and localities:— R. N. 4, stn. 53, 63°15′ N, 15°07′ W, 795 faths., bottom temp., 3°08; R. N. 16, 31.i, stn. 21, 58°01′ N, 44°45′ W, 1330 faths., bottom temp. 2°4; R. N. 20, stn. 19, 60°29′ N, 34°14′ W, 1566 faths., bottom temp. 2°4; R. N. 22, 28, 33.i, stn. 78, 60°37′ N, 27°52′ W, 799 faths., bottom temp. 4°5; R. N. 46, stn. 54, 63°08′ N, 15°40′ W, 691 faths., 3°9; R. N. 48, stn. 84, 62°58′ N, 25°24′ W, 633 faths., bottom temp. 4°8; R. N. 70, stn. 46, 61°32′ N, 9°43′ W, 643 faths., bottom temp. 4°17.

List of literature referred to.

1888 Agassiz, A "Three cruises of the United States Coast and Geodetic Survey Steamer Blake Vol II Bull Mus Comp Zool XV pp 170 176

1920 Arnesen, E "Spongia Report of the Scientific Results of the "Michael Sars" North Atlantic Deep-Sea Expedition 1910 Vol III, Pt 2.

1871 Bocage, Barboza du, J V "Sur l'existence de la *Holtenia carpenteri* Wyville-Thomson dans les cotes du Portugal Lisboa J Sci Math Vol 3 1871 pp 69—70

1862 Bowerbank, J S "On the Anatomy and Physiology of the Spongiadae Part III" Phil Trans Roy Soc London 1862 vol 152 pp 1087 1135

1869 Id "A monograph of the siliceo-fibrous sponges Part II" Proc Zool Soc, London 1869 pp [illegible]

1914 Brondsted, H. V "Porifera" Conspectus Faunae Groenlandicae «Meddelelser om Gronland" XXIII Copenhagen

1916 Id "Report on the Porifera collected by the Danmark Expedition at North-East Greenland" Danmark Ekspeditionen til Gronlands Nordostkyst 1906 1908 Bd 3 pp 475 483

1869. Carpenter, W B and Wyville Thomson "On Hexactinellids" Ann Mag Nat Hist London vol 4 1869 p 12[illegible]

1873 Carter, H J "On the Hexactinellidae and Listhistidae generally etc" Ann Mag Nat Hist London vol 12 187[illegible] pp [illegible] 472

1874 Id "Descriptions and figures of deep-sea sponges and their spicules from the Atlantic Ocean dredged up on board H M S "Porcupine" etc" Ann Mag Nat Hist vol 14 1874 pp 207 257

1885. Id "Report on a collection of marine sponges from Japan, made by Dr J Anderson F R S Ann Mag Nat Hist London vol 15 1885 pp. 387 406

1881. Edwards, H Milne. "Compte rendu sommaire d'une exploration zoologique fait dans la Mediterranee a bord du Navire de l'Etat "Le Travailleur"" Compt Rend Acad Sci, Paris vol 93 1881 pp 876 882 and pp [illegible]

1885 Filhol, H "La vie au fond des mers" La Nature, Paris Ann [illegible] Sem pp [illegible] 410

1887. Fristedt, K "Sponges from the Atlantic and Arctic Oceans and the Behring Sea Vega Exped Vetensk Iakttag Stockholm vol 4 1887 pp 401 471

1858 Gray, J E "On Aphrocallistes, a new genus of Spongiadae from Malacca Proc Zool Soc London 1858 pp 114

1867 Id "Notes on the arrangement of sponges, with the description of some new genera" Proc Zool Soc London 1867 pp [illegible]

1870 Id "Notes on anchoring sponges (Pheronema Holtenia" Ann Mag Nat Hist London vol [illegible] pp [illegible]

1903 Ijima, I "Studies on the Hexactinellida Contribution III" Imp Univ Tokyo vol 18 pp [illegible]

1904 Id "Studies on Hexactinellida Contribution IV" J Coll Sci Univ Tokyo Vol 18 Art

1916 Id "Notes on *Aphrocallistes beatrix* Gray particularly with reference to the form occurring in East Asiatic seas [illegible] japon vol [illegible] pp [illegible] 153

1870 Kent, W S "Notice of a new Vitreous sponge, *[illegible]*" Ann Mag Nat Hist London [illegible] 182 186

1880. Kirkpatrick, R "Report of a deep sea trawling cruise off the South West Coast of Ireland" etc Ann Mag Nat Hist London vol 4 1880 p 440

1909 Lundbeck, W "The Porifera of East Greenland" Medd om Gronland vol [illegible] pp [illegible]

Marshall W "Ideen uber die Verwandschaftsverhaltnisse der Hexactinelliden" Zeitschr. wiss. zool. vol 27 1876 pp 113—136.

Perrier F "Les explorations sous-marines" Paris 1886.

1884 Priest B W "On the Hexactinellidae" Quekett Club Journ, London vol 2 1884—6 pp. 8—15.

1870 Schmidt, O. "Grundzuge einer Spongien-Fauna des Atlantischen Gebietes" Leipsic 1870.

1880 Id "Die Spongien des Meerbusens von Mexico und des Caraibischen Meeres Heft II" Jena 1880.

1886 Schulze F E "Ueber den Bau und das System der Hexactinelliden" Abh Akad., Berlin 1886.

1887 Id "Zur Stammgeschichte der Hexactinelliden" Abhandl math.-phys Cl der K Akad., Berlin 1887 pp 1—35

1893 Id "Revision des Systems der Hyalonematiden" Sitzungsber der K -pr Akad der Wiss, Berlin 1893 pp 541—589.

1895 Id "Hexactinelliden des Indischen Oceans Th II Die Hexasterophora" Abh Ak Berlin 1895

1897 Id "Revision des Systems der Asconematiden und Roselliden" Siz -Ber Akad Wiss, Berlin 1897 pp 520—558

1899A Id "Amerikanische Hexactinelliden nach dem Materiale der Albatross-Expedition" Jena.

1899B Id "Zur Histologie der Hexactinelliden" Sitz -Ber. Akad Wiss., Berlin 1899 pp. 198—203.

1900A Id "Die Hexactinelliden" Fauna Arctica Bd. 1 p 87—108.

1900B Id "Hexactinelliden des indischen Oceans" Abh Akad Wiss, Berlin 1899—1900 Physik Abh 1.

1902. Id "An account of the Indian Triaxonida collected by the Indian Marine Survey Ship "Investigator" Calcutta 1902.

1903. Id "*Caulophacus arcticus* (Armauer Hansen) und *Calycosoma gracile* F. E Sch." Abh Akad. Wiss, Berlin 1903 Physik Abh No. 1.

1904 Id "Hexactinellida" Wiss Ergebn deutsch Tiefsee-Expd. Valdivia Bd 4, 8.

1915 Stephens, J «Atlantic sponges collected by the Scottish National Antarctic Expedition" Trans. Roy. Soc., Edinburgh Vol. 50 1915 2 15 pp 423 497

1890 Topsent, E. "Notice preliminaire sur les spongiaires recueillis durant les Campagnes de l'Hirondelle". Bull Soc. Zool Fr 15 pp 65 71

1892. "Contribution a l'etude des spongiaires des l'Atlantique Nord etc." Monaco 1892 pp. 165

1901A Id "Notice préliminaire sur les éponges receuillies par l'expedition belge" Arch Zool exper. (3) T. 9 notes et revue pp v-xvi

1901B Id. "Eponges nouvelles des Acores" Mem. Soc. zool France T. 14 pp 448—466.

1901C Id "Spongiaires" Result Voyage Belgica Zool

1904A Id "Spongiaires des Açores" Résult Camp. scient. Albert de Monaco. Fasc 25

1904B. Id "Notes sur les éponges du Travailleur et Talisman. II". Bull Mus. Hist nat, Paris 1904 pp 195—200.

1904C Id T c pp 372—377.

1870. Wright. E. P. "Notes on sponges" Q J Micr. Sci., London vol 10 1870 pp. 73—82.

THE INGOLF-EXPEDITION

1895—1896.

THE LOCALITIES, DEPTHS, AND BOTTOMTEMPERATURES OF THE STATIONS

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom-temp.
1	62° 30′	8° 21′	132	7°2	24	63° 06′	56° 00′	1199	2°4	45	61° 32′	9° 43′	643	4°17
2	63° 04′	9° 22′	262	5°3	25	63° 30′	54° 25′	582	3°3	46	61° 32′	11° 36′	720	2°40
3	63° 35′	10° 24′	272	0°5		63° 51′	53° 03′	136		47	61° 32′	13° 40′	950	3°23
4	64° 07′	11° 12′	237	2°5	26	63° 57′	52° 41′	34	0°6	48	61° 32′	15° 11′	1150	3°17
5	64° 40′	12° 09′	155			64° 37′	54° 24′	109		49	62° 07′	15° 07′	1120	2°01
6	63° 43′	14° 34′	90	7°0	27	64° 54′	55° 10′	393	3°8	50	62° 43′	15° 07′	1020	3°13
7	63° 13′	15° 41′	600	4°5	28	65° 14′	55° 42′	420	3°5	51	64° 15′	14° 22′	68	7°32
8	63° 56′	24° 40′	136	6°0	29	65° 34′	54° 31′	68	0°2	52	63° 57′	13° 32′	420	7°87
9	64° 18′	27° 00′	295	5°8	30	66° 50′	54° 28′	22	1°05	53	63° 15′	15° 07′	795	3°08
10	64° 24′	28° 50′	788	3°5	31	66° 35′	55° 54′	88	1°6	54	63° 08′	15° 40′	691	3°9
11	64° 34′	31° 12′	1300	1°6	32	66° 35′	56° 38′	318	3°9	55	63° 33′	15° 02′	316	5°9
12	64° 38′	32° 37′	1040	0°3	33	67° 57′	55° 30′	35	0°8	56	64° 00′	15° 09′	68	7°57
13	64° 47′	34° 33′	622	3°0	34	65° 17′	54° 17′	55		57	63° 37′	13° 02′	350	3°4
14	64° 45′	35° 05′	176	4°4	35	65° 16′	55° 05′	362	3°6	58	64° 25′	12° 09′	211	0°8
15	66° 18′	25° 59′	330	÷0°75	36	61° 50′	56° 21′	1435	1°5	59	65° 00′	11° 16′	310	0°1
16	65° 43′	26° 58′	250	6°1	37	60° 17′	54° 05′	1715	1°4	60	65° 09′	12° 27′	124	0°9
17	62° 49′	26° 55′	745	3°4	38	59° 12′	51° 05′	1870	1°3	61	65° 03′	13° 06′	55	0°4
18	61° 44′	30° 29′	1135	3°0	39	62° 00′	22° 38′	865	2°9	62	63° 18′	19° 12′	72	7°92
19	60° 29′	34° 14′	1566	2°4	40	62° 00′	21° 36′	845	3°3	63	62° 40′	19° 05′	800	4°0
20	58° 20′	40° 48′	1695	1°5	41	61° 39′	17° 10′	1245	2°0	64	62° 06′	19° 00′	1041	3°1
21	58° 01′	44° 45′	1330	2°4	42	61° 41′	10° 17′	625	0°4	65	61° 33′	19° 00′	1089	3°0
22	58° 10′	48° 25′	1845	1°4	43	61° 42′	10° 11′	645	0°05	66	61° 33′	20° 43′	1128	3°3
23	60° 43′	56° 00′	Only the Plankton Net used		44	61° 42′	9° 36′	545	4°8	67	61° 30′	22° 30′	975	3°0

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom temp.	Station Nr.	Lat. N	Long W.	Depth in Danish fathoms	Bottom-temp.	Station Nr.	Lat. N.	Long. W	Depth in Danish fathoms	Bottom-temp.
[illegible]	[illegible]	22° 30'	843	3°4	92	64° 41'	32° 52'	976	1°4	118	68° 27'	8° 20'	1060	—1°0
[illegible]	62° [illegible]	22° 17'	580	3°0	93	64° 24'	35° 14'	767	1°46	119	67° 53'	10° 19'	1010	—1°0
	63° [illegible]	22° 05'	134	7°0	94	64° 56'	30° 19'	204	4°1	120	67° 29'	11° 32'	885	—1°0
71	63° 40'	22° 03'	46			65° 31'	30° 45'	213		121	66° 59'	13° 11'	529	—0°7
72	63° 12'	23° 04'	197	6°7	95	65° 14'	30° 30'	752	2°1	122	66° 42'	14° 44'	115	1°8
73	62° 55'	23° 28'	486	5°5	96	65° 24'	29° 00'	735	1°2	123	66° 52'	15° 40'	145	2°0
74	62° 17'	24° 30'	695	4°2	97	65° 28'	27° 39'	450	5°5	124	67° 40'	15° 40'	495	—0°6
	61° 5[illegible]'	25° 35'	701		98	65° 38'	26° 27'	138	5°9	125	68° 08'	16° 02'	729	—0°8
	61° 28'	25° 06'	820		99	66° 13'	25° 53'	187	0°1	126	67° 19'	15° 52'	293	—0°5
75	61° 28'	26° 25'	780	4°3	100	66° 23'	14° 02'	59	0°4	127	66° 33'	20° 05'	44	5°6
76	60° 50'	26° 50'	806	4°1	101	66° 23'	12° 05'	537	—0°7	128	66° 50'	20° 02'	194	0°0
77	60° 10'	26° 50'	951	3°6	102	66° 23'	10° 26'	750	—0°9	129	66° 35'	23° 47'	117	6°5
78	60° 37'	27° 52'	799	4°5	103	66° 23'	8° 52'	579	—0°6	130	63° 00'	20° 40'	338	6°55
79	60° 52'	28° 58'	653	4°4	104	66° 23'	7° 25'	957	—1°1	131	63° 00'	19° 09'	698	4°7
80	61° 02'	29° 32'	935	4°0	105	65° 34'	7° 31'	762	—0°8	132	63° 00'	17° 04'	747	4°0
81	61° 44'	27° 00'	485	6°1	106	65° 34'	8° 54'	447	—0°6	133	63° 14'	11° 24'	230	2°2
82	61° 55'	27° 28'	824	4°1		65° 20'	8° 40'	466		134	62° 34'	10° 26'	299	4°1
83	62° 25'	28° 30'	912	3°5	107	65° 33'	10° 28'	492	—0°3	135	62° 48'	9° 48'	270	0°4
	62° 30'	26° 01'	472		108	65° 30'	12° 00'	97	1°1	136	63° 01'	9° 11'	256	4°8
	62° 30'	25° 30'	401		109	65° 29'	13° 25'	38	1°5	137	63° 14'	8° 31'	297	—0°6
84	62° 58'	25° 24'	633	4°8	110	66° 44'	11° 33'	781	—0°8	138	63° 26'	7° 56'	471	—0°6
85	63° 21'	25° 21'	170		111	67° 14'	8° 48'	860	—0°9	139	63° 36'	7° 30'	702	—0°6
86	63° 03'	23° 47'	76		112	67° 57'	6° 44'	1267	—1°1	140	63° 29'	6° 57'	780	—0°9
87	65° 02'	23° 56'	110		113	69° 31'	7° 06'	1309	—1°0	141	63° 22'	6° 58'	679	—0°6
88	64° [illegible]'	24° 25'	76	6°9	114	70° 30'	7° 29'	773	1°0	142	63° 07'	7° 05'	587	—0°6
89	64° 45'	27° 20'	310	8°4	115	70° 50'	8° 29'	86	0°1	143	62° 58'	7° 09'	388	—0°4
90	64° 45'	29° 06'	598	4°4	116	70° 05'	8° 26'	371	—0°4	144	62° 49'	7° 12'	276	1°6
91	64° 44'	31° 00'	1230	3°1	117	69° 13'	8° 23'	1003	—1°0					