

Arthur Sandy, Esq.,
with the author's
best regards.

*Presented
to the
Society*

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SECOND REPORT

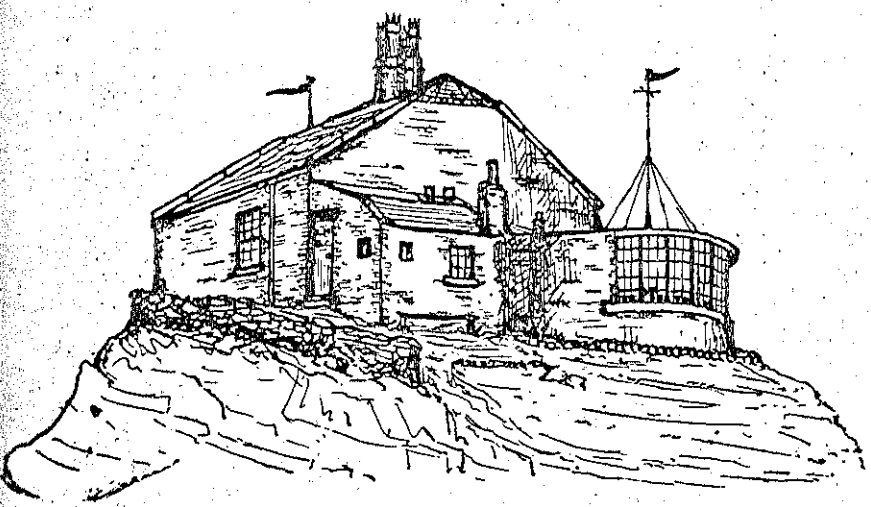
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HANIT IA

ON THE

PORIFERA OF THE L.M.B.C. DISTRICT.

WITH THREE PLATES.



BY

RICHARD. HANITSCH, Ph.D.

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SECOND REPORT on the *PORIFERA* of the L.M.B.C.
DISTRICT.

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With Plates V., VI. and VII.

[Read 8th February, 1889.]

SINCE the publication in 1886 of the "First Report upon the Porifera," by Mr. Thomas Higgin, F.L.S., in the first volume of "The Fauna of Liverpool Bay," several very important works upon the Sponges have appeared which have changed to a considerable extent the accepted views as to the classification of the group, and render a re-arrangement of the species dealt with in the former report absolutely necessary. I have found it convenient to arrange the Sponges in the following groups:—*Myxospongiæ*, *Ceratosa*, *Monaxonida*, *Tetractinellidæ*, *Hexactinellidæ*, and *Calcarea*. I regard these groups as orders, although I do not wish to state that they are all equivalent to each other. Every one of these orders, except the *Myxospongiæ*, has been treated of in a separate "Challenger" Report, and this fact justifies my classification sufficiently. In the further division of the orders I shall accept Ridley and Dendy's system for the *Monaxonida*, and Sollas's system for the *Tetractinellidæ*. In regard to the *Calcarea*, I shall follow Mr. Higgin's example and use Haeckel's classification, instead of that of Polejaeff. The Sponges in our district belonging to the remaining orders are so few in number that any further classification of them is unnecessary.

I will add an explanation, why I did not follow the latest classification of the sponges given by R. v. Lendenfeld,

in his "Catalogue of the Sponges in the Australian Museum, Sydney." This is the only work on sponges from that author which I have been able to see, and it would have been very difficult to identify even the genera by that catalogue, as figures of spicules and similar details necessary for identification are not given. Nor, perhaps, as v. Lendenfeld's work is a museum catalogue, should we expect to find illustrations of that kind in it. Finally, it did not seem advisable to me to re-arrange the species which I had identified chiefly by Bowerbank's "British Spongiadae" and the "Challenger" Reports, according to the system of another author, especially as it has not yet been shown that v. Lendenfeld's classification is superior to that of the "Challenger" Reports.

The following list includes the Sponges recorded by Mr. Higgin in his "Report on the Porifera of the L.M.B.C. District." Those Sponges are marked in column "I." whilst the additions made in the present report are given in column "II." The nomenclature of this report differs in some cases from that of the first report, and I shall give the latter nomenclature in brackets. For the names of authors I use the following abbreviations:—

B. Bowerbank.	H. Haeckel.
C. Carter.	J. Johnston.
F. Fleming.	M. Montagu.
G. Gibson.	S. O. Schmidt.

I am able to add seven to the list of sponges recorded from this neighbourhood, of these is one (*Reniera semitubulosa*, S.) new to British seas, and one (*Seiriola compacta*) is new to science.

LIST of PORIFERA recorded from the L.M.B.C. DISTRICT.

Order I. MYXOSPONGIÆ.		I.	II.
Family.			
HALISARCIDÆ <i>Halisarca dujardini</i> , J.	x	x
Order II. CERATOSA.			
SPONGELIDÆ <i>Dysidea fragilis</i> , J.	x	x
Order III. MONAXONIDA.			
Subord. HALICHONDRINA.			
HOMORRHAPHIDÆ	<i>Halichondria panicea</i> , J.	x	x
	(<i>Amorphina panicea</i> .)		
	<i>Halichondria coccinea</i> , B.	x	
	(<i>Amorphina coccinea</i> .)		
	<i>Halichondria albescens</i> , J.	x	
	(<i>Amorphina albescens</i> .)		
	<i>Halichondria caruncula</i> , B.	x	
	(<i>Amorphina caruncula</i> .)		
	<i>Reniera varians</i> , B.	x	x
	(<i>Isodictya varians</i> .)		
	<i>Reniera elegans</i> , B.	x	
	(<i>Isodictya elegans</i> .)		
	<i>Reniera simulans</i> , J.	x	
	(<i>Isodictya simulans</i> .)		
	<i>Reniera fistulosa</i> , B.	x	x
	(<i>Isodictya fistulosa</i> .)		
	<i>Reniera clava</i> , B.	x	
	(<i>Isodictya clava</i> .)		
	<i>Reniera semitubulosa</i> , S.		x
	<i>Chalina oculata</i> , J.	x	x
	<i>Chalina limbata</i> , M.	x	x
	<i>Chalinula pallida</i> , B.	x	
	(<i>Isodictya pallida</i> .)		
	<i>Chalinula densa</i> , B.	x	
	(<i>Isodictya densa</i> .)		

Family.	I.	II.
HETERORRHAPHIDÆ. None.		
DESMACIDONIDÆ.. <i>Desmacidon incrustans</i> , J.....	x	
(<i>Halichondria incrustans</i> .)		
<i>Desmacidon fucorum</i> , J.....	x	x
(<i>Isodictya fucorum</i> .)		
<i>Esperia agagropila</i> , C.....	x	
<i>Clathria seriata</i> , J.	x	
(<i>Ophlitaspongia seriata</i> .)		
<i>Plumohalichondria plumosa</i> , C... x		
AXINELLIDÆ..... <i>Hymeniacion sanguinea</i> , J.....	x	
<i>Raspailia viminalis</i> , S.		x
<i>Raspailia stelligera</i> , S.	x	x
(<i>Dictyocylindrus stuposus</i> , B.)		
Subord. CLAVULINA.		
SUBERITIDÆ..... <i>Suberites carnosus</i> , J.	x	
<i>Suberites suberea</i> , M.....	x	x
<i>Cliona celata</i> , J.	x	x
* <i>Papillina suberea</i> , S.	x	
(<i>Raphyrus griffithsia</i> , B.)		
<i>Polymastia mammillaris</i> , J.....		x
<i>Polymastia robusta</i> , B.		x

Order IV. TETRACTINELLIDÆ.

Subord. CHORISTIDA.

TETILLIDÆ..... <i>Tethya lyncurium</i> , J.....	x	
PACHASTRELLIDÆ.. <i>Dercitus niger</i> , C.	x	
SEIRIOLIDÆ. <i>Seiriola compacta</i> , n. sp.	x	
STELLETTIDÆ..... <i>Stelletta grubii</i> , S.	x	
<i>Ecionema ponderosa</i> , B.....	x	x
GEODIIDÆ <i>Pachymatisma johnstonia</i> , B. ...	x	x

Subord. LITHISTIDÆ.

None.

Order V. HEXACTINELLIDÆ.

None.

Order VI. CALCAREA.

Family.	I.	II.
ASCONES..... <i>Ascetta primordialis</i> , H.....		x
<i>Ascetta coriacea</i> , F.	x	
<i>Ascaltis botryoides</i> , F.	x	
LEUCONES <i>Leucandra fistulosa</i> , J.....	x	
<i>Leucandra gossei</i> , B.	x	
<i>Leucandra nivea</i> , F.	x	
<i>Leucandra johnstonii</i> , C.	x	
SYCONES <i>Sycandra ciliata</i> , F.	x	x
<i>Sycandra compressa</i> , F.....	x	x
<i>Aphroceras ramosa</i> , C.	x	
<i>Sycortis aspera</i> , G.....	x	

Order I. MYXOSPONGIÆ.

Halisarca dujardini, J.

Frequently met with by dredging and shore collecting at Puffin Island and other places. There seem to be two colours, grey and brownish.

Order II. CERATOSA.

Dysidea fragilis, J.

Dredged in Church Bay, near Holyhead, "Hyæna" Expedition, 1886. Collected on the Beacon Rocks, Puffin Island, 1st February, 1888.

Order III. MONAXONIDA.

Halichondria panicea, J.

Collected at Puffin Island, Hilbre Island, &c. on various occasions.

Reniera varians, B.

Collected at Hilbre Island, 20th March, 1886.

Reniera fistulosa, B.

Collected on "Hyæna" Expedition, 1888, off the south end of the Isle of Man, 20 fathoms.

Reniera semitubulosa, O. Schmidt.

Pellina semitubulosa, O. Schmidt.

Halichondria semitubulosa, Lieberkühn.

This Sponge was first described by Oscar Schmidt, in his "Spongien des Adriatischen Meeres." It had been found commonly near Venice, and formed an irregular base with numerous ascending branches, which were here and there fused together. The colour was greenish or whitish. One of the chief characteristics was that the dermal membrane could easily be separated from the underlying tissue. The oscula were found mostly on the extremities of the branches, but also on the other parts of the surface. The spicules were oxea. A few years afterwards O. Schmidt formed the new genus *Pellina*,* and gave the species which he formerly called *Reniera semitubulosa* as the type for it. In the same work he describes two other species of this genus: *Pellina bibula*, found in the Kattegat, and *Pellina profunditatis*, found near Florida.

Ridley and Dendy† do not agree with O. Schmidt's proposal to form a new genus for this sponge, not regarding the character of the separable dermal membrane as being of generic importance. They further remark, "The so-called dermal membrane is also a very distinct feature of *Halichondria panicea*, yet Schmidt keeps this species out of his genus *Pellina*, into which it ought certainly to fall

* Oscar Schmidt, "Spongienfauna d. Atl. Gebietes."

† Ridley and Dendy, "Report on the Monaxonida collected by H.M.S. *Challenger*," p. 15.

according to his definition, if such it can be called." For this reason I am also inclined to retain the generic name *Reniera* for this sponge.

A small specimen of it was found on the North Spit at Puffin Island, at low water, in September, 1887. The base of the specimen is about 2.5 cm. in height and 1 cm. in thickness. There are five branches arising from the base, three of which are broken off close to their origin, the two others are about 8 mm. in length by 3 mm. in diameter. The spicules are oxea, and measure about 0.3 mm. They are arranged in multispiculous triangular or quadrangular meshes.

Chalina oculata, J.

Dredged in Church Bay, near Holyhead, on the "Hyæna" Expedition, 1886.

Chalina limbata, M.

Two splendid specimens were obtained on the Beacon Rocks at Puffin Island, at low spring tide, 1st February, 1888.

Desmacidon fucorum, J.

Dredged in Church Bay, near Holyhead, on the "Hyæna" Expedition, 1886; also off the North side of Puffin Island, 12—15 fathoms, in February, 1888; and on 24th March, 1888; also off Calf of Man, 20 fathoms, "Hyæna" Expedition, 20th May, 1888.

Genus *Raspailia*, Nardo.

The genus *Raspailia* was founded first by Nardo, in the year 1833. The exact words of his definition are not known to me, but as Oscar Schmidt* states that he accepts Nardo's definition of the genus, giving it however in his own words, we may take it for granted that

* Oscar Schmidt, "Spongien des Adriatischen Meeres," p. 59.

Schmidt's definition agrees in general with that of Nardo. The characters are: from the narrow base of the sponges of the genus *Raspailia* branches are given off which may be simple or dichotomous. The spicules are arranged in two different ways—some lie in bundles in the vertical axis, the others are placed horizontally and project through the ectoderm. The bases of the spicules are imbedded in ceratose. The colour of the sponges is a dark yellow. Schmidt describes three species of this genus, two of which are of special interest to us: *Raspailia viminalis*, S. (with large and small styli and spined styli), and *Raspailia stelligera*, S. (with large and small styli and spherasters).

Bowerbank, when he published the first two volumes of his "British Spongiadæ," took no notice of Schmidt's researches, and so it came to pass that many species which had been already described by Schmidt, were re-described by Bowerbank as new species, and were christened once more. To those privileged sponges belonged the genus *Raspailia*, Nardo. Bowerbank's error was first pointed out by O. Schmidt, in his second supplement to the above mentioned work, and he stated that the sponges of the genus *Dictyocylindrus*, B., belong either to *Raspailia*, Nardo, or to *Axinella*, S., and that *Dictyocylindrus stuposus*, B., is identical with *Raspailia stelligera*, S. Consequently we find in Ridley and Dendy's classification the genera *Raspailia*, Nardo, and *Axinella*, S., instead of *Dictyocylindrus*, B. But their definition of *Raspailia* does not quite agree with that of Nardo and Schmidt, as they have added the negative character "no microsclera." Now *Raspailia stelligera*, S., could not come under the genus *Raspailia* as defined by Ridley and Dendy, for this species has microsclera. And it becomes still more difficult to find a place for *Raspailia stelligera*, S., in Ridley and Dendy's system, when we read on page xxi. of their "Introduction"

to the Report on the Monaxonida, that the only stellate forms of microsclera "which are certainly known to occur in the Monaxonida" are "spirulæ, discastra and amphiastra." According to this, *Raspailia stelligera*, S., as having spherastrous microscleres would not even belong to the Monaxonida. But there can be no doubt that *Raspailia stelligera* is a true monaxonid sponge, and I think even the presence of microsclera not important enough to remove it from the genus in which it had been placed by Schmidt. Therefore I would amend two points in Ridley and Dendy's Report. Firstly, spherasters should be mentioned as being a fourth form of stellate microsclera in the Monaxonida; and secondly, the limits of the genus *Raspailia* should be enlarged by leaving out the negative character "no microsclera," so as to reconstitute the older and wider genus defined by Nardo and Schmidt.

Raspailia viminalis, Schmidt (Pl. V., figs. 2—4). ↑

Dictyocylindrus ventilabrum, Bowerbank. ↓

note. sp. takes
Bowerbank's name of
Ridley and Dendy's 1861
citation.

Both the figures and the description of *Dictyocylindrus ventilabrum*, B., as given by Bowerbank, agree so fully with all the characters of *Raspailia viminalis*, S., as given by Schmidt, that I do not hesitate to consider those species as identical.

One specimen of this species was dredged on the "Hyæna" Expedition, 1886, in Church Bay, near Holyhead. Bowerbank records it from the British Channel and Brighton, and O. Schmidt from the Adriatic Sea. The colour of the living sponge is orange yellow.

Our specimen was apparently quite a young one, as it measured only 3.5 cm. in height. The stem is cylindrical, has a well pronounced expanded base, and bears distally two branches. The beginning of a third branch is just visible (see Pl. V., fig. 2). Bowerbank had much larger

specimens at his disposal. Of one of them he gives the following description:—"The pedicel is barely an inch in height; at an inch and a half from the base it has divided into four primary branches; within one inch from their origin these primary branches each divide dichotomously, and this mode of division continues, with a single exception of one branch dividing trichotomously, so that at four inches from the base there are as many as twenty-two, all nearly in the same plane, assuming a fan-shaped series of branches, eight inches in height by about the same extent in width. The branches are cylindrical," &c.

A transverse section through this sponge shows us that it consists of a solid mass without central cavity. The oscula are numerous, although visible only in those sections. Bowerbank has stated that the "oscula and pores are inconspicuous." The oscula open into irregular cavities, branching throughout the whole sponge. The spicules consist firstly of styli of two different sizes. The large styli measure from 1.2 mm. to 1.5 mm. by 0.013 mm.; the shorter ones from 0.42 mm. to 0.45 mm. by 0.004 mm. Besides that, we find spined styli, 0.124 mm. by 0.0055 mm. The ordinary styli are arranged either in bundles running parallel to the longitudinal axis of the sponge, or they form bundles standing at right angles to the longitudinal axis, and project for about two-thirds of their length through the ectoderm. This latter point had been noticed by Bowerbank,* who said that "in the dried condition of the sponge the fasciculi of radiating spicula project from the central cylinder of the skeleton to the extent of at least one-third of the whole diameter of the branch," but he adds, "it is probable that in a living state their apices would be barely visible beyond the dermal membrane." As I have stated already, sections through a well preserved

* Bowerbank, "British Spongiadæ," vol. ii., p. 101.

specimen of *Raspailia viminalis* do not leave any doubt that in a living state the spicules do project beyond the ectoderm. These projecting bundles of styli consist, in most cases, of one large stylus surrounded by a number of small ones. In some cases the bundles consist only of small styli, and lastly the large styli are also found singly. All those different arrangements are represented in the semi-diagrammatic figure (Pl. V., fig. 4). The spined styli are found scattered throughout the whole mass of the Choanosome.

Raspailia stelligera, Schmidt (Pl. V., fig. 1).

Dictyocylindrus stuposus, Bowerbank.

As Mr. Higgin states, this species has already been collected at Port Erin, Holyhead and Isle of Man. On the 16th and 17th of February last, Professor Herdman obtained a number of bright orange coloured sponges at extreme low tide, under one of the ledges of rock, on the north end of Puffin Island, near the Biological Station. The specimens showed a narrow base and an expanded distal portion with more or less numerous short branches. The whole mass was beset with rough ridges, and spicules were seen projecting through the ectoderm. The height of the sponge-masses varied between 2 cm. and 4 cm. Transverse and longitudinal sections through this sponge show that the arrangement of the megasclera is here the same as in *Raspailia viminalis*. The only remarkable point is the great masses of ceratose in which the bases of the spicules, especially of those in the interior, are imbedded. The bundles of the projecting spicules consist of styli, and the centre of these bundles is commonly formed by one or more shorter and stouter styli (0.92 mm. by 0.012 mm.), which are surrounded by long and thin styli (0.8—1.5 mm. by 0.0043 mm.). The spicules of the

= *S. rigida*
cf. *T. infans* 1890.
292 + *Pointed*
1890.213.

interior are in most cases strongyla (0.54—0.85 mm. by 0.012 mm.), besides which there are found also styli of the above mentioned kind, and a very few oxea. The microsclera are spherasters, with about twelve rays, and measuring 0.02 mm. in diameter. Those spherasters are found only in the ectosome; they lie very close to the surface and are numerous, although they do not form a continuous layer.

Suberites suberea, M.

Collected at Puffin Island, on the North side, 14th January, 1838, and on the South Spit, March, 1838.

Cliona celata, J.

Raphyrus griffithsia, B.

Very common, boring in old shells and in the limestone rocks, at Puffin Island.

Polymastia mammillaris, Johnston (Pl. VI., figs. 1—3).

Spongia penicillus, Montagu.

Halichondria mammillaris, Johnston.

One small specimen of this Sponge was dredged in Church Bay, near Holyhead, on the "Hyæna" Expedition of 1836, and it is the first one which has been obtained in the L.M.B.C. district, although the species had previously been found at many points on the British coast. Johnston gives the following localities: coast of Devon, Scarborough and Strangford. Bowerbank mentions Larne Lough, Guernsey, Shetland, and the Orkney Islands. According to Vosmaer,* it is found in the Atlantic, Arctic, Mediterranean and Adriatic Seas generally. The specimen from Holyhead has a rounded basal mass of about 7 mm. in diameter, and had apparently been fixed to a small stone. Four papillæ are given off, the largest of which is 8 mm.

* Vosmaer, "Sponges of the Willem Barrems Expedition, 1830 and 1831," in "Bijdragen tot de Dierkunde."

in height. I do not think it necessary to figure this specimen, as figures of the entire *Polymastia mammillaris* have been given by Johnston, Bowerbank and Vosmaer. Vosmaer figures also a section through the basal mass and one of the papillæ. As the figure, however, is quite a low power view, it does not show some points of interest which I was able to make out in transverse and longitudinal sections through two of the papillæ. The papillæ have the form of tubes, in which the diameter of the central cavity is about as large as, or slightly larger than, the thickness of the wall. This central cavity gives off numerous recesses into the wall, which come so close to the surface that only a thin membrane, 0.02 mm. in thickness, is left separating the cavity from the outer world (see figs. 2 and 3, Pl. VI.). Seen from the surface those membranes are round or oval in outline, with a diameter of 0.08 to 0.14 mm. Oscula are not present either on the extremity of the papillæ or on their sides. The absence of oscula in the papillæ agrees with the generic characters of *Polymastia* given by Ridley and Dendy:*—"Genus *Polymastia*, Bowerbank. Suberitidæ of massive, sessile form, with more or less numerous mammiform processes on the upper surface, some of which may bear oscula at their summits, but usually without visible openings." Pores are most probably present in the above mentioned thin membranes (pore membranes), but I have not been able to see them satisfactorily.

The skeleton of *Polymastia mammillaris* has already been sufficiently described by the above mentioned authors. In the wall of the papillæ we find bundles of large and stout tylostyli (0.75—0.8 mm. by 0.01—0.012 mm.), running parallel to the long axis of the papillæ, and further bundles of short and thin tylostyli (0.15 mm. by

* Ridley and Dendy, "Report on the Monaxonida collected by H.M.S. *Challenger*," p. 210.

0.003 mm.) standing perpendicularly to the longitudinal axis and projecting for half their length through the ectoderm. One spicule of the former kind is given in fig. 1 a, Pl. VI.; one of the latter kind in fig. 1 b, Pl. VI. In regard to the arrangement of the spicules see figs. 2 and 3, Pl. VI.

Polymastia robusta, Bowerbank.

Dredged in Church Bay, near Holyhead, on the "Hyæna" Expedition of 1886. The largest of the three specimens has a flat basal mass, 5.5 cm. by 4 cm. in horizontal expansion and 1.5 cm. in thickness. On one side it bears between 30 and 40 papillæ, which in the natural condition probably are standing upright, but now have become pressed down upon the basal mass. These papillæ are laterally compressed and vary greatly in size. The largest measure 2 cm. in height and 7 mm. in breadth. They taper towards the extremities, but there are no oscula visible on their extremities. The dermal membrane can very readily be torn off from the basal mass. The colour of the specimens, which have been kept in spirit for nearly three years, is whitish. The skeleton consists of styli, which are of two different sizes: 0.6 mm. by 0.01 mm. and 0.17 mm. by 0.004 mm. The arrangement of the spicules is similar to that of *Polymastia mammillaris*.

According to Bowerbank, *Polymastia robusta* is found on the coast of Northumberland.

Order IV. TETRACTINELLIDÆ.

Tethya lyncurium, J.

Dredged in Church Bay, near Holyhead, on the "Hyæna" Expedition of 1886. This species had not previously been recorded in the L.M.B.C. district, although it is found, according to Bowerbank, at various localities on the British

coast: Plymouth, Torquay, Guernsey, Diamond Ground off Hastings. I may add the Chausey Islands, off the Normandy coast, from which locality there is one specimen, collected by Professor Herdman in 1882, in the Zoological Museum of University College, Liverpool. *Tethya lyncurium* has been found by Oscar Schmidt in the Adriatic Sea, and by Vosmaer in the Adriatic, Mediterranean, and Arctic Seas. A description of this well known sponge is not wanted.

SEIRIOLIDÆ, n. fam.

The tetractinellid sponge, described below under the name *Seiriola compacta*, appears so different from all described forms that I am obliged to found a new family for it, the "Seiriolidæ," called after St. Seiriol's Island, an older name for Puffin Island. This new family belongs clearly to the demus Streptastrosa, Sollas, since *Seiriola compacta* is an astrophorous sponge in which one of the microscleres is some form of spiraster. The three families of the demus Streptastrosa, Sollas, are now as follows:—

Fam. 1. THERNEIDÆ: "The ectosome never forms a cortex; the mesoderm is a collenchyma; the flagellated chambers eurypylous" (Sollas).*

Fam. 2. PACHASTRELLIDÆ: "Streptastrosa, in which the chief megascleres are calthrops; triænes being absent. The microscleres may be spirasters, spherasters or microrabds. The choanosomal mesoderm is sarcenchymatous and the chamber system aphodal" (Sollas).

Fam. 3. SEIRIOLIDÆ: The ectosome forms a cortex. Chief megascleres triænes. The choanosomal mesoderm is cystenchymatous.

* Sollas, "Report on the Tetractinellidæ collected by H.M.S. *Challenger*," pp. 59 and 104.

Seiriola,* n. gen.

Characterized by the tylostyles of the ectosome. This genus is formed for the single new species

Seiriola compacta, n. sp. (Pl. VII., figs. 1 to 3).

This sponge was found by Mr. Rutherford, Curator of the Biological Station, Puffin Island, in June, 1888, in one of the caves on the N.W. side of the island which are exposed only at low spring tides.

The specimen forms a knob-like mass, like that of so many tetractinellid sponges, and measures horizontally 4 cm. by 1.5 cm., and vertically 1.3 cm. It is dark grey in colour and has a somewhat rough surface. A vertical section through this sponge shows that the cortex (which in this species is quite identical with the ectosome) is extraordinarily well marked off from the choanosome, and further examination shows that the ectosome is both in regard to skeleton and to histological structure, very different from the choanosome. The spicules of the ectosome are tylostyles, and their shape and arrangement reminded me at once of *Polymastia mammillaris*, which sponge, of course, belongs to quite a different group. These tylostyles measure from 0.1 to 0.33 mm. by 0.003 to 0.006 mm. They are arranged in bundles, and project for about one-half of their length through the ectoderm (see fig. 1, Pl. VII.).

The skeleton of the choanosome consists of megasclera and microsclera. The former show the following forms: dichotriæna, orthotriæna, oxea, styli, strongyla, tylota. The dichotriæna are very numerous, and are arranged immediately beneath the ectosome, with their cladomes directed towards the ectosome. The rhabdome measures from 0.36 to 0.42 mm., the protocladus from 0.06 to 0.09

* From Seiriol, an early Welsh saint, who is said to have had his cell on Puffin Island.

mm., and the deuterocladus from 0.037 to 0.045 mm. The orthotriæna are far less numerous and slightly smaller than the dichotriæna. They are also placed close to the ectosome. The oxea are the most numerous spicules, and are arranged in bundles, which take their origin in or immediately beneath the region of the triæna, and stretch vertically down through the whole depth of the choanosome. Those oxea measure 0.34 to 1.5 mm. by 0.009 to 0.026 mm. Amongst them we find a few stylote, strongylote and tylote spicules.

The microsclera are spherasters, 0.025 mm. in diameter, and spirasters 0.012 to 0.016 mm. in length. Besides those, I have found in some sections a third kind of microsclera, which looked like the fragments of the narrow blades of fret-saws, straight on one side, toothed on the other, and a few which were toothed on both sides (see fig. 2c, Pl. VII.). These spicules measure 0.08 mm. by 0.0014 mm., but I do not think I have seen a complete spicule of this kind. They were found in the choanosome immediately beneath the ectosome.

A great part of the choanosome, especially the portion in the neighbourhood of the ectosome, consists of a cystenchymatous tissue, also called vesicular connective tissue or bladder cells ("blasiges Bindegewebe" of German authors). It has been already remarked by other authors in various groups of the sponges, as by Vosmaer,* in *Polymastia hemisphærica*, by Sollas† in *Pachymatisma*, &c., and also in some of the Lithistidæ. A similar tissue is known to occur in many Molluscs and in Tunicata.‡

* Vosmaer, "Sponges of the Willem Barreants Expedition," 1880 and 1881. "Bijdragen tot de Dierkunde."

† Sollas, "Report on the Tetractinellidæ, collected by H.M.S. *Challenger*," p. xxxix.

‡ W. A. Herdman, "Report on the Tunicata, collected by H.M.S. *Challenger*," part i., p. 28—29.

I could not get a correct idea of the canal system of *Seiriola compacta*. The figure on Pl. VII. shows everything I could make out in regard to this point.

Ecionema ponderosa, Bowerbank.

Found in the caves on the N.W. side of Puffin Island, June, 1888. = *Stelletta goubii* (cf. Hamitsch 1870, p. 2)

Pachymatisma johnstonia, Bowerbank.

Found in the caves on the N.W. side of Puffin Island, June, 1888.

Order VI. CALCAREA.

✓ *Ascetta primordialis*, Haeckel.

Collected at low tide at the south end of Puffin Island, on 8th September, 1888, by Professor Herdman.

The species is new to the district, although it is cosmopolitan, and has been recorded by Haeckel from nearly every part of the world.

Sycandra ciliata, Haeckel. *Flammula*

Collected at Isle of Man, August, 1886; common at Puffin Island.

Sycandra compressa. Haeckel. *Flammula*

Common at Puffin Island. Some very fine specimens were found hanging from the ledges of rock at the north end, below the Biological Station.

EXPLANATION OF THE PLATES.

- | | |
|--|---------------------|
| bl. Bladder cells. | o. Ova. |
| ch. Choanosome. | os. Osculum. |
| c.c. Ciliated chambers. | p. Pores. |
| e. Ectosome. | p.m. Pore membrane. |
| ls. Longitudinal bundles of spicules in transv. section. | |

PLATE V.

- Fig. 1. *Raspailia stelligera*, S., nat. size.
 Fig. 2. *Raspailia viminalis*, S., nat. size.
 Fig. 3. a., b. and c. Stylote spicules of *Raspailia viminalis*, S. (x 55). d. Spined spicule of the same (x 235).
 Fig. 4. Portion of a transverse section through the middle of the stem of *Raspailia viminalis* (x 40).

PLATE VI.

- Fig. 1. Tylostylote spicules of *Polymastia mammillaris*. a. (x 100); b. (x 235).
 Fig. 2. Transverse section through one of the papillæ of *Polymastia mammillaris* (x 100).
 Fig. 3. Longitudinal section through one of the papillæ of *Polymastia mammillaris* (x 60).

PLATE VII.

- Fig. 1. Vertical section through *Seiriola compacta*, n. sp. (x 100). [N.B. The third cladus of every triæna has been left out as standing nearly at right angles to the plane of the section.]
 Fig. 2. Microscleres of *Seiriola compacta*, n. sp. a. (x 1000); b. (x 1000); c. (500).
 Fig. 3. The cladome of a dichotriæna of *Seiriola compacta*, n. sp. (x 200). [N.B. The rhabdome must be imagined as standing vertically upon the centre of the cladome.]

Fig. 1.

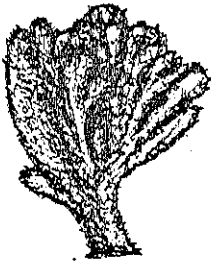
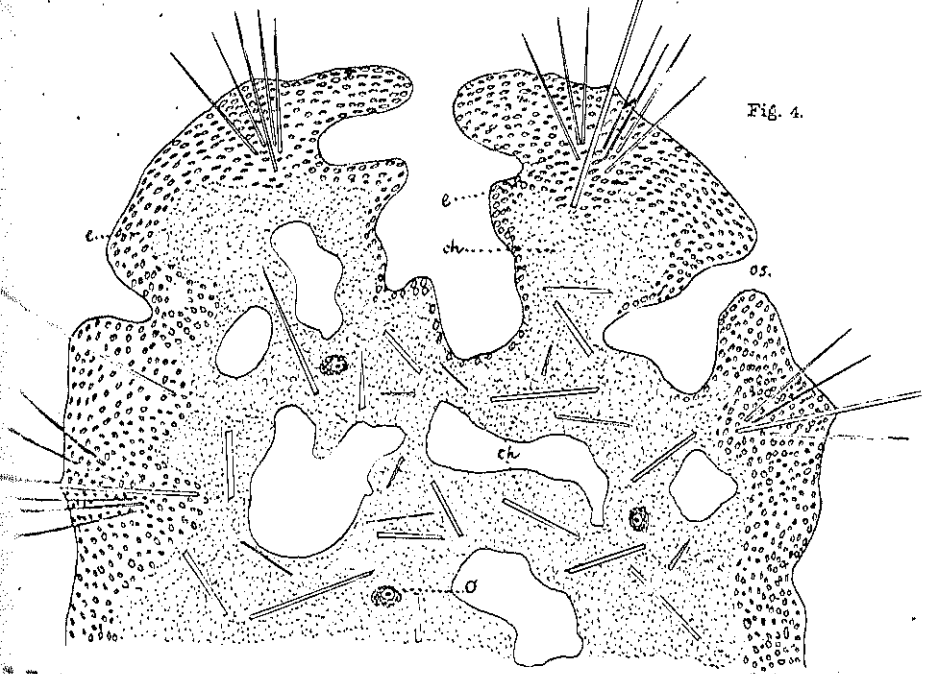


Fig. 2.



Fig. 3.

Fig. 4.



A. Hanitsch, del.

RASPAILIA STELLIGERA, Schmidt.

RASPAILIA VIMALIS, Schmidt.

R. rigida cf. Topsent
1890: 292.
+ Hanitsch 1890: 213

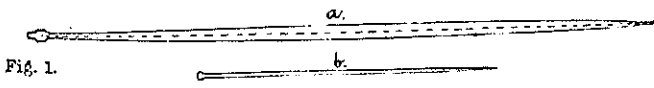


Fig. 1.

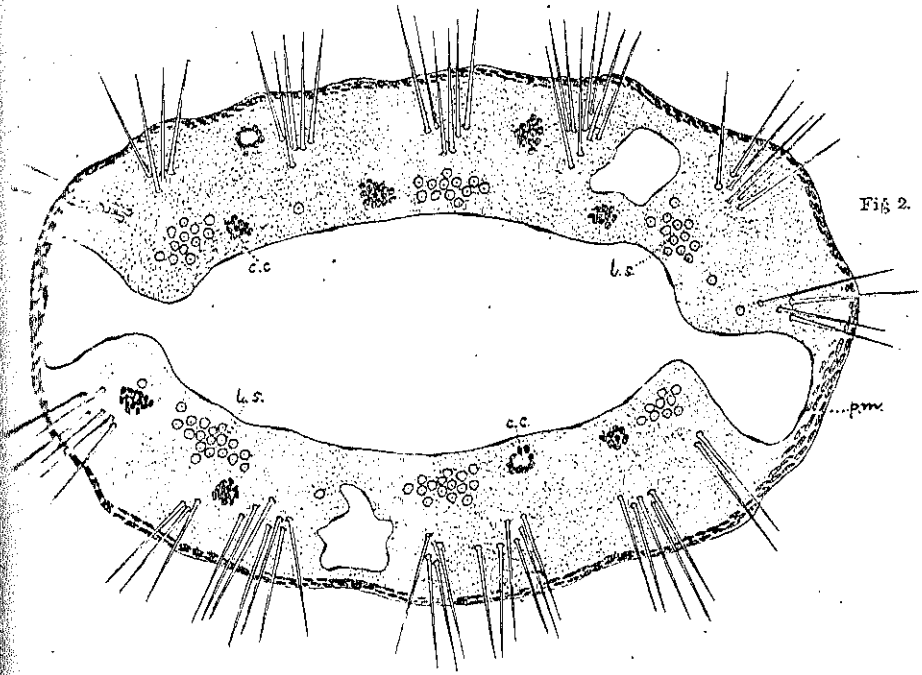


Fig. 2.

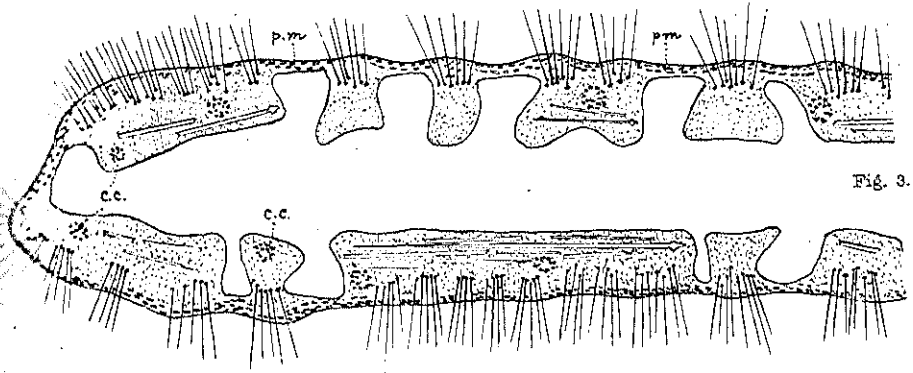


Fig. 3.

R. Habitch, del.

POLYMASTIA MAMMILLARIS. Johnston.

Fig. 1.

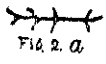
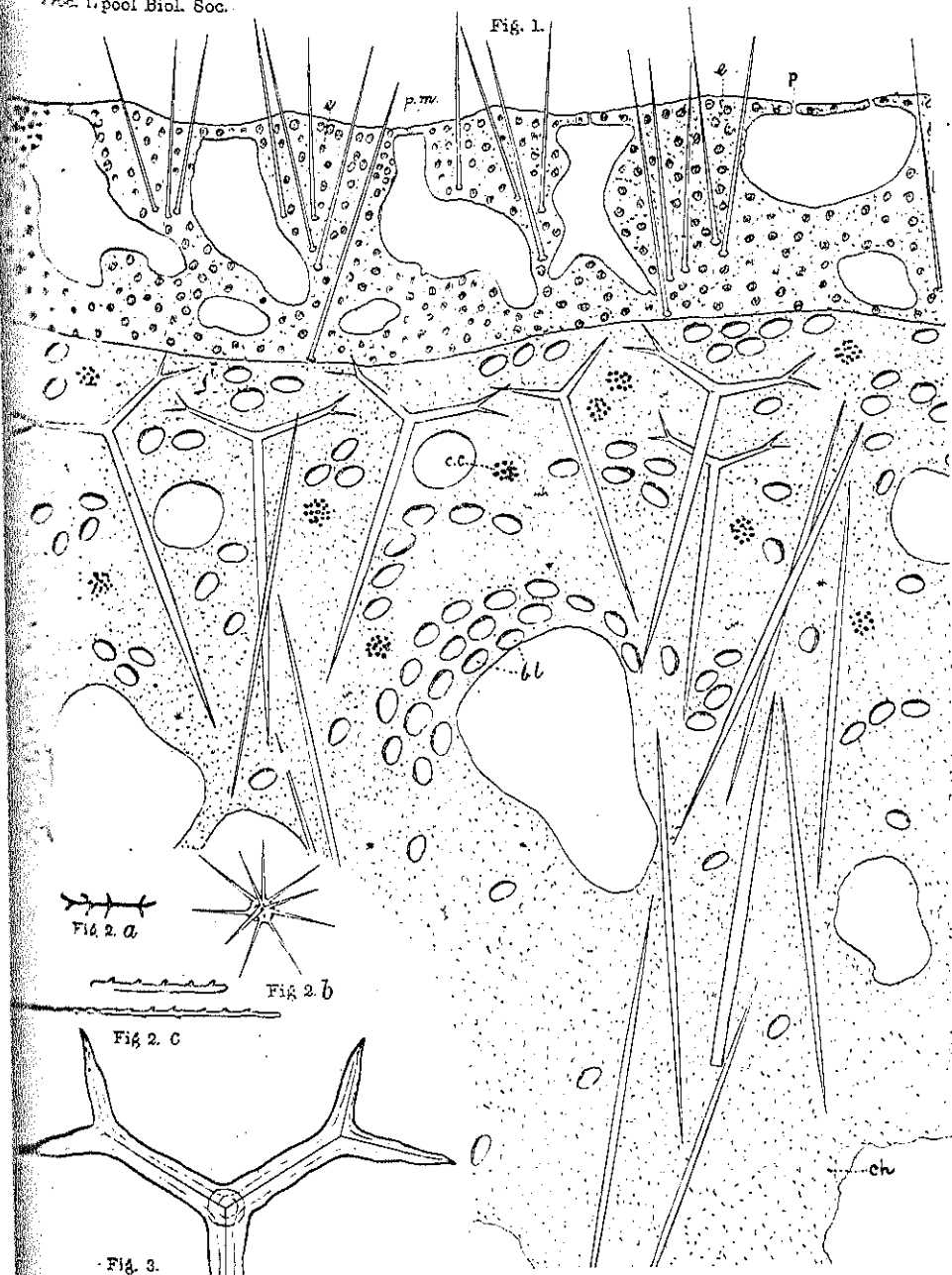


Fig. 2. a

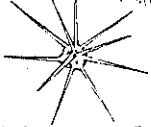


Fig. 2. b

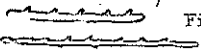


Fig. 2. c

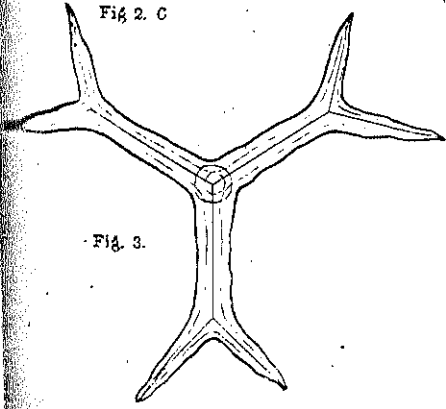


Fig. 3.

R. Hanitsch, del.

SEIRIOLA COMPACTA, n. sp.