J. B. Wilson, Esq., together with numerous other interesting marine Invertebrata. It was dredged in Port Phillip Bay, South Australia.

The annexed woodcut represents the shell one half the natural size and a greatly magnified view of one of the transverse series of the lingual teeth.

XXVIII.—*Supplement to the Descriptions of Mr. J. Bracebridge Wilson's Australian Sponges.* By H. J. Carter, F.R.S. &c.

[Plate X.]

Having finished the description of Mr. J. Bracebridge Wilson's Australian Sponges which came to me in his first consignments, I have now to add in the following "Supplement" descriptions of those which have been received since, and further to supply any omissions and corrections that may be necessary in what has already been published, including replies to objections that have been made to any parts of the latter.

Taking the orders again as they stand in my Classificatory Arrangement of 1875 ('Annals,' vol. xvi. p. 131 &c.), I would observe that the plan adopted latterly in my descriptions of these Australian Sponges, viz. that of inserting a copy of the tabular view of this arrangement for more convenient reference at the commencement of each order, was omitted in the Carnosa and Ceratina; hence this will now be supplied.

Order I. CARNOSA.

Fam. 1. Halisarcida.

Char. Possessing no spicules.

Fam. 2. Gumminida.

Char. Possessing spicules.

I also omitted to note what I had written on the subject, viz. a paper on all the then-known species of Carnosa, in the 'Annals' of 1881 (vol. viii. p. 241 and "Addendum," p. 450).

To this I would add the illustrated observations of Prof. F. E. Schulze on the development of the species of *Halisarca*, the *family* of the Chondrosidæ, and *Corticium candelabrum* respectively (Zeitschrift f. wiss. Zoologie, Bde. xxviii. and xxix. of 1877 and Bd. xxxv. of 1881); also Dr. R. v. Lendenfeld's "Preliminary Report on the Australian Myxospongiæ" (Proc. Linn. Soc. N. S. Wales, vol. x. pt. 1, p. 139, pls. i.–v.).

With reference to my account of "*Halisarca australiensis*" in the 'Annals' of 1885 (vol. xv. p. 196), Dr. v. Lendenfeld has stated (*ib.* vol. xvi. p. 21) that "it is not a sponge at all, but the crusts described by Carter under the above name are the ova of *Boltenias* surrounded by their folliculi;" which, *ab initio*, may be refuted by simply drying a piece of the stem of a *Boltenia* with a portion of the crust on, when the latter will be found to be homogeneous in structure, like dry glue, and the former heterogeneous (that is, the cartilage of which the stem is composed), more or less charged with the cells, which Dr. Lendenfeld appears to me to have mistaken for "folliculi" of the *Boltenia*.

If, now, we go further, and examine a portion of the ovary of the Ascidian itself, it will be found that the ripening of the ova for expulsion takes place *successively*, so that the whole is not discharged at once in a mass, like the spawn of Gasteropods &c., and therefore could not form a "crust" on the stem of the *Boltenia*.

While if sections be made of the "crust" when fresh or undried, it will be found to contain no appearance of ova whatever, but, on the contrary (especially when stained), will be found to present pores on the surface leading into elongated chambers, followed by the ampullaceous sacs (Geisselkammern) themselves; thus, independently of the dried condition, proving at once that the crust on the stem of *Boltenia australiensis* is not the spawn of an Ascidian, even if there were such a thing, but a *bonâ fide* Halisarcous sponge.

Having had to repeat my examination of this "crust," together with that of the other specimens of *Halisarca australiensis* whose characters were originally included under this heading, it now seems to me that in my description I have mixed up at least *three* forms, which might be more conveniently divided into *Halisarca australiensis*, *H. ascidiarum*, and *H. reticulata*, since the solidity of the former, the incrusting character of that on the stem of *Boltenia australiensis*, and the strongly marked reticulated structure of the surface of the latter, if not specifically distinct, are so varietally.

Taking them separately, then, they may be distinguished thus :—

Halisarca australiensis.

Massive, cuboidal or plano-convex, spreading, growing over the detritus of the sea-bed of the locality (agglomerated sand and shells), or unattached and free; following no particular shape, but generally more or less round and lobed. Consistence doughy. Colour grey or brown. Surface very smooth, puckered here and there, presenting under the microscope a thin layer of small epithelial cells, covering a soft fibro-reticulated structure, whose interstices represent the subdermal cavities. Pores in the epithelial layer over the interstices. Vents single, here and there on the smooth parts and in the puckered depressions respectively. Structure (as seen in the vertical section) commencing from the outside with the thin layer of epithelium, followed by the soft reticulated structure, into whose interstices the pores open, and then the body-substance, more or less traversed by lacunæ and the canals of the excretory systems, whose forms, whether vertical and crevice-like or oblique and transverse, are influenced by the line of section, surrounded more or less radiatingly by aggregations of ampullaceous sacs, which are subglobular or pyriform. Size of specimens, of which there are several, as variable as their form, but not more than 2 inches in their longest diameter.

Obs. It will therefore be observed that the plan of structure is the same as that of all other sponges. How the particles of nourishment which pass in with the water through the pores are subsequently conveyed to the ampullaceous sacs remains to be shown.

Halisarca ascidiarum.

Incrusting, growing over the surface of sessile as well as stalked Ascidians, more especially over *Boltenia*, seldom more than 1-12th in. in thickness, and presenting a creno-tuberculated or mesenteric form of surface corresponding to that of the subjacent cartilaginous test, but not of the stem, where it is even still more creno-tuberculated, while the stem remains smooth, so that it is probably the form assumed by the *Halisarca* itself. Consistence yielding, like that of soft dough. Colour pinkish or brownish white. Surface very smooth, presenting under the microscope a thin layer of small epithelial cells, covering a soft homogeneous fibro-reticulation, whose interstices represent the subdermal cavities. Pores in the

epithelium covering the interstices. Vents not seen. Structure generally compact, and the parts mentioned in *H. australiensis* so indistinctly and delicately developed that, although evident, I have not been able to make a vertical section in which the forms of the ampullaceous sacs could be satisfactorily seen; still the form, if not identical, appears to be but a variety of *H. australiensis*, chiefly dependent on its habit for its differences. The "creno-tuberculated" state may be an exaggerated form of the puckerings on the surface of this kind of sponge generally.

Halisarca reticulata.

Enveloping with a thin layer the calcareous fronds of Reteporian and Escharidian Polyzoa, uniting through the interstices of the former; varying in thickness under 3-24ths in. Consistence exceedingly tough. Colour whitish grey. Surface smooth, presenting a tough fibro-reticulated structure, with more or less *round* interstices, covered by a thin epithelial layer. Pores in the interstices. Vents here and there indicated in their position by the centres respectively of substellate, branching, superficial, excretory canal-systems in the form of venations, which are seen just below the epithelium. Structure essentially fibrillous throughout, commencing (in the vertical section) with the thin epithelial layer, followed by the fibro-reticulated one, whose tough fibrillæ extending inwards are accompanied by the usual subglobular form of ampullaceous sacs, succeeded in one specimen by the development of small ova, each furnished with a germinal vesicle and its nucleolus or germinal spot, and about 8-6000ths in. in diameter. These are situated in juxtaposition in the midst of a tough fibrillous trama, but each separate and provided with a cell-cavity, which, on being scratched out from the general mass, comes away with the ovum inside it, while the surface of the "cell-cavity" is fringed with filaments which appear to have been in connexion with the fibrillæ of the trama. Size of specimen indefinite, following that of the fronds of the Polyzoon on which it may be growing. There are three large specimens of this species, viz. one from "Port Phillip Heads" and the other two from "Port Western," all growing on the same kind of Polyzoa, and all presenting the same characters, which, from the strongly marked and tough retiform fibre-structure of the surface, has been designated "*reticulata*." It is totally different from either of the foregoing forms in this respect and from every other species of this order that I have seen, so that I am in doubt whether it

should not be made the type of a new genus, in which case the generic name would have to be changed.

There is still another species among the specimens from "Port Western," which may be characterized under the following name:—

Halisarca tessellata.

In every respect this is like the brown-coloured specimens of *H. australiensis* from the same locality; but the surface presents a fibro-reticulated arrangement, in which the interstices are characteristically *polygonal*, although variable in size and number of sides. The margin (in the vertical section) presents a uniform succession of translucent separated spaces, which correspond with the vertically cut ends of the dermal fibro-reticulation, and the ampullaceous sacs are almost *linear* in form, that is ten times longer than they are broad.

Besides the difference in consistence generally the dermal fibro-reticulation, although like that of *H. reticulata*, is not accompanied by *circular* or elliptical interstices, as in the latter, but by polygonal ones, as above stated. The succession of transparent spaces in the vertical section of the margin is more uniform, and the ampullaceous sacs are *linear*, and not subglobular or pyriform.

Notwithstanding this difference in the form of the ampullaceous sacs, some of the latter, when viewed in the vertical section of the *other* species, occasionally appear to be much more narrow than the rest, hence considerably resembling the form of those in *H. tessellata*. This, however, it should be remembered may depend on the line of section, which, if passing through the *short* diameter of a compressed pyriform ampullaceous sac, would give the *linear* form. Hence it, with many more questions of a like nature, in all these species should be worked out more satisfactorily, since in this necessarily hasty sketch I am only able to direct attention to the existence in the localities mentioned of species of the Carnosa, to which it is desirable to give more extended examination.

All the structure of *Halisarca australiensis* may be seen in *Halisarca Dujardini* when the latter is fresh, only being more delicate it is not so strongly marked, in short not so strongly developed, in the British species; and if *H. lobularis* were covered with a cortical layer it would, in like manner, present the same appearance, for the most remarkable part of this sponge is its *active ciliated surface.*

Here I might add that the species of *Halisarca* described

and illustrated by Merejkowsky under the name of "*H. Schulzii*" (Mém. Acad. Sc. St. Pétersb. 1878, tome xxvi. no. 7, pl. i. figs. 1–6, and pl. ii. figs. 9–15) appears to me to be no other than *Halisarca Dujardini*, which is as abundant on the rocks and *Fuci* at Budleigh-Salterton (S. Devon) at "half-tides" as in the "White Sea."

In 1874 I gathered some branches of the small *Fuci* here bearing specimens of this sponge, and put them at once, that is on the spot, into some sea-water containing indigo paint in solution, in order to see if the sponges took in the latter, which was the case; so I placed the whole in spirit for preservation. Now (in 1886), finding that Merejkowsky had discovered certain "glands" in his species (*l. c.* p. 32, pl. ii. fig. 9 *b*), and conceiving that it was the same as *H. Dujardini*, I gently raised one of the specimens (about 1-12th in. in diameter) from the frond of the *Fucus* to which I have alluded, and placing it in a microscope-cell filled with *glycerine*, brought it under a magnifying-power of about 300 diameters, when, to my great delight, I saw the cells which Merejkowsky had described and represented, particularly as he has stated, viz. about the "osculum" (p. 33), which, projecting from one side of the object, is in a very favourable position for observations of this kind, that is by transmitted light. Moreover, as the spongozoa had become coloured by the indigo, while not a particle was to be seen in these bodies, termed by Merejkowsky "glands," it is evident that the latter at least are not for *nutrient* purposes.

After this I stripped off a bit of the dermis from one of Mr. Wilson's specimens of *Halisarca australiensis*, and having stained it with blue ink, also mounted this in a "cell" with *glycerine*, when a similar layer of bodies became equally evident, *mutatis mutandis* of course, that is with more strongly marked fibrous structure than in *H. Dujardini*, so that the difference between the two was rather quantitative than qualitative, as before explained.

Similar bodies in his *Dendrilla rosea* &c., from the south coast of Australia, were described and represented by Dr. v. Lendenfeld in 1883 (Zeitschrift f. wiss. Zoologie, Bd. xxxviii. p. 278, pl. xii. fig. 21 *d*), and by Dr. Polèjaeff in 1884 ('Challenger' Reports, vol. xi. pt. xxxi. Keratozoa, p. 40, pl. ii. fig. 5), in *Ianthella*, &c. So that the existence of these organs is well established and probably their function, that which Merejkowsky originally assigned to them, viz. "unicellular glands," which secrete the "viscous" matter of the surface (*l. c.* p. 34).

Lastly I would allude to the following variety of *Halisarca australiensis* in Mr. Wilson's collection from "Port Western," which might be designated

Halisarca australiensis, var. *arenacea.*

It is much lighter in colour than the rest, owing probably to the presence of quartz-sand, with which it is abundantly charged, thus affording another instance of what occurs in *Gummina gliricauda*, Sdt., &c., whose consistence, viz. that of soft caoutchouc or india-rubber, is similar to that of *Halisarca australiensis* (see my paper on the CARNOSA, *op. et loc. cit.* p. 248, respecting this sand in the Halisarcida).

Chondrilla nucula, Sdt.

I have already alluded to the specimen of this species which came from "Port Phillip Heads" ('Annals,' *l.c.*), in the description of which, however, the size of the globostellate spicules, which I now find to average 4-6000ths in. in diameter, is not mentioned. This is the size also of the globostellates in two other specimens from "Port Western," one of which, growing upon and half imbedding large fragments of mussel-shells, is $4\frac{1}{2}$ in. long by $1\frac{1}{2}$ in. in diameter more or less, being irregularly cylindrical in shape, and bearing the usual minute papillæ charged with globostellates on its surface; varying in size under 1-160th in. in diameter, and about the same distance apart.

Chondrilla secunda, Lendenfeld.

Chondrilla secunda, Lendenfeld, Proc. Linn. Soc. N. S. Wales, vol. x. pt. i. p. 151, figs. 10–12.

Specimen flat or only slightly convex; sessile throughout; growing on the calcareous test of a Polyzoon. Colour light yellowish brown. Surface even, smooth, like glass, minutely granulated. Pores plentifully scattered over the surface. Vent single, situated towards one end of the specimen. Structure internally consisting of a brownish, pulpy, elastic tissue, surrounded by a thick, rigid, cartilaginous cortex, through which (in the vertical section) the pores may be seen to descend, increasing in size towards the usual interlobular lacunose crevices of the body. Spicule of one kind only, viz. globostellate, of different sizes under 18-6000ths in. in diameter, whose spines may be sharp-pointed or obtuse. Chiefly aggregated towards the surface, where, together with a great number of pigment-cells, they respectively add to the consist-

ence and dark colour of the cortex produced by the latter. Size of specimen 11-12ths × 7-12ths in. horizontally and 4-12ths in. high in the centre.

Loc. Port Western.

Obs. To this variety of *Chondrilla nucula* Dr. v. Lendenfeld has given the above name. My specimen does not appear to contain the smaller stelliform spicules which he has represented (*l. c.*).

Chondrilla papillata, Lend.

Chondrilla papillata, Lend. *op. et loc. cit.* p. 153, figs. 13–16.

Specimen irregularly elliptical, flattish, convex, contracted towards the base, which had been attached to the calcareous test of a Polyzoon. Colour greenish or greyish stone. Surface papillated over the upper part, becoming smooth beneath; papillæ hemispherical, in strong relief, in juxtaposition, and averaging 1-66th in. in diameter at the base, smooth and slippery, but minutely granulated. Pores on the surface, not well seen. Vents three in number, situated respectively in the deep, puckered, crevice-like depressions usually present, as before stated, on the surface of such sponges, the largest presenting at the bottom a cribriform structure that represents the openings of several excretory canals which empty themselves at this point. Structure internally consisting of a thick rigid cortex, about 1-48th in. in diameter including the papillæ, surrounding a lighter-coloured, elastic, pulpy tissue, presenting the usual crevice-like lacunose vacuities, decreasing in size towards the circumference, where they become subdivided and thus end in the pores. Spicule of one form only, viz. globostellate, in which the spines are pointed, globostellate, comparatively small, averaging 4-6000ths in. in diameter; chiefly congregated in the papillæ, where they form the granulated surface, and, together with an abundance of pigmental cells, add respectively to the consistence and colour of the cortex. Size of specimen about 4-12ths × 7-12ths in. horizontally, and 4-12ths in. high.

Loc. Port Western.

Obs. In this specimen also I did not see any of the stelliform spicules represented by Dr. v. Lendenfeld, although there can be no doubt that it is the same species as that which he has described and illustrated under the above name.

As regards the diameter of the "globostellates" in different species of *Chondrilla*, I find that in *C. nucula*, Sdt., it is 7-6000ths; in *C. australiensis*, Cart., 7-6000ths; in the

specimens of *C. nucula* from "Port Phillip Heads" &c. 4-6000ths; in *C. secunda*, Lend., 18-6000ths; in *C. sacciformis*, Cart. (Mauritius), 27-6000ths; and in *C. papillata*, Lend., 4-6000ths.

I omitted to mention that in all the *Chondrillæ* there appears to be a horizontal, more or less interrupted cavity traversed by filaments between the cortex and the body, like the subdermal cavities of sponges generally, which not only marks the division between the two, where they are easily separable, but into which the pores empty themselves before their contents are continued on to the interior of the body.

Such a line of demarcation does not appear in the varieties of *Halisarca* above mentioned.

Order II. CERATINA.

Having also in my descriptions of the Australian species in this order, which have been already published, omitted to premise, for more convenient reference, the classificatory arrangement of 1875, it is herewith supplied as tabulated at p. 188 (*op. et loc. cit.*).

Fam. 1. **Luffarida.**

2. **Aplysinida.**

3. **Pseudoceratida.**

For the characters of these "families" respectively I must refer the reader to p. 134 &c. (*l. c.*), where they are given *in extenso*; while I take this opportunity of briefly stating whence the names of the first and second families here have been derived.

In 1794 Esper described and illustrated a species named "*Spongia fistularis*" ('Pflanzenthiere,' vol. ii. tab. 21 *a*), which, in 1816, Lamarck identified with one of the same kind in his "Cabinet" (Anim. sans Vertèbres, tome ii. p. 367); and in 1845, Bowerbank changed the generic name of "*Spongia*" to "*Verongia*" (in honour of Dr. Veronge, who sent the specimen to him), adding the following diagnosis of its fibre, accompanied by equally good illustrations, viz. :—

"Skeleton composed of a network of keratose fibres inosculating in every direction without order. Fibre cylindrical, continuously fistular, without spicula. Cavity of the fibre simple" ('Annals,' vol. xvi. p. 403, pl. xiii. fig. 7), whereby Esper's "*Spongia fistularis*" became *Verongia fistularis*, Bowerbank.

Meanwhile, in 1833, Nardo, in his classification of the

Sponges generally, had made a genus under the name of "*Aplysia*," which, in 1834, he altered into "*Aplysina*;" and, further, divided into two "subgenera," which were respectively characterized by the possession of "flaccid" (*fibris flaccidis*) and "more rigid" (*rigiditatis majoris*) fibres (Isis, Spong. Classificatio), thus establishing structurally their most striking differences, as I can testify by possessing specimens of *Spongia fistularis*, Lam., and *Aplysina*, Sdt., respectively from Nardo's neighbourhood, that is the Mediterranean. Hence it may be inferred that Nardo was acquainted with both forms when he laid down their characters respectively (Venice, 1834). In short, this is certain as regards *Spongia fistularis*, for Ehlers, in 1870, identified Nardo's type specimen in the Museum at Erlangen with "*Verongia fistularis*," Bk. (Esperschen Spongien &c.).

In 1864, De Fonbressin and Michelotti made a "tribe" of the "more rigid" of these sponges under the name of "Spong. Homogenæ," wherein they were classed under one genus named "*Luffaria*" (Spongiaires de la Mer Caraïbe, p. 58); while Schmidt, in 1870, pointed out, by description and illustration, that which Nardo had done in 1834, only in different terms, viz. the distinction between *Spongia fistularis* and *Aplysina* (Atlantisch. Spongienf. p. 30, Taf. iii. figs. 15 and 16, respectively), accepting at the same time De Fonbressin and Michelotti's name of "*Luffaria*" for the former.

It therefore seems evident that Nardo's first subgenus, viz. "*Aplysinæ spongeliæ*," constitute my "Aplysinida;" and that his second subgenus, viz. "*Aplysinæ velariæ*," = *Spongia fistularis*, Esper (altered generically to "*Verongia*" by Bowerbank, and subsequently, without any allusion to the latter, by De Fonbressin and Michelotti to "*Luffaria*," which term was accepted by Schmidt also without any allusion to Bowerbank's name), forms my "Luffarida."

Hence, in matter of nomenclatural precedence and custom I should have used the term "Verongida" for the family, but having unconsciously adopted that of "Luffarida" after Schmidt for such sponges, in my classification, "*Verongia*," as originally instituted, must now come in as a genus illustrated by "*Verongia fistularis*," as typical of the "Luffarida," unless hereafter it may be considered proper to discharge the latter altogether. It is not necessary that a family name should be based upon that of any particular genus in that family, if upon any at all, for many genera may be formed upon single species by different people and under different names, which finally some one may consider it desirable to place in one family under his own name.

But to return to the more legitimate object of this communication, it may be stated that, in 1881, I published a paper on the "CERATINA," in which some new species were described and illustrated, together with observations on the development of the "fibre" ('Annals,' vol. viii. pp. 101 and 113, respectively, pl. ix.); and in 1882 other species from the West Indies were added (*ib.* vol. ix. p. 268 &c.). Since which nothing occurred to cause me to return to the subject until the arrival of Mr. Wilson's sponges from "Port Phillip Heads" in 1885, to the descriptions of which I have now to add the following supplement.

Dendrilla rosea, Lendenfeld, var. *digitata*, Cart.

With reference to the specimen which I described in 1885, under the name of "*Luffaria digitata*" ('Annals,' vol. xv. p. 201), I now find on reexamination of it, aided by Dr. R. v. Lendenfeld's valuable description and illustrations (Zeitschrift f. wiss. Zoologie, Bd. xxxviii. p. 271, Taf. x. figs. 3 and 4, a copy of which he kindly sent me), that it is not a "*Luffaria*," but an "*Aplysina*" (following Schmidt's distinctive characters); still, the designation "*digitata*" applies to my form, which is that with which, through Mr. Wilson's specimens, I am most familiar, better than to that of Dr. Lendenfeld's typical illustration, although they both present the same dendritic, *un*anastomosing character of the fibrous skeleton, of which therefore mine can only be considered a variety, as above designated.

Nothing can be more striking than the differences in structure of the Luffarida and the Aplysinida (which certainly I overlooked in the present instance), inasmuch as the fibre of the former is unyielding and almost wiry in consistence, both wet and dry, with a continuous, anastomosing, central, tubiform core; while in the latter it is more or less flaccid with an *un*anatomosing core. The course of the core, too, in Luffarida is uniform, while in the Aplysinida it is interrupted transversely by parabolical lines of growth, which apparently is an unfailing sign of the fibre.

Of the Luffarida there is an abundance of specimens in the British Museum, viz. tubular and cylindrical, branched and solid respectively, many of which are very large, *ex. gr.* the specimen from the Gulf of Honduras, described under the name of "*Luffaria Archeri*" by Mr. Th. H. Higgin, F.L.S. ('Annals,' 1875, vol. xvi. p. 223), which is a curved trumpet-shaped tube, 3 ft. 9 in. long, and 5 in. in diameter at the free end. Most of these specimens come from the West Indies, but there are others in the collection which were purchased

from the executors of the late Dr. Bowerbank, labelled "S. Australia," and also one in spirit from the island of Crete, in the Levant, which was obtained and presented to the Museum by Admiral Spratt, who surveyed this island. But of the Aplysinida there are very few specimens indeed, perhaps because the flaccidity of their skeletons, when dry, gives them such a worthless aspect.

Thinking that Prof. A. Hyatt's "Dendrospongia" might be very nearly allied to *Dendrilla rosea*, if not the same, I sent him the skeleton of a digitated macerated specimen for comparison, and received from him in reply the following, viz., "*Dendrilla* is quite different from *Dendrospongia*; the latter never has a trunk of fibres;" together with a type specimen of the latter confirmative of his statement.

The keratose skeleton of the specimen which I described in 1885 (*l. c.*) is 9 in. high, and of a light brown-amber colour, commencing from a root-like expansion of individual fibres which become gathered together spirally into a short stem nearly as broad as it is long, viz. 7-12ths in., which then divides into several long branches that go on dividing and diminishing in size tree-like, without anastomosing, to the ultimate ends of the filaments that appear at the circumference of the digitations, where the latter often project through the surface, but in their natural state simply elevate into conical points the pink flesh-like fibro-reticulate dermal sarcode with which they are naturally covered; maintaining throughout such a degree of resiliency, toughness, and flexibility that the whole specimen can be squeezed into a large bottle through a narrow neck and taken out repeatedly without breaking.

Besides the specimens of *Dendrilla rosea* there are others in Mr. Wilson's collection from "Port Western" whose skeletons in structure are quite the reverse, as may be seen from the following description of one which, for distinction sake, may be provisionally termed

Aplysina cæspitosa.

Cæspitose, consisting of a great number of short erect branches interuniting in their course upwards from the base to the circumference, so as to form a hemispherical or convex general mass of a pinkish colour. Surface presenting a soft, fleshy, fibro-reticulation like that of *Dendrilla rosea*. Pore-areas occupying the interstices of the reticulation. Vents scattered here and there. Structure sarcodic and fibrous, the former less firm in consistence than that of *Dendrilla rosea*, therefore shrinking up to almost nothing on desiccation; the latter also

commensurately thin and flaccid, although still resilient; consisting of main and lateral branches, the main ones pursuing an irregular course towards the surface without anastomosing, and the lateral ones uniting the main filaments together ladder-like, or through an intervening anastomotic reticulation of their own, whose filaments are fixed to the surface of the main fibre, with the central cavity of which, however, that of the filaments does not communicate. Colour dark amber. The whole, on desiccation, collapsing, from the thinness of the walls, into a flimsy, resilient, skeletal structure. Size of specimens, of which there are two, about 4 in. high by 6 in. in horizontal diameter.

Loc. Port Western.

Obs. The fibre of this species is invaded by a branched reticulated fungus, which traverses its central cavity, and thus renders it identical with Bowerbank's representation of the fibre of his genus "*Auliskia*" ('Annals,' 1845, vol. xvi. p. 405, pl. xiii. fig. 1), in which his "cæcoid canals" are nothing more than the branches of a fungus or a "parasitic alga," as Schmidt has stated long ago (Spongien d. adriat. Meeres, 2nd Suppl. p. 10). It is somewhat curious that of the four genera created by Bowerbank in this paper (*l. c.* p. 400 &c.), viz. *Verongia*, *Auliskia*, *Stematumenia*, and *Cartilospongia*, one only, viz. the first, should be tenable, since "*Auliskia*" is characterized by a parasitic fungus; "*Stematumenia*" also by the presence of a parasite, viz. *Spongiophaga communis*, Cart.; and "*Cartilospongia*," based on the structure of bone in the "body" of a vertebra from a young whale, which may be seen among his specimens now in the British Museum. It is extraordinary that a man of such extensive microscopic experience did not see in his illustrations of the latter (*l. c.* pl. xiv. fig. 6 &c.) the "oat-shaped cavities," the "lacunæ," and the "canaliculi" of osseous structure. Indeed the odour of the specimen when I made a section of it was, without anything else, sufficient to convince me of its nature.

There is another specimen which again, for distinction sake, might be provisionally designated "*massa*," on account of its slightly lobate massive form. I say "provisionally," because there appears to me to be a great variety of Aplysinoid growths in the neighbourhood of "Port Phillip Heads," which possibly (if altogether considered on the spot where they can be easily obtained, as they should be) might be found to be derived from only one or two species. These varieties do not appear to me to be so much in the soft parts as in the colour and structure of the keratose skeleton. Thus in *Aplysina massa* the colour of the fleshy part is dark grey and the

skeletal fibre light brown, as will be seen by the following description; while, as I have before stated, in identical specimens of what I now know to be *Dendrilla rosea* it may be flesh-coloured and grey or colourless respectively.

Aplysina massa.

Massive, slightly lobate, sessile, contracted towards the base. Colour mouse- or dark grey. Surface even, presenting the usual dermal, soft, fibro-reticulation raised into conical points by the ends of the dermal filaments of the subjacent keratose fibre. Pore-areas in the interstices of the reticulation. Vents scattered here and there. Structure fleshy, supported on keratose fibre. Fleshy part more or less cancellated by the canals of the excretory systems; traversed perpendicularly from the circumference by large inhalant "fold-bearing" canals (that is, canals surfaced by transverse folds or sharp ridges of the lining membrane, which, partially encircling the canal in segments of a circle, thus intercross each other's terminations longitudinally like the "*valvulæ conniventes*" of the small intestine), which commence immediately under the cribriform pore-structure of the surface apparently without the intervention of subdermal cavities; hence the situation of their mouths respectively may be seen from the outside, as their dark circular areas loom through the cribriform structure: keratose fibre aplysinoid, of a light-brown colour corresponding with that of the flesh; consisting of large and small filaments, the former arising *singly* in a plurality of points and pursuing an unbranched, *i. e.* undivided, course to their termination, in an attenuated form respectively on the surface; the latter branching off from the former, but not by *division* of the central canal of the larger fibre, as will now be explained.

Having macerated a large portion of this specimen in water, so as to rid the keratose skeleton of all *soft* parts, the skeletal structure was placed between two pieces of glass, with sufficient water to fill up all the vacuities, in which condition it was examined under a low microscopic power, and the apparent branches found to be not divisions of the large fibres, but *additions* to their surfaces respectively, formed by the development of the "horn-cells" of the sarcode thus applied to them. I have already described and illustrated the "horn-cell" and this mode of growth in *Aplysina corneostellata* = *Darwinella* ('Annals,' 1872, vol. x. p. 107, pl. vii. figs. 4 and 5), and in the present instance they were observed to be in great plurality, attached to the outside of the larger fibres,

in all stages of development, viz. from that of simple approximation, followed by a covering composed of several layers of kerasine, to that which afterwards became similarly extended into the usual laminated filament. So that it may fairly be assumed that the first-formed fibres of the skeletal structures throughout originated in this way, viz. from the "horn-cells" attached to the object on which the specimen grew. Size of specimen about 3 in. high by 3 × 2 in. horizontally.

Loc. Port Western.

Obs. There is another specimen of this kind in which the skeleton appears to be more reticulate but formed after the same plan, viz. by "horn-cells" applied to the exterior of the main filaments, and, indeed, so might the skeletal fibres of *Dendrilla rosea* at the commencement, although gathered together afterwards spirally from the root-like expansion into a common trunk; but they do not do so above this, for in the divisions of the *branchlets*, when placed under the microscope, the latter may be seen to arise from a budding-off of the central canal, although the subsequent thickness of the fibre appears to be added by layers of kerasine applied to the exterior, that is by the sarcode, as in *Aplysina massa*.

In *Aplysina massa* too the same kind of large nucleated epithelial cells of the surface, averaging 5-6000ths in. in diameter, are to be found as in *Dendrilla rosea* &c., but accompanied by much smaller granuliferous ones, about 2-6000ths in. in diameter, that appear to be endogenously derived from them, and which, in the blood-red species about to be described, viz. *Aplysina cruor*, are seen to be the pigment-cells or bearers of the red colouring-matter of this species, all of which *first* present themselves as *coloured* granules in the large epithelial cells.

Lastly, the fibre of this species is *also* traversed by a parasite in the form of a branched fungus, which gives it the appearance of Bowerbank's imaginary genus *Auliskia*. The filaments, too, of this organism are often fructiferous.

Aplysina nævus, Carter.

Aplysina nævus, Carter, 'Annals,' 1876, vol. xviii. p. 229, pl. xii. figs. 1 *c* and 2.

Growing over both valves of a large mussel in an incrusting form. Consistence soft. Colour, when fresh, "coffee-brown." Surface presenting the usual soft fibro-reticulated structure, here charged with a few fine, foreign, acerate spicules and supported on the ends of short, skeletal, keratose filaments, arranged vertically, so as to raise the reticulated structure

into monticular elevations or conuli; filaments respectively fixed to the shell by an expanded base and for the most part unbranched, that is ending by a *single* point, which may or may not project beyond the dermis; presenting the usual aplysinoid structure, and the whole about 3-24ths in. long. Pore-areas in the interstices of the dermal reticulation. Vents not seen. Flesh densely charged with the parasitic cell which I have named "*Palmella spongiarum*" ('Annals,' 1878, vol. ii. p. 165). Incrustation about 2-12ths in. thick, diminishing towards the circumference. Diameter of parasitic cell 1–1½-6000th in.

Loc. Port Phillip Heads.

Obs. This seems to me to be only a variety of my *A. nœvus* (*l. c.*), in which the dermal sarcode is much less charged with foreign material than in *A. nœvus*.

As it is almost entirely composed of the parasitic cell above mentioned, the soft structures of the body are almost as entirely obscured by it, which is the case also with one of the specimens of the calcareous sponge called *Teichonella prolifera*, to whose description I must refer the reader for a more detailed notice of it ('Annals,' 1886, vol. xviii. p. 147).

Aplysina cruor.

Massive, growing over the valve of a *Pecten*, supported on erect keratose filaments, based respectively on the shell and subdividing twice or thrice towards the surface into several short branches; covered by the usual soft fibro-reticulated dermis, which possesses an opaque *blood-red colour*. Colour produced by the presence of small oval, granuliferous cells, about 2½-6000ths in. in their longest diameter, filling the triangular spaces left by the juxtaposition of large, circular, nucleated, flat, epithelial cells, about 6-6000ths in. in diameter, which form a layer over the fibro-reticulated structure of the surface and from which the smaller pigmental cells are endogenously derived. Pores in the interstices of the dermal reticulation. Vents here and there. Internal structure consisting of fleshy sarcode supported on erect filaments of keratose fibre; filament expanded at the base, more or less branched, as above stated, about half an inch long. Size of specimen about 2 in. square and ½ in. thick.

Loc. Port Western.

Obs. The keratose filaments of this specimen also are remarkable for the presence of a minute branched filamentous alga, composed of concatenated cells, which appears to have entered by the base.

Pseudoceratida.

Pseudoceratina typica, n. sp. (dry).

Flabelliform, circular, thick, stipitate; stem cylindrical, expanding into a circular compressed head above and into a root-like disk of attachment below. Consistence now, in the dried state, crisp and wiry, from the hardened state of the keratose fibre. Colour clear amber-brown. Surface of dermal sarcode originally covered by a reticulated layer composed of white sand, being the originally soft, fleshy, reticulated structure charged with this material. Pores in the interstices of the reticulation. Vents scattered over the surface irregularly. Structure looking like that of the main fibre of a *Psammonematous* keratose skeleton overrun by one of a *Luffaria*; the latter, which is much smaller in diameter than the former and represents the so-called "secondary fibre," interuniting the psammoniferous branches, and present generally, to such a degree in the stem as to almost conceal the psammonematous part of the skeleton; hard, cylindrical, and, from desiccation, crisp now, presenting a transparent amber-colour, traversed continuously and uniformly by an opaque, white, homogeneous, cylindrical core, in short genuine *Luffarid* fibre. Size of specimen:—total length 9 in., of which the head is $5\frac{1}{2}$ high by $7\frac{1}{2} \times 1\frac{3}{4}$ in. horizontally; stem $3\frac{1}{2}$ in. long by $\frac{3}{4}$ in. in diameter in the middle, rather compressed.

Loc. Port Western.

Obs. This specimen is preeminently typical of the family Pseudoceratida, hence its designation. Nothing can be more marked or more distinct than the two kinds of fibre of which it is composed, viz. the Psammonematous and the Luffarid, each being genuine of its kind.

Before leaving the order Ceratina it may be as well to allude again to the comparatively large, more or less flat, circular or oval, nucleated, epithelial cells, with sharply-defined cell-wall, which form a layer over the soft, fleshy, fibro-reticulated, dermal structure that especially characterizes the surface of the *Aplysinæ*. Such cells I described and illustrated in two "Pachytragous" sponges from this place in 1871 ('Annals,' vol. vii. pp. 4 &c. pl. iv. figs. 6 and 14), viz. *Dercitus niger* and *Stelletta aspera*, pointing out that in the former they constitute a "cortical layer" of several cells deep in which they are held together by a soft fibro-reticulated structure or "sarcodal trama," that extends more or less into "the mouths

of the larger oscules" (*l. c.* p. 4); also that the same kind of cells are arranged "on the surface" of *Stelletta aspera* "in a tessellated manner" in "distinct cavities" of the same kind of sarcodal trama or fibrillous structure as in *Dercitus niger*, while such cells were not only to be found on the surface, but also "scattered throughout the sponge generally" (probably in connexion with the epithelial lining of the excretory canals), together with here and there a cell charged with black granules, also precisely like those of *Dercitus niger* (*ib.* p. 7). Thus it was observed that the material of the dark pigment was seated in the "granules" themselves, that is little cellulæ, although not always making itself visible.

Unfortunately a typographical error occurs here which causes the measurement of these cells to appear as "1-170th of an inch" in diameter, instead of 1-750th or 8-6000ths, which it ought to have been; thus they are a little larger than those of *Dendrilla rosea*, which, according to my measuring, vary under 6-6000ths, as will more particularly appear hereafter.

Schulze alludes to a layer of these cells in *Aplysina ærophoba* under the term "ectoderm" (Zeitschrift f. wiss. Zoologie, Bd. xxx. p. 392), and Lendenfeld does the same under the name of "Plattenepithel" in *Dendrilla rosea* (*ib.* Bd. xxxviii. p. 281, Taf. xii. fig. 19 E *c*), while Polèjaeff has given a representation of them in his *Cacospongia vesiculifera*, adding that they are "not dissimilar to the renowned and still debatable 'Schleimzellen' of Mollusca, as Dr. Fleming has drawn them, and thoroughly identical with the vesicular cells of many Desmacidonidæ undescribed hitherto, but undoubtedly very well known to every spongologist who has had to deal with the representatives of the family [Spongelidæ] just mentioned" ('Challenger' Reports, 1884, Keratozoa, p. 59 of separate copy).

In some fragments of the soft, fibro-reticulated, dermal structure of a specimen of *Dendrilla rosea* which had fallen off from the skeleton during maceration, the circular cavities *alone* occupied by some of these cells remained, even after portions had been stained, dried, and mounted in balsam, so that it became perfectly evident that they had been imbedded in the fibre of the fibro-reticulated structure of the surface in *distinct* compartments similarly to those above mentioned which exist in a similar tissue in *Dercitus niger*; so that these epithelial cells do not always appear to be confined to a simple lamina.

I have already stated that their granules in *Dercitus niger* bear the black-brown colouring-matter of this sponge,

and that in *Aplysina cruor* they appear outside the cells, from which they seem to have been endogenously derived, in the form of minute granuliferous cellulæ about 1–2-6000ths in. in diameter, still bearing the red colouring-matter of this species. Moreover, in some instances, where somewhat enlarged, they present a nucleus surrounded by minute granules, and in this condition, losing for a time their pigmental character, seem to pass gradually into the largest form of the parents, the epithelial cells beside them; hence my allusion to these particulars where I have above stated that in *Dendrilla rosea* the size of the epithelial cell "varies under 6-6000ths of an inch." So that, by a repetition of this process, the epithelial cells and the pigmental granules are thus continually renewed.

That one function of the epithelial cell is to produce the colouring-matter there can be no doubt; neither can there be any doubt that it does not always perform this function, for in *Aplysina massa*, as above stated, there is with the same kind of epithelial cell no colouring-matter at all. Again, it is not uncommon to find the upper and more exposed portions of a sponge black (where this is the colour), while the lower and more shaded ones are colourless, ex. gr. *Spongia officinalis*, auctt. (see 'Annals' of 1882, vol. ix. p. 272), wherein also the black colour extends for a short distance into the external openings (oscules) of the large excretory canals.

It therefore may be possible (for Nature has always an unlimited number of resources) that they also possess the power of the "Schleimzellen" in Mollusca, as above noticed.

In some sponges, as in Mr. Wilson's Australian one, viz. *Axinella atropurpurea*, already described ('Annals,' 1885, vol. xvi. p. 359), such cells, bearing the colouring-granules, are dispersed generally throughout the mass, where I have before suggested they may still be connected with the lining membrane of excretory canals, although they do not present the flattened form of those on the surface; while in *Suberites Wilsoni*, the great carmine-coloured sponge of South Australia brought to my notice by Mr. Bracebridge Wilson, after whom I have named it, the colouring-matter appears to be diffuse, since I have never been able to find it in granules (*i. e.* the cellulæ of larger cells).

Lastly, I would observe that when the skin of an *Aplysina* and the like sponges is stript off the surface it is found to consist essentially of two layers, the outermost of which is composed of epithelial cells and their pigmental granules (if any) set in transparent sarcode, rendered more or less generally

cribriform by the presence of the "pores" (how far this sarcode may belong to the epithelial cells individually, and thus being agglomerated possess a general motory power like that of an Amœba or Myxogaster (*Æthalium*), I am not prepared to say),—and the innermost layer of a soft fibro-reticulated structure, in which the fibre is composed of fibrillæ in the form of elongated, linear, (?) muscular cells. The pores are best seen over the interstices of the fibro-reticulated layer, as the light then passes directly through them, when the reticulated fibro-framework of *their* structure again appears to be composed of the "transparent sarcode" in which the epithelial cells are imbedded, rendered more or less opaque here and there by the presence of an epithelial cell or two, with other granular matter.

[To be continued.]

XXIX.—*Contributions to the Study of the Littoral Fauna of the Anglo-Norman Islands* (*Jersey, Guernsey, Herm, and Sark*). By Dr. R. Kœhler.

[Plate XI.]

[Continued from p. 243.]

JERSEY (*continued*).

Crustacea.

The class Crustacea is represented at Jersey by numerous individuals belonging to various species. It was to the Crustacea, which interested me from various points of view, that I paid attention more particularly during my visits to the Anglo-Norman islands. I shall speak here only of the Decapoda, Isopoda, and Amphipoda. The number of species that I can record amounts to 141; and it is to be remarked that this is nearly the number indicated by Delage in the list given by him of the Crustacea of Roscoff, namely 119.

Decapoda.

Stenorhynchus phalangium, Edw., and *tenuirostris*, Bell, occur very commonly among the rocks. A third and more

XXXVII.—*Supplement to the Descriptions of Mr. J. Bracebridge Wilson's Australian Sponges.* By H. J. Carter, F.R.S. &c.

[Plate X.]

[Continued from p. 290.]

Order III. PSAMMONEMATA.

Stelospongos, Sdt.

I have already gone into the history of this genus under the head of "*Stelospongus lævis*, Hyatt" ('Annals,' 1885, vol. xv. p. 303), and I should not have returned to the subject had I not found, on comparing the whole of the specimens in Mr. Wilson's several collections, that I had confused, in my description, two forms so very much alike externally that without many examples of each, and thus sufficient material for the destruction caused by sectioning, I should not have been able to contrast their characters satisfactorily for distinction. Let us now see what these are.

In *Stelospongus lævis* the keratose skeletal structure not only predominates in quantity over the sarcodic, but is peculiarly abundant, presenting in a vertical section of the dried and washed-out specimen a radio-floral arrangement of the main bundles of the fibre, by their curving upwards and outwards from the lower part of the axis to the circumference, being bound together on their way by a dense network of lateral or smaller fibre. In the other species, for which I propose the name of "*Stelospongus cribrocrusta*," it is the opposite, viz. the sarcodic greatly predominates over the keratose structure, which, on the other hand, is very scanty, presenting itself only under the form of a scattered fibro-reticulation, in which the meshes appear from their width to be almost absent in the centre, while they thicken by becoming smaller towards the circumference, and especially in the stem, where this structure is most required for general support.

In *Stelospongus lævis* the surface consists of a thin incrustation uniformly studded over with little tufts of fibres, which project beyond the dermal sarcode and are the circumferential terminations of the radiating bundles of the interior; these tufts may be separate, or, becoming compressed and extended laterally, so as to meet each other, may give rise to a poly-

gonal or honeycomb appearance on the surface. In *S. cribrocrusta* it consists of a thick incrustation of foreign material, which externally presents a polygonal lattice-like reticulation in slight relief, whose interstices in the perfect condition are diaphragmed with sieve-like pore-structure, which, in the worn state, is replaced by a single circular hole; while internally this crust is attached to the circumferential portion of the subjacent fibrous skeleton by a few straight, single, delicate filaments, which for the most part do not penetrate the crust sufficiently to appear on the surface; indeed, so slight is this attachment that on desiccation the crust cracks up, through partial collapse of the sarcodic interior, and thus separates itself from the filaments of the subjacent fibre.

In *Stelospongus lævis* the abundance of keratose skeletal fibre enables it under desiccation to retain its original form, while in *S. cribrocrusta* there is more or less corrugation and breaking-up of the crust, owing, as just stated, to the shrinking of the sarcode internally.

Thus the keratose fibro-skeletal structure of *S. cribrocrusta* is so delicate and so scanty that it could hardly sustain the wash of the sea-shore waves without going to pieces, while that of *S. lævis* is so firm and dense that the utmost washing of the waves could hardly destroy its structure; hence the latter has been found in great numbers on the South-Australian shores, as our museums and private collections testify; while I have never seen a specimen of *S. cribrocrusta* except in Mr. Wilson's collection, where the specimens were transferred from the dredge directly to a vessel containing methylated spirit and water for preservation.

The spirit-preserved specimen described and illustrated by Bowerbank under the name of "*Halispongia choanoides*," so named from its supposed identity with the fossil "*Choanites Kœnigii*" (Proc. Zool. Soc. 1872, p. 123, pl. vi.), seems to have been a variety of *S. cribrocrusta*; but if this should not be the case, the illustrations of the "keratose sponge" from South Australia, which he described from spirit-preserved specimens in the British Museum in 1841 ('Annals,' vol. vii. p. 129, pl. iii.), are so undoubtedly! and to those, especially that of the dermal crust in its "perfect state" (fig. 7), I would refer the reader, for it is, as Dr. Bowerbank has stated of all the rest, "beautifully and faithfully represented."

It is strange that, in his description of *Halispongia choanoides*, Bowerbank should have made no allusion to this "keratose sponge," which is so typical of *S. cribrocrusta* that had he proposed a name for it, I should not have had to introduce the one above mentioned; for the characters of

Stelospongus lævis and *S. cribrocrusta* are so remarkably different that the two cannot come under the same designation, while those of *Halispongia choanoides* and *Stelospongus cribrocrusta* are remarkably alike.

At the same time Dr. Bowerbank, in 1872 (*l. c.*), evidently connects *Halispongia choanoides* with *Stelospongus lævis*, when at p. 123 he says, "the skeletons of what are apparently various species of this genus are very common in collections from Australia," by which he probably meant those of *S. lævis*, to which I have alluded as being so durable that their skeletal structure survives the ordeal of the waves in which *S. cribrocrusta* would go to pieces.

Again, Hyatt states, with reference to the typical structure of the fibrous skeleton in "*Stelospongus*," viz. the radiating primary bundles (*op. et loc. cit.* p. 529), that "there are none of these, properly speaking, in some other species, but only closely connected sheets of parallel primary fibres; . . . these lead into the genus *Spongelia*, between which and this genus no definite and constant differences, applicable to all the species without reservation, have been found in the skeleton." How far this may apply to *S. cribrocrusta* I cannot say, for the other species of *Stelospongus* which I have described from "Port Phillip Heads" (*op. et loc. cit.*), viz. *S. flabelliformis*, *S. latus*, and provisionally *S. tuberculatus*, present respectively the crust of *S. cribrocrusta*, but with much more keratose fibre—especially *S. flabelliformis*, which, but for the difference in consistence, form, and structure of the fibre, might *externally*, on account of the crusts being so much alike, be viewed as a specimen of *Coscinoderma*; while, on the other hand, the density of the keratose structure and its sand-bearing fibre internally allies it to *Stelospongus lævis*.

Under these circumstances I shall give the following description of *Stelospongus cribrocrusta*, and leave others to form their opinion of it afterwards.

Stelospongus cribrocrusta, n. sp.

General form pear-shaped (the same as that of *S. lævis*). Colour grey. Surface even, composed of foreign material so arranged as to present a uniform polygonal reticulation in slight relief, whose interstices are diaphragmed by the pore-areas, which consist of a much smaller reticulation formed of sarcode, also charged with foreign material. Vents for the most part very large, single or in plurality, on the summit of the sponge, more or less projected on conical eminences of the general structure, or on a level with the arenaceous crust that extends up to their margin, which is not fringed but even.

Internal structure sarcodic, much more than kerato-fibrous, the latter consisting of a loosely reticulated fabric, whose interstices are so wide and the fibres so small and scanty in the centre of the sponge that it is hardly noticeable, thickening in structure and consistence towards the circumference, and especially in the stem. Fibre stiff, of a clear amber-colour and transparency, here and there cored with grains of quartz-sand, supporting on the circumference the crust above mentioned, which is very thick, consisting of a reticulated dermo-fibrous sarcodic structure, densely charged with foreign material, presenting *externally* the kind of "surface" above described, which is penetrated on the inner side by fine straight filaments of the skeletal fabric, the latter (still further in) supporting the sarcodic parenchyma, which is largely traversed by the canals of the excretory system that empty themselves into a cylindrical, central, cloacal, tubular cavity, which terminates in the single vent mentioned, or in plurality, when the vents also are more than one in number. Size variable, the largest specimen about 5 in. long, one third of which is stem; head 2 in. in its greatest diameter; stem, which expands upwards into the head and downwards into the root, $\frac{1}{2}$ in. in diameter in its narrowest part.

Loc. Port Phillip Heads and Port Western.

Obs. When a vertical section of this species is made the great cylindrical, cloacal canal of the centre, which in *Stelospongus lævis* is in the midst of dense fibrous keratose structure, is found to be in the midst of almost entirely parenchymatous sarcode, for the skeletal fibre here is so scanty that the greater part of the body appears to be composed of sarcode, so that in this matter alone *S. cribrocrusta* and *S. lævis* are totally different; yet it sometimes seems to me possible that they may be the extreme structures of the same form and genus respectively, hence the same generic name has been used for both.

Hircinia flagelliformis, n. sp. (dry).

Erect, cauliform, cylindrical, round, solid, long stems of different lengths, growing together and branching scantily from an expanded base of the same structure; round at the free end and decreasing in size backwards so gradually that one 28 in. long may be only $\frac{1}{2}$ in. in diameter at the base and $\frac{1}{4}$ in. at the other extremity. Consistence firm and stiff, especially when dry. Colour amber-brown. Surface uniformly presenting small conuli arranged in more or less broken sinuous lines intertympanized by homogeneous fine sarcode charged with small epithelial cells supported by the subjacent keratose

structure. Pores not seen. Vents numerous, scattered over the surface irregularly throughout the branch. Skeletal support consisting of densely reticulated, stiff, short-jointed fibre of two kinds, viz. sand-cored or main, whose branches end in the conuli on the surface, and transparent or lateral, interuniting the sand-cored filaments, the latter diminishing in size with the increase of the reticulation. Largest specimen, which consists of a group of twelve stalks of different lengths, varying from $2\frac{1}{2}$ to 28 in. in length and under $\frac{1}{2}$ in. in diameter, all growing up out of the same expanded base.

Loc. Port Western.

Obs. This species in form is very like that from the West Indies, which I have described under the name of "*Aplysina longissima*" ('Annals,' 1882, vol. ix. p. 271), whose structure and characters were so ill-defined, that at the time I was doubtful whether to call it an *Aplysina* or "*Hircinia*," so it is just possible that the two are the same. The soft fibro-reticulated dermal structure which characterizes most sponges of this kind in Mr. Wilson's collection is absent in *Hircinia flagelliformis*, in which, instead of being thick and opaque when dry, it is thin, transparent, and homogeneous.

Hircinia (*Spongelia*) *rectilinea*, Hyatt.

Hircinia (*Spongelia*) *rectilinea*, Hyatt, Revision of N. American Poriferæ, p. 537, pl. xvii. no. 13.

Vase-shaped, cylindrical, stipitate, rather everted at the brim, externally nodose and lumpy, internally even; stem smooth, rather compressed. Colour sponge-brown. Surface minutely conulated both externally and internally; conuli projecting through a soft, fleshy, fibro-reticulated, dermal structure, the interstices of which are occupied by the pore-areas, which are chiefly on the outside of the specimen. Vents circular, plentifully scattered over the inside, increasing in size towards the bottom of the cup, where there are two very large ones. Skeletal fibres sand-cored and transparent, the former main or primary, and the latter interuniting or secondary, producing together a reticulated structure which, on the outside of the vase, grows up into large, irregularly nodose or lumpy excrescences without any distinct form or arrangement, but on the inner side presents an even surface. Size of specimen:—Body 5 in. high by 3 in. in diameter; cup-like excavation about 2 in. deep and 4 in. in diameter across the brim.

Loc. Port Western.

Obs. This is so very like the form and description of Hyatt's

specimen, which came from the same neighbourhood, viz. "Phillip's Island," close to "Port Western," that I have given it his designation.

Besides these there are other massive specimens of *Hircinidæ* in Mr. Wilson's collection from Port Western, mostly small, which, but for the character of their keratose fibre, might be mistaken for colourless or grey *Aplysinæ*, since they present no particular shape, and, as I have before stated respecting the Aplysinidæ, much experience on the spot where an unlimited number of specimens can be obtained is necessary to reduce the whole here as well as elsewhere to their proper specific value, a task which the *great* number of species among the PSAMMONEMATA renders as important as at present it seems to be overwhelming.

Euspongia infundibuliformis, n. sp.

Vase-shaped or flabellate; infundibularly contracted towards the base where the stem has been truncated (probably by the dredge). Outer surface raised into thick, broken, subreticulate ridges, which radiate irregularly from the base to the circumference; inner surface even. Colour light brown. Surfaces (internal and external) uniformly covered with minutely conulated, sinuous ridges, projecting through an epithelial layer of nucleated circular cells, each about $2\frac{1}{2}$-6000ths in. in diameter, which, in its turn, rests on a soft, fleshy, dermal fibro-reticulation. Pores in the interstices of the reticulation, chiefly on the outside. Vents thickly distributed over the *inner* side, each about 1-18th in. in diameter, and for the most part respectively provided with a sarcodic sphinctral ring, subuniform in size and distribution, absent about the lower part of the cup; structure, although fine, very compact, chiefly composed of comparatively small keratose fibres of two kinds, viz. sand-cored and transparent, the former scanty and branching in more or less straight lines towards the surface, where they end in the conuli, the latter abundant and interuniting the former, but so delicate that they can only be seen with a microscope. Size of vasiform specimen (for there are two) 5 in. high both inside and out, wall $\frac{1}{4}$ in. thick, diameter across the brim 7 in.; stem, where it has been truncated, about 2 in. in diameter.

Loc. Port Western.

Obs. The exact height of this specimen cannot be given as the stem has been cut off. In its dried state it is firm and hard on the surface, on account of the presence of the dried sarcode over its compact structure, which, if thoroughly

washed out, as some specimens are among the waves, would have presented the usual woolly or soft structure of the finest "Turkey sponge." The flabellate specimen is (as I have before stated in many instances) only preparatory to the vase-shaped one, wherein the two sides of the former approximating become united, often, too, leaving a hole at the bottom.

There is another, but dried, cup-shaped specimen whose surface throughout is covered with a thick coating of sand mixed with the filaments of *Spongiophaga communis*; hence it is very hard, and the surfaces (inner and outer) respectively very smooth. It is 4 in. across the brim and 2 in. deep.

Order IV. RHAPHIDONEMATA.

Chalina oculata, var. *repens*, n. var.

Reptant, spreading over both sides of the flat fronds of a black olive *Fucus*, at least 8 in. long and 2 to 3 in. broad, covered with large circular vents respectively, terminating conical, monticular processes in juxtaposition. Colour light brown. Consistence resilient. Surface even, minutely fibro-reticulate. Pores in the interstices of the fibro-reticulation. Vents numerous, large, and circular, each terminating the summit of a flask-shaped or monticuliform individual which, in conjunction with others of the same kind, form the reptant crust of which the specimen is composed. Structure essentially keratose, that is without spicules; fibre reticulate and short-jointed, smaller on the surface than in the interior, supporting a thin sarcode charged with ova in an advanced state of segmentation. No spicules. Size of specimen about 8 in. long (that is, the size of the branches of the *Fucus* over which it has grown), about 1 in. thick.

Loc. Port Western.

Obs. This variety of *Chalina oculata* is evidently allied to the "knotty mass or crust-like" form of *Halichondria simulans*, Johnston (Brit. Spong. 1842, p. 109), whose relations I have noticed in connexion with specimens in the British Museum, being, from the nature of its keratose structure, a *Chalina* in one place and a *Reniera* in another ('Annals,' 1882, vol. ix. p. 277), to which I must refer the reader for further observations on the subject, as it bears upon the fact to which Schmidt alluded in 1870, viz. the connexion between *Chalina* and *Reneira* (Atlantisch. Spongienf. p. 37). It is illustrative of my family no. 3, viz. the "Reptata" (see Classification, 'Annals,' 1875, vol. xvi. p. 141), and is a repent variety of *Chalina oculata*, as described in the 'Annals' of 1885 (vol. xvi. p. 285). The absence of spicules is as

remarkable as it is unusual; but I have already alluded to the extreme smallness of these in the other specimens of Mr. Wilson's *Chalinæ* (*ib.* p. 284), and here they are *altogether* absent, while the fibre is only cored by a flocculent substance such as appears in the transparent fibre of the PSAMMONEMATA.

Acervochalina claviformis, n. sp.

Erect, cylindrical, clavate or pyriform, with the largest end uppermost. Consistence remarkably loose and tender. Colour grey-brown. Surface uniformly smooth, covered with a fine fibro-reticulation. Pores in the interstices of the reticulation. Vents numerous, very large and circular, with prominent or raised margin, scattered irregularly over the surface. Structure remarkably loose, composed of fibres cored with the spicules of the species, many of which project through the sides, supporting the sarcode abundantly traversed by large excretory canals which terminate respectively in the vents mentioned. Spicule of one form only, viz. acerate, smooth, curved, fusiform, sharp-pointed, about 40 by 1½-6000th in., coring the fibre and more or less projecting through it. Size of specimen (of which there are two almost exactly alike, although coming from different localities), 5 in. high, 1½ in. in diameter in the widest part of the head, and 5-8ths at the base, where it expands into a discoid root-like attachment.

Loc. Port Phillip Heads and Port Western.

Obs. This species, in the present instance, is chiefly characterized by its pyramidal erect form, large vents, and delicate structure, so that, if handled roughly, it would go to pieces.

Order V. ECHINONEMATA.

Plumohalichondria plumosa, var. *purpurea*, n. var.

Fig-shaped, the largest end upwards, growing on a fragment of the calcareous test of a Polyzoon. Consistence firm. Colour pinkish purple. Surface even, minutely reticulated. Pores in the interstices of the reticulation. Vents small, scattered over the summit. Structure compact; dermis pinkish, but internally light sponge-yellow, composed of sarcode supported on the spiculiferous fibre of the species, traversed by the canals of the excretory system. Spicules of two kinds, viz. skeletal and echinating:—1, skeletal spicules of two forms, viz. acuate, curved, scantily spined but chiefly towards the large end, about 45 by 2-6000ths in.; and acerate, smooth, curved or nearly straight (viz. the "tibiella"), more or less gradually pointed: 2, echinating spicule clavate, thickly

spined, spines large, viz. as long as the shaft is thick; total size about 20 by 3-6000ths in. Skeletal spicules of both forms mixed in the fibre, the "tibiella"* most numerous; No. 2, the echinating spicule, plentifully dispersed over the fibre.

Loc. Port Western.

Obs. This variety is chiefly characterized by the absence of a flesh-spicule, viz. the usual angulated equianchorate, together with the presence of a pinkish colour in the dermis, although in respect to the latter, when only superficial, I am always in doubt how far it may have been derived from the proximity of a similarly coloured sponge, ex. gr. *Suberites Wilsoni*.

Axinella chalinoides, var. *cribrosa* (dry).

Specimen a compressed cluster of polychotomous branches rising from a short thick stem with root-like expansion; branches finger-like, subcylindrical, subpointed, dividing more or less on the same plane, interuniting more or less midway between the stem and the free extremities. Consistence compressible, not hard. Colour fawn-colour. Surface cribrate generally. Pores not seen, probably in the holes of the cribration. Vents in great plurality, arranged linearly on each side of the subcylindrical branch, deeply sunk into the tissue and rendered stelliform by grooves radiating from them to the surface, probably in the fresh state consisting of subdermal branched venations of the excretory systems leading to the vents. Structure compact generally, that is not condensed axially; fibre strongly developed, short-jointed. Spicules acuate, of two sizes, viz. one comparatively stout and short, about 25 by 1-6000th in., and the other long and thin, about 50 by ½-6000th in. in diameter—the former coring the fibre and projecting through it, especially towards the surface, which is thus rendered shortly hispid, and the latter both in the fibre with the former and loose in the surrounding sarcode. Size of specimen 9 in. high and 4 in. in its broad diameter.

Loc. Port Phillip Heads.

Obs. The rough cribrose surface together with the stelliform vents and acuate form of spicules of this species cause it to differ from, as much as the general form and linear arrangement of the vents cause it to resemble, the digitiform *Chalinæ*.

Axinella cladoflagellata, n. sp.

Long, round, attenuated, whip-like, branched, scantily divided, the whole rising from a short thick stem. Consistence firm. Colour grey. Surface even, granulated with

* "Tibiella," the name proposed for this spicule in the 'Annals' of 1881 (vol. vii. p. 369, pl. xviii. fig. 9, *b*).

little tufts of spicules that just project through the dermis where the latter is entire, but where the dermis is abraded, presenting a villous surface. Neither pores nor vents seen. (They are generally very small in these sponges, and on desiccation, from the compactness of the structure and the thickness in consistence of the sarcode, disappear altogether owing to the contraction of the latter.) Structure very compact and condensed in the axis, becoming less so towards the surface, also usual with these sponges. Spicules of one kind only, viz. long, acuate, entering thickly into the composition of the axis, and appearing at the circumference in the little "tufts" mentioned. Size of specimen 1 ft. long; stem thin, long, 5-8ths in. in diameter.

Loc. Port Western.

Obs. This is simply a *Dictyocylindrus* without echinating spicules, and therefore called an "*Axinella.*"

Axinella coccinea, n. sp.

Massive, lobodigitate, digitations united, contracted towards the base, stipitate. Consistence lax. Colour rich deep purple-red throughout. Surface even, smooth, fibro-reticulate, covered by thin dermis. Pores in the interstices of the reticulation. Vents conical, at the ends of the digitations respectively. Structure lax, fibrous, consisting of spiculiferous fibre stained by the red colouring-matter exuding from the granules of the sponge; supporting sarcode plentifully charged with dark red-purple granuliferous, pigmental cells, whose cell-wall is colourless and about 10-6000ths in. in diameter, accompanied by the granules also *separately*, in the form of minute, spherical, pigmental cellulæ about 2-6000ths in., which have become extravasated into the tissue generally, but of which I could see neither on the surface in the form of *epithelial* cells; structure traversed plentifully by the canals of the excretory canal-system. Spicule of one form only, viz. acuate, smooth, curved, rather abruptly pointed at one end, round at the other, about 55 by $1\frac{1}{2}$-6000th in.; coring the fibre, and here and there projecting through it subechinatingly. Size of specimen 6 in. high by 4×4 in. in its greatest horizontal diameters.

Loc. Port Western.

Obs. This differs from *Axinella atropurpurea*, viz. the similarly coloured specimen already described ('Annals,' 1885, vol. xvi. pp. 359, 360), both in general form and spiculation, as may be seen by comparing the descriptions respectively; but the colouring-matter and its persistence is the same, that is to say it is neither altered by preservation in spirit nor by desiccation. I am in doubt, from its loose structure, whether it ought not to be considered a *Chalina*.

Phakellia ventilabrum, var. *australiensis*, n. var.

Specimen flat, thin, wedge-shaped. Consistence firm. Colour grey. Surface even, consisting of a thin, white dermal crust of small spicules arranged cribrately, covering both sides of the frond and continuous over the margin, which is round. Pores in the minute holes of the cribriform crust. Vents not seen. Structure consisting of fine, dense, keratoceous, spiculiferous fibre. Spicules of one form only, viz. a simple acuate, of two sizes, coring the fibre and composing the dermal layer respectively, much larger in the former than in the latter. Size of specimen 7 in. high, 6 in. broad at the upper margin, and 2-8ths in. thick.

Loc. Port Western.

Obs. The sinuous spicule which is present in the British species, viz. *Phakellia ventilabrum*, is here absent.

Phakellia papyracea (dry).

Flabelliform, more or less slit in through the margin or lobed, very thin, papyraceous. Consistence tough, stem hard. Surface of the lobes or divisions concentrically lineated. Pores numerous, minute, general, undistinguishable in size from the vents. Fibre tough, keratose, short-jointed, and dense; cored and subechinated by the spicules of the species. Spicules of two forms, viz. :—1, comparatively stout, smooth, acuate, curved, varying in size under 50-6000ths in. long by 2-6000ths in. in its thickest part; 2, thin, sub-pinlike, 60-6000ths in. long by $\frac{2}{3}$-6000th in. thick. The former coring and projecting through the keratose fibre subechinatingly, the latter confined to the sarcode about no. 1. Size of largest specimen, for there are two, 9 in. high, including the stem (which is round, 2 in. long and $\frac{3}{8}$ in. in diameter), 10 in. broad, and about $\frac{1}{8}$ in. thick, thinning towards the margin.

Loc. Port Western.

Phakellia villosa, n. sp.

Undulating, texture-like, or in the form of a vase, with continuous undulating, infoliated, thin wall and margin; stem truncated (probably by the dredge). Consistence firm. Colour purplish. Surface even, villous, soft. Poriferous generally on the outer surface. Vents, or rather excretory canal-systems, in the form of little stelliform branched venations scattered subuniformly over the inner surface. Spicules of one form only, viz. acuate, smooth, short, thick, curved, 53 by 3-6000ths in., coring the fibre and projecting through it echinatingly. Size of vasiform specimen 4 in. high by 3 in. across the brim, wall 2-8ths in. thick.

Loc. Port Western.

[To be continued.]

Hyla agrestis, Bell, *l. c.* p. 46, pl. xix. fig. 3.
Hyla prasina, Burm. Erläuter. p. 106, pl. xxxi. fig. 2.
Hyla lateralis, Raddi, Mem. Soc. Ital. xix. p. 76.
Hyla rubicundula (non Reinh. & Lütk.), Hens. *l. c.* p. 158.
Hyla bracteator, Hens. *l. c.* p. 159.

B. M.; v. I.

Hyla Guentheri.

Hyla leucotænia (non Burm.), Günth. Proc. Zool. Soc. 1868, p. 489, pl. xl. fig. 4.
Hyla bracteator (non Hens.), Bouleng. Cat. p. 395, and Ann. & Mag. Nat. Hist. (5) xv. p. 196.

B. M.; v. I.

PHYLLOMEDUSA, Wagl.

Phyllomedusa Iheringii.

Phyllomedusa Iheringii, Bouleng. Ann. & Mag. Nat. Hist. (5) xvi. p. 88.

B. M.; v. I.

APODA.

CHTHONERPETON, Ptrs.

Chthonerpeton indistinctum.

Siphonops indistinctus, Reinh. & Lütk. Vidensk. Medd. 1861, p. 203; Hens. *l. c.* p. 162.
Chthonerpeton indistinctum, Peters, Mon. Berl. Ac. 1879, p. 940; Bouleng. Cat. Batr. Caud. p. 104.

XLII.—*Supplement to the Descriptions of Mr. J. Bracebridge Wilson's Australian Sponges.* By H. J. CARTER, F.R.S. &c.

[Plate X.]

[Concluded from p. 379.]

Order VI. HOLORHAPHIDOTA.

Reniera vasiformis, n. sp.

Vasiform, infundibular; wall thin, margin round, uneven, sloped out on one side, truncated (? by the dredge) at the bottom, where the point of attachment is solid. Consistence fragile. Colour light fawn. Surface more or less even generally, but smoother and more cribrate externally than internally. Pores on the outside. Vents numerous, chiefly scattered over the upper and inner side of the margin. Structure fragile, presenting in a vertical section the plumose arrangement generally seen in thin-walled sponges, where the fibres are directed upwards and outwards curvedly from

the axis to the surface on each side, traversed by the canals of the excretory system. Spicules of one form only, viz. acerate, fusiform, curved, sharp-pointed, about 60 by 3-6000ths in., arranged fascicularly. Size of specimen about 3 in. high and 3½ in. across the brim, cup 2½ in. deep, wall in its thickest part about ¼ in.

Loc. Port Phillip Heads.

Obs. This specimen is very like Bowerbank's figures of his *Isodictya infundibuliformis* (B. S. vol. iii. pl. liv.); but I could see no acuate spicules among the acerates of the Australian species.

Phlœodictyina.

There are several fragments of the tubular appendages of Bowerbank's Australian form of *Desmacidon Jeffreysii* (*Oceanapia*, Norman), viz. *D. fistulosa*, Bk. (Proc. Zool. Soc. 1873, p. 19, pl. iv. figs. 7 and 8), but no entire specimen, together with a thick fragment in which several tubes appear to be joined together longitudinally, hence might be termed provisionally:—

Phlœodictyon cohærens.

This fragment, which is cylindrical, consists of the free end of a portion 2½ in. long by 1¼ in. in diameter at the base, which is truncated, diminishing slightly towards the free end, which is round, flat, and obtuse; the truncated end presents a septate structure composed of about twenty tubes, large and small, in juxtaposition, and these, much diminished in calibre, present themselves in the form of as many circular holes or vents at the free end, which is thus rendered cribriform, like the top of a "pepper-box;" hence the structure, instead of being a simple single tube as in *Desmacidon fistulosa*, is a composite one in which many tubes cohere together like a gun with a plurality of barrels. In other respects the structure is just like that of the tubular appendages of this species, and the spicule (of which there is only one form, viz. acerate, curved, cylindrical, and abruptly pointed, about 35 by 2-6000ths in.) is also much the same if not identical; so that it is possible that this may be only another but composite form of one of these appendages, hence it has been "provisionally" designated "*cohærens.*" Until therefore it is known whether this is the whole of the sponge minus its base, or whether it is only part of the tubular appendages of a turnip-shaped body like that of *Desmacidon fistulosa*, the question must remain undetermined.

Loc. Port Western.

There is also another fragment of a large cylindrical tube similarly truncated (probably by the dredge), but of a *very different* kind, inasmuch as this consists of a portion of a large tube which is divided into several finger-like small ones, in which also the spiculation is so different that there can be no hesitation in at once making it the type of a new species, if not genus, in this family; hence it will be described and illustrated under the following name :—

Phlœodictyon birotuliferum, n. sp. (Pl. X. figs. 1–5.)

Fragment consisting of a stiff, hollow, cylindrical tube with thin wall, about 2½ in. in diameter and the same in length, which afterwards divides into three branches, one of which, about 2 in. long, remains single, but with a bud upon its middle (Pl. X. fig. 1, and *c*), while the other two become united about their middle, and then divide into four, which vary a little under 2½ in. from the first division; branches tubular, cylindrical, slightly diminishing towards the free ends, which are round and closed. Tubulation resilient, open, chiefly on account of the structural arrangement, of which hereafter. Colour grey. Surface smooth, especially over the main or lower portion (fig. 1, *a*) and for more than two thirds of the branches, *the rest poriferous* (fig. 1, *f*). Pores in the dermal structure covering the last third of the branches respectively. Vents not seen. Structure of the main portion of the tubulation (fig. 1, *a*) consisting of three coats, of which the external is composed of a layer of small cells in juxtaposition, about 2-6000ths in. in diameter, but being mixed with those of *Melobesia* and Polyzoa, which have overgrown this part, I am unable to say whether they are or are not all epithelial: the middle, a layer of skeletal spicules arranged parallel and close to each other, transversely to the direction of the tube; and an internal layer consisting of soft fleshy sarco-fibre, so voluminous and loose that a portion (fig. 1, *d*) hangs outside the basal end of the tube. As the main portion of the tubulation approaches the last third of the branches the sarco-fibrous or internal structure, which is of considerable thickness, gradually assumes a reticulated or clathrous character, in which the holes, which are more or less circular, infundibuliform, and fenestral in appearance, open externally in the way that will be presently mentioned. During this transition the spicules of the spiculiferous layer gradually lose their transverse arrangement and become bundled into a skeletal structure, which is fibro-reticulated longitudinally, that is the meshes are elongated in this direc-

tion; while the external layer of the smooth part becomes poriferous and supported by an additional but slighter skeletal framework, more or less composed of single spicules intercrossing each other, which support in their interstices the pore-structure; thus the smooth portion of the tubulation (fig. 1, *a*, *b*), which is imperforate for about two thirds of its course, becomes poriferous in the last third of the branches (fig. 1, *f*). Following now the structure of the latter, that is the wall of the poriferous portion, we find that it consists from without inwards of first a layer of small epithelial cells, rendered cribriform by a great number of pores (fig. 5, *b b b b*) and supported on a framework of slender intercrossing spicules (fig. 5, *c c*); second, a skeletal layer, which consists of the longitudinally fibro-reticulate spicular layer, now transformed into a quadrangular fibro-reticulate one (fig. 5, *a a a a*); and lastly the sarco-fibrous layer (fig. 4, *a*), which has assumed the structure above mentioned, in which the clathrous holes, which are infundibular (fig. 4, *b b b*), open by circular, contracted, sphinctral apertures under the pores (fig. 4, *c c c c*), so that, by placing the object between the eye and the light, the pore-structure of the surface may be seen through the infundibular spaces (fig. 4, *d d d d*), showing that whatever passes through the pores must fall directly, without the interposition of any canals, into the tubular cavity of the branch, thus affording an undoubted instance of the "mode of circulation in the Spongida" to which I have alluded in the 'Annals' of 1885, viz. that the whole of the water and its contents which enters through the pores passes directly into the interior of the sponge before the nutritive particles of it are deflected towards their destination in the spongozoa of the ampullaceous sacs or elsewhere ('Annals,' vol. xv. p. 119), for there are no excretory or any other canals here to receive it. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal spicules of two sizes, the largest, elliptically inflated at one end, followed by a straight fusiform shaft, ending in a smaller inflation of the same kind at the other end, about 55 by 1-1800th in., and the lesser one a little thinner, cylindrical, and undulating, but similarly although less inflated at the extremities (fig. 2, *a*, *b*) : 2, flesh-spicule, a birotulate, consisting of a thick straight shaft, slightly swollen in the middle, terminated at each end by an umbrella-shaped head (fig. 2, *c*, and fig. 3, *a*, *b*) consisting of eight or more compressed ribs, each of which radiates from the centre of the summit backwards and outwards to a free point, while the inner or concave surface of the arched rib is united to the shaft by a thin falciform septum; total length of the birotu-

late 12-6000ths in., head 2-6000ths in. longitudinally and 3-6000ths in. transversely, shaft 2-6000ths in. thick in the centre. Skeletal spicules alone forming the middle layer of the large or lower main portion of the tubulation and that of the branches throughout, as above described; flesh-spicules chiefly in the dermal layer, rather scanty. I see one simple bihamate, about 8-6000ths in. long, in the *mounted preparation*, but cannot say for certain that it belongs to the spiculation. Size of specimen 3 in. in length.

Loc. Port Western. Depth not mentioned.

Obs. This, as the above description will show, is a remarkable sponge both in respect of general form and spiculation, irrespective of the peculiar mode of circulation. The structure of the wall of the poriferous portions is analogous to that of the tubular appendage of a Phlœodictyon, viz. *Desmacidon fistulosa* &c. Whether the specimen has been simply cut off from its base of attachment or from the body of a large sponge I am unable to say; but the difference in structure of the basal or larger portion and the quantity of fleshy fibrous sarcode hanging out of it (fig. 1, *d*) would seem to indicate that this was an extension of the body-substance of the sponge, whatever the form of the rest might be.

Halichondria scabida, Cart.

Halichondria scabida, 'Annals,' 1885, vol. xv. p. 112.

In the collection from "Port Western" there are three more specimens of this remarkable sponge, which I mention more particularly to show how a number of specimens of the same species may be necessary to describe the whole of the adult forms that it may assume.

Thus the first specimen described (*l. c.*) was "globular, compressed, and sessile," whereas the largest of the specimens from "Port Western" is branched and stipitate, $3\frac{1}{2}$ in. high by 3×2 in. horizontally; the branches thick and flabelliform, ending in subdigitate margins respectively; the largest branch about 3 in. broad by $\frac{1}{2}$ in. thick. The next in size, which has grown over the end of a large calcareous (?) *Serpula*-tube, is pyriform in shape, and presents a nodose surface whose nodes or humps are in high relief all over; while the third is so small and shapeless that it is not worth description.

All these forms may be easily derived from one another; and this kind of transition is so common in the different species of the Spongida, that it might be almost premised with certainty that at one time or another they may be found under any one of them. Hence the futility of describing the adult form of any species from a single specimen.

Halichondria pustulosa, Carter (dry).

Halichondria pustulosa, 'Annals,' 1882, vol. ix. p. 285, pl. xi. fig. 1, *a–g*.

Specimen small, massive, convex above, about ½ in. high by 1¼ in. in diameter. Colour light grey. Surface closely overscattered with discoid and pustuliform eminences composed of linear spicules extending from the circumference to the centre, which can thus, by being raised or depressed, be opened or closed as occasion may require; each presenting a poriferous area charged with the flesh-spicules of the species, or a simple oscular hole for a vent, as the case may be; in all respects the same as the Falkland-Island specimen (*op. et loc. cit.*), but with the large acuate spicule smooth instead of spined, and the "tibiella" or straighter spicule for the most part obtuse or only slightly inflated at the ends. I did not see any bihamates, but then these were very scanty in the Falkland-Island specimen.

Halichondria compressa (incertæ sedis).

Massive, erect, compressed; thick, with wide flat border; longitudinally convex, contracted towards the base or point of attachment. Consistence subcompact. Colour sponge-yellow. Surface even, covered with a cribriform dermal structure composed of small spiniferous spicules, circumscribing the pores and vents respectively, the former chiefly confined to the sides and the latter entirely to the flat border. Structure subcompact, consisting of sarcode densely charged throughout with spiniferous spicules in the midst of fibre chiefly composed of smooth ones, the whole plentifully traversed by the canals of the excretory systems. Spicules of two kinds, both acuates, but the larger smooth and the smaller remarkably spinous:—1, smooth spicule, acuate, long, curved, fusiform, subcapitate, abruptly pointed, 50 by 1-6000th in.; 2, spiniferous, acuate, curved, remarkably prickly from the size, number, and unequal length of the spines, which cover the whole of the shaft, 26 by 3-6000ths in., including the spines, which, base to base on both sides, are together equal to the transverse diameter of the shaft. No. 1 is confined to the fibre and no. 2 chiefly to the sarcode, especially on the surface, but is sometimes mixed with no. 1 *in* the fibre, and sometimes appears to be arranged in a linear form by itself; very abundant thoroughout. No flesh-spicules, that is anchorates or bihamates, while the spiniferous spicule, although chiefly confined to the sarcode, seems to be too large to be considered a flesh-spicule. Size of largest specimen

(for there are three of different sizes, but all of the same shape) 4 in. high, 5 in. long, and 1 in. thick, which is the breadth of the flat border or summit.

Loc. Port Western.

Obs. This species is chiefly characterized by the intensely prickly aspect of the spiniferous acuate, while the smooth acuate, which is confined to the fibre, very much resembles one of the forms assumed by the "tibiella" in the *Halichondriæ*. But at present, as I cannot find an undoubted skeletal acuate and there are no flesh-spicules, I can only place it among the *Halichondriæ* provisionally.

Halichondria stelliderma (incertæ sedis).

Specimen subglobular, bicornute, growing round the small stem of a *Gorgonia*, imbedding at the same time much foreign material together with the spicules of the *Gorgonia*. Consistence soft, resilient. Colour grey. Surface uniformly scattered over with small cones rising out of a general, fibro-reticulate, dermal structure, which, together with the opacity of the conical eminences, gives the stellate appearance of which the latter form the centres of the stars respectively; cones about 1-24th in. in diameter at the base, about the same height, and about twice this distance apart, surmounted by a single short filament of the internal fibro-skeletal structure. Pore-areas occupying the interstices of the dermal fibro-reticulation. Vents mostly large, sparsely scattered over the surface, one at the end of each horn-like process of the body, each provided with a strong sphinctral sarcodic diaphragm. Internal structure loose, consisting from without inwards of a thin skin followed by large subdermal cavities opening into "fold-bearing" ?excretory canals, which traverse plentifully the body-substance and end in the vents mentioned, the sarcode being supported on a reticulated spiculo-fibrous structure whose circumferential filaments terminate in the summits of the cones, also as above mentioned. Spicules (which, from their smallness and delicacy, cannot be distinctly seen until a minute fragment of the sponge has been mounted in balsam and placed under the microscope) of two kinds, viz. skeletal and flesh-spicules. Skeletal spicule very slender, smooth, almost cylindrical, slightly inflated at each end, 40 by $\frac{1}{2}$-6000th in.; flesh-spicule a very minute equianchorate, whose shaft is so curved that it looks almost equal to half a circle, and of whose three flukes the two lateral ones are spread out almost at right angles to the head; about $2\frac{1}{2}$-6000ths in. long, but so fine that it can hardly be seen

satisfactorily with a microscopic power of less than 300 diameters; while the skeletal spicule is chiefly confined to the spiculo-fibre, the flesh-spicule is very abundant everywhere, and at first so much presents the appearance of a minute bihamate, from the minuteness of the flukes and their lateral expansion, that without microscopical examination it might easily pass for one. Size of specimen $2\frac{1}{2}$ in. high by $2 \times 1\frac{1}{2}$ in. horizontally.

Loc. Port Western.

Obs. This anomalous species, characterized by the stelli-dermatous structure and its spiculation, especially the form of the equianchorate, I shall also provisionally place among the *Halichondriæ*, to which it appears to me to be most nearly allied. In the mounted specimen I see a *single* bihamate of the common form about $7\frac{1}{2}$-6000ths in. long, that is much larger than the anchorate, and the skeletal spicule looks very much like the "tibicella" of a *Halichondria*; but here, again, I could find no skeletal acuate, and the bihamate might not belong to the spiculation.

There is a certain amount of resemblance between this species and that which will presently be described under the name of "*Pseudohalichondria clavilobata*;" but there is no sand-fibre, although much foreign material is dispersed through the sarcode, while the dermal structure is closely analogous, each species being covered with conical eminences, through which a filament of the skeletal structure protrudes, although this of course is different in composition, being spiculiferous in one and areniferous in the other.

Histioderma verrucosum, n. sp.

Specimen flat or slightly convex, growing over agglomerated sand, presenting a great number of wart-like appendages on the surface. Colour grey when fresh. Surface even, smooth, interrupted only by the wart-like appendages, which consist of small, hollow, ficoid bodies scattered irregularly over it, each consisting of a constricted neck, which is in continuation with the histiodermal surface, and an inflated portion or head, which is composed of hollow, thin, reticulated, clathrous structure, the whole averaging about 3-12ths in. long by 1-12th in. in its greatest transverse diameter. Pores in the interstices of the reticulated structure of the head. Vents opening below, not well seen. Structure consisting of a flat basal or body-mass of sarcode and spicules covered with a compact, thick, textile, dermal layer, from which the wart-like appendages are prolonged; appendages opening into the subdermal cavities and through them again into large canals entering into the body-

substance. When dry the body-substance, which is massive and brown in colour, contrasts strongly with the dermal layer, which, becoming corrugated and more or less detached by contraction in the line of the subdermal cavities, permits the openings of the wart-like appendages to be seen from the inner side, where they open into these cavities. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal, smooth, cylindrical, straight, slightly inflated at one end and more or less obtuse or round at the other, about 100 by 1-6000th in.; 2, flesh-spicules of two forms, viz. bihamate and equianchorate, the former C-shaped, elongate, about 9-6000ths in. long, and the latter slightly "angulate" in the shaft, about 5-6000ths in. long, both belonging to the common forms. No. 1 is the skeletal spicule generally and no. 2 the flesh-spicule, which is most abundant in the clathrous structure of the wart-like appendages. Size of specimens, of which there are three, now in their dry and corrugated state, about an inch high by 1½ in. in horizontal diameter, each bearing upwards of forty wart-like appendages.

Loc. Port Western.

Obs. At first sight this species looks very like a *Polymastia*, especially *P. robusta*, Bk. (Mon. Brit. Spong. vol. iii. pl. x. fig. 5), although not so like *P. bicolor*, Cart., of these parts ('Annals,' 1886, vol. xvii. p. 119), in which the nipple-like process, instead of being clathrous in structure (like basket-work), is uniformly covered with a close villous surface, which arises from the usual addition in *Polymastia* of a layer of minute pin-like spicules intermingling with the sharp outer ends of the large skeletal ones of the interior. In *Polymastia*, too, there are no flesh-spicules, ? excretory system as in *Polymastia*.

Our species, viz. *Histioderma verrucosum*, is more nearly allied to *H. appendiculatum*, Cart., which was found among the "Deep-sea Sponges" dredged up from the Atlantic Ocean on board H.M.S. 'Porcupine,' of which I have given an illustrated description ('Annals,' 1874, vol. xiv. p. 220, pl. xiv. figs. 23–25), and to *Halichondria phlyctenodes*, also a histiodermal sponge (*ib.* 1876, vol. xviii. p. 314, pl. xv. fig. 35).

Histioderma polymasteides, n. sp.

Very similar in all respects to *H. verrucosum*, but with the "wart-like appendages" a little larger, more pointed, lanceolate, and the spiculation different generally. Appendages pointed, leaf-like in outline, *i. e.* when compressed, about ½ in. long and 2-8ths in. in their greatest trans-

verse diameter. Body-substance yellowish grey in colour. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal, inflated at each end, or with one end more or less sharp-pointed, varying greatly in size, the thickest in the mounted preparation being about 90 by $2\frac{1}{2}$-6000ths in., and the thinner ones about 180 by $1\frac{1}{2}$-6000th in., but hardly any two alike in this respect; 2, flesh-spicule, a simple navicular-shaped anchorate of the common form, about 8-6000ths in. long. No. 1 is the skeletal spicule generally, and no. 2 the flesh-spicule, which is most abundant in the clathrous structure of the appendages. Size of specimen now dry and corrugated about $\frac{1}{2}$ in. high by 2 in. in horizontal diameter; bearing upwards of twelve appendages.

Loc. Port Western.

Obs. The same observations apply to this species as to the foregoing one, *H. verrucosum*. Without microscopical examination of their elementary parts it would be very easy to mistake both species for specimens of *Polymastia*.

Pseudohalichondria clavilobata, n. sp. (Pl. X. figs. 6–9.)

Specimen large, massive, composed of several claviform lobes of different sizes, large and small, united together into a common mass, which becomes contracted towards the base into a substipitate form, expanding again below, to produce the root-like attachment (Pl. X. fig. 6). Consistence subcompact, yielding. Colour yellowish white. Surface even, presenting a stout, soft, fibro-reticulation (fig. 9, *a a*), indistinctly covered with small epithelial cells and pore-areas (fig. 9, *b b*), in the midst of which are a great number of circular, monticular elevations, terminated respectively by a single sand-cored filament (fig. 6, *b b b b*, and fig. 9, *d*). Pores in the interstices of the fibro-reticulation (fig. 9, *b b*). Vents small, in the prominent parts of the lobes (fig. 6, *c c c c*). Structure internally subcompact, covered with a cortical layer 1-24th in. thick, composed of soft, compact, fibrillous structure, through which the pores, which are about 4-1800ths in. in diameter, have to pass before they reach the subdermal cavities; skeletal support consisting of thick sand-fibre, which, extending in more or less longitudinal lines from the base upwards, branches out towards the circumference of lobes, where it ends in the monticular elevations mentioned (fig. 9, *d*), which, from the transparency of the quartz-sand coring the filaments by which these are surmounted, presents the appearance of a punctum like a small vent; mixed with strongly developed spiculiferous

fibre in the sarcode bearing spicules proper tothe species; the whole traversed plentifully by the canals of the excretory systems, which end in the vents mentioned. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal, straight or flexuous, fine, smooth, almost cylindrical, slightly constricted at one end, so as to present the appearance of an incipient inflation, abruptly pointed or obtuse at the other, about 65 by $\frac{2}{3}$-6000th in. (fig. 7, *a*); 2, flesh-spicule, very peculiar in form, consisting of a thick, cylindrical, C-shaped shaft, about 3-6000ths in. long, spined over the convexity towards each end (fig. 7, *b*, and fig. 8, *a*, *d*); spines obtuse, erect, six or more in number, continued backwards from each end for about one third of the length of the shaft, leaving the central third smooth (fig. 8, *a*); ends, when viewed directly, presenting a triangular form simulating those of an equianchorate (fig. 8, *d*). Sand-fibre, which greatly predominates in quantity over the spiculation, and thus affords the chief skeletal support, composed of comparatively large grains of quartz and other foreign microscopic bodies forming a thick fibre about 1-90th in. in diameter, that is, about as broad as the skeletal spicule is long (fig. 9, *d*). No. 1 scattered through the body generally or surrounded by a minimum of kerasine in fibrous bundles; no. 2 also scattered through the sarcode generally, most abundant on the surface. Size of specimen about 6 in. high by 4 × 4 in. horizontally.

Loc. Port Western.

Obs. Were there nothing but the peculiarly-shaped flesh-spicule, which, viewed in front, looks like an equianchorate, and laterally like a bihamate, to distinguish the species, this would be sufficient; but with the presence of the thick sand-fibre the combination is unmistakable, especially with the monticular elevations pierced by the circumferential ends of the sand-fibres and the unusual thickness of the skin or cortical layer which the pores have to traverse, so that instead of being holes in a thin film, they consist of so many short canals in a thick one.

In general structure and colour like a *Halichondria*, while the sand-fibre is like that of a Psammonematous sponge; hence I have named it provisionally *Pseudohalichondria clavilobata*, not forgetting that it possesses a spiculation which in form hitherto has not been found in any species of *Halichondria*, or, indeed, in any other kind of sponge.

Pseudoesperia enigmatica olim *Esperia parasitica.*

In 1885 ('Annals,' vol. xv. p. 108, pl. iv. fig. 1, *a*, *b*) I

gave a description of this sponge under the idea that it was a parasitic growth of an *Esperia* over the sand-fibre of a dead Psammonematous sponge; but having received another specimen of the same kind from Mr. Wilson, which shows that this could not have been the case, for skeletal spicules of the *Esperia* are mixed with the quartz-grains of the Psammonematous fibre, I saw that the name which I had given to it was not only altogether inappropriate, but misleading, in short that it was an *Esperia* which had built up the *whole* structure; hence I propose to change the name of "*Esperia parasitica*" to "*Pseudoesperia enigmatica*," following the course which I have laid down for the location of such compound sponges, explained in the 'Annals' of 1885 (vol. xv. pp. 319–321). Thus it might be placed in the order HOLORHAPHIDOTA at the end of the group to which it more particularly belongs, viz. the "Esperina." It is a very remarkable combination, but not more so than the covering of a Psammonematous structure with Luffarid fibre, as described above under the name of *Pseudoceratina typica* (p. 287), or that in the species just mentioned, viz. *Pseudohalichondria clavilobata*, which is accompanied by a Holorhaphidotic spiculo-fibre.

Suberites spinispirulifera, Cart.

Suberites spinispirulifera, 'Annals,' 1879, vol. iii. p. 345, pl. xxviii. figs. and

Specimen consisting of a thick crust about ½ in. high and 4 in. square. Colour yellowish. Surface pitted, pits surrounded by ridges, altogether forming a subreticulated pattern. Pores not seen. Vents here and there in the pits. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal spicule, subpin-like; 2, flesh-spicule, consisting of a spiniferous shaft, spirally twisted for about one turn and a half.

Loc. Port Western.

Obs. This is a varietal form of that from Port Elizabeth (Cape Colony), the type specimen of which, described and illustrated in 1879 (*l. c.*), is in the British Museum, bearing my running nos. 13 *h* and 15 *h*, registered 71. 5. 12. 1.

Suberites (*Hymeniacidon*) *carnosus*, Bk.

Suberites (*Hymeniacidon*) *carnosus*, Bk., Mon. B. S. vol. iii. pl. xxxiv. figs. 5–9.

Specimen fig-shaped, with globular head and contracted narrow stem. Head 1 in. in diameter. Growing on the valve of a *Pecten*.

Loc. Port Western.

Trachya globosa, var. *rugosa*, n. var.

This is a spherical variety with a dark grey cortex, pitted uniformly all over the surface, the pits consisting of subcircular depressions with raised borders in juxtaposition. Stipitate, with a large, round, single vent on the summit. Spiculation the same as that of the original species described in the 'Annals' of 1886 (vol. xvii. p. 121), viz. consisting of enormously long acerates accompanied by small bihamates.

Loc. Port Western.

Obs. In this variety the bihamates, on account of their smallness, do not come out distinctly until a bit has been dried and mounted in balsam, when they make their appearance abundantly, together with the groups of dark pigment-cells which colour the cortex, thus resembling the Tethyina (*T. cranium* &c.); but there are no trifid spicules anywhere.

Trachya horrida, n. sp.

Massive, irregularly elliptical, elongate or bolster-shaped, growing round a similarly-shaped nucleus of agglomerated sandy rocks; presenting a glistening villous surface, produced by the projecting ends of the spiculation. Colour grey. Surface uniformly even and villous. Pores not seen. Vents few and not conspicuous. Internal structure very compact, consisting of sarcode densely charged with the spicules of the species. Spicules of one form only, viz. acerate, but of two sizes, the largest, long, smooth, fusiform, curved, and gradually narrowed to a sharp point at each end, about 750 by 12-6000ths in., and the other, the smallest, of the same form but variable in measurement. No. 1 chiefly constitutes the body-mass, where the spicules are arranged parallel to each other, and, radiating from the base to the circumference, become mingled there with a layer of no. 2, thus causing the specimen (in a vertical section) to present a cortical layer about 1-18th in. thick. Size of specimen about 6 in. high from the base of attachment, which was at one end, and $3\frac{1}{2} \times 2$ in. in horizontal diameter, varying in thickness with the irregularities of the piece of rock over which it has grown, being in some parts 2 in. thick.

Loc. Port Western.

Obs. Designated "*horrida*" on account of the disagreeable manner in which the large spicules are torn away by adhering to the fingers when the specimen is handled.

Eccœlonida.

Cliona celata, Grant.

Infesting the shell throughout of a large smooth bivalve, about $2\frac{3}{4}$ in. long and $2\frac{1}{4}$ in. high.

Vioa Johnstonii, Schmidt.

Vioa Johnstonii, Atlantisch. Spongienf. 1870, p. 5, Taf. vi. fig. 18.

This carmine-coloured boring sponge, which, for the most part, is concealed under the calcareous crust of a *Melobesia*, presents itself externally under the form of little heads filling circular holes of the same size among the conceptacles of the *Melobesia*, where, under a 2-inch lens, it may be easily recognized by its bright carmine colour. The holes, which are about 1-48th in. in diameter, are occupied by the pore-areas and vents respectively, as in all other sponges of the kind, the latter being, as usual, provided with a sphinctral sarcodic diaphragm. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal spicule, pin-like; 2, flesh-spicule, a spinispirula of four bends, about 10-6000ths in. long.

Loc. Port Western.

Obs. This chiefly differs from *Vioa Johnstonii* in the spiculation being smaller than that of the Adriatic species, but not sufficiently to constitute in any respect even a variety.

Stelletta ochracea, n. sp.

Specimen irregularly cylindrical, bolster-shaped. Colour bright ochre-yellow throughout. Surface even. Pores in juxtaposition over the surface generally. Vents few and scattered here and there. Structure compact, without marked cortex, but possessing a superficial layer of large epithelial cells mixed with small acerates and minute bacillar spicules. Epithelial cells 8-6000ths in. in their longest diameter, and the "granules" (cellulæ) which contain the yellow colouring-matter about $1\frac{1}{2}$-6000th in., the latter plentifully extravasated into the tissue generally, which gives the species its yellow colour. Spicules acerate, trifurcate, and bacilliform:—1, acerates of two sizes, both alike in form, one, the larger, about 240 by 6-6000ths in., constitutes the usual body-spicule, and the other, or smaller, the flesh-spicule of the surface, varying under 35 by 1-6000th in.: 2, trifurcate, consisting of three straight arms, radiating at equal angles from each other, each of which is furcated, that is divided into two

others, which are sharp-pointed, and all radiating from a common centre; diameter of the whole 63-6000ths in.: 3, flesh-spicule, bacillar, smooth, cylindrical, curved, often inflated in the centre, varying in length under 5-6000ths in. No. 1 in its large form belongs to the body-substance, and in its smaller one to the surface. No. 2 is congregated round the circumference immediately under the thin dermal layer; and no. 3 in the surface itself. Size of specimen about $1\frac{1}{2}$ in. high by $5\frac{1}{2} \times 3\frac{1}{2}$ in. horizontally.

Loc. Port Western.

Obs. The yellow colour at first sight seems to characterize this species; but the most peculiar feature is the presence of the *trifurcates* round the circumference, evidently representing the head of the "zone-spicule" without the shaft; hence there is *no zone-spicule* of this kind *here*, as in the usual forms of *Stelletta*. I saw neither "forks" nor "anchors," while the intense yellow colour of the excretory canals, where cut across, showed how the pigmental cells may be continued throughout the structure.

Stellettinopsis lutea, n. sp.

An irregular mass growing over and enclosing fragments of agglomerated sand and shells. Colour golden yellow throughout. Surface smooth, composed of fibro-reticulated tissue, whose interstices are plentifully pierced with pores, covering subjacent structure, whose irregularities cause it to present a number of small elevations of different sizes. Pores in the interstices mentioned. Vents numerous, large, scattered over the surface generally, chiefly on the larger elevations. Internal structure fibrous, charged with the spicules of the species, largely traversed by the canals of the excretory systems. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal, a large, fusiform, curved, sharp-pointed acerate; 2, flesh-spicule, a minute stellate. No. 1 chiefly constitutes the body-mass as the skeletal spicule, among which the flesh-spicule, no. 2, is plentifully distributed, but so minute that it is not very easily seen except a fragment be mounted in balsam. Size of specimen about 5 in. high by 4×4 in. horizontally.

Loc. Port Western.

Stellettinopsis purpurea, n. sp.

An irregularly-shaped hemispherical mass, truncated by having been cut off from its place of attachment (probably by

the dredge). Consistence compact. Colour red-purple. Surface smooth, but very uneven. Pores punctate, general. Vents few, large and scattered. Structure compact, covered with a cortex about 1-48th in. thick; body-substance of the usual kind in these sponges, viz. subcompact, largely traversed by the canals of the excretory system. Spicules of two kinds, viz. skeletal and flesh-spicules:—1, skeletal, acerate of two sizes, viz. very small and very large, the former confined to the cortex and the latter to the body-substance; 2, flesh-spicule, a minute stellate about $1\frac{1}{2}$-6000th in. in diameter. Pigmental cellulæ containing the purple colouring-matter confined to the epithelial cells of the surface and the excretory canals or extravasated into the tissue generally. Size of specimen about $1\frac{1}{2}$ in. high by $1\frac{1}{2}$ in. horizontally.

Loc. Port Western.

Obs. This only appears to differ from the preceding species in presenting a red-purple colour instead of a bright golden yellow.

Tethya stipitata (dry).

Fig-shaped, stipitate, rugosely corrugated over the head, smooth over the stem, which is cylindrical and rather twisted, expanding into the head above and into a root-like mass below, which is charged with coarse sand. Consistence firm. Colour reddish purple above, becoming less so towards the stem, which is colourless. Surface rugosely corrugated over the head in lines running upwards from the smooth stem, covered with an epithelial layer of small granuliferous cells in which the granules on the exposed part (that is on the head) become more intensely coloured as the summit is approached. Pores not seen. Vents in plurality, the chief and largest single, on the summit. Structure internally pale yellow in colour, consisting of the usual bundles of long spicules radiating from the centre, held together by sarcode and traversed by cavernous excretory canals which open at the vents mentioned. Spicules of two kinds, viz. skeletal and flesh-spicules. 1. Skeletal, as usual, very long and slender, of two forms—one pointed at each end and the other provided with a trifid termination consisting of three more or less short, stout, and expanded arms; both forms variable in length according to their position. 2. Flesh-spicules also of two forms, viz. one minute, the usual C- and S-shaped bihamate, about 4-6000ths in. long, and the other much larger, whose form varies from a slight curve to a parabola, cylindrical, microspined, and obtuse at the ends, which are more or less separated according to the amount of curvature, *i. e.* 9 to 13-6000ths in. apart, with a

general thickness varying under $\frac{2}{3}$-6000th in. Skeletal spicules confined to the head and stem respectively, in which the trifid ones of the stem are much larger and stouter than the acerates of the head. I could find no anchors or forks in the spiculation of the head or stem either projecting or internally, and the trifid ends of the long spicules were only to be seen at the extremity of the root, amongst the grains of sand and shreds of sarcode which firmly held the whole together. Flesh-spicules of both forms mixed together in the head, but not in the stem, where the small one is absent. Size of specimen about 3 in. high, $1\frac{3}{4}$ in. of which is stem; head 1 in. in its largest transverse diameter.

Loc. Port Phillip Heads.

Obs. This sponge, whose root in composition at the extremity shows that it had grown in a sandy bottom, very much resembles *T. dactyloidea* ('Annals,' 1869, vol. iii. p. 15, and *ib.* 1872, vol. ix. p. 82), chiefly differing from it in the plurality of vents, the consolidation of the stem, and the presence of the large flesh-spicule, together with the corrugated surface of the head, which, not becoming smooth after much soaking, does not appear to have been occasioned by the desiccation to which the specimen had been exposed. The long consolidated stem causes this species to take a position in this respect between the sessile forms, ex. gr. *T. cranium*, and the stipitate ones, viz. *T. polyura*, Sdt., whose stem is composed of a flimsy bunch of more or less separated root-spicules. *T. euplocamus*, Sdt., had a "consolidated" stem and *T. polyura* was covered with bumps (Buckeln), extending into conical processes *below* (see 'Atlantisch.' and 'Küste v. Algier. Spongien,' 1870 and 1868, Taf. vi. fig. 8, and Taf. v. fig. 10, respectively).

List of Mr. J. Bracebridge Wilson's Sponges from the Neighbourhood of "Port Phillip Heads" and "Port Western," on the South Coast of Australia, which have been described and notified respectively in vols. xv., xvi., xvii., and xviii. of the 'Annals' for 1885–86.

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Order II. Ceratina.

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Order VII. Hexactinellida.

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SUPPLEMENT.

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Halichondria scabida, *Cart.* (1885), p. 449.
—— pustulosa, *Cart.* (1882), p. 450.
—— compressa (incertæ sedis), p. 450.
—— stelliderma (incertæ sedis), p. 451.
Histioderma verrucosum, p. 452.
—— polymasteides, p. 453.
Pseudohalichondria clavilobata, p. 454.
Pseudoesperia enigmatica, p. 455.
Suberites spinispirulifera, *Cart.* (1879), p. 456.
—— (Hymeniacidon) carnosus, *Bk.*, p. 456.
Trachya globosa, var. rugosa, p. 457.
—— horrida, p. 457.
Cliona celata, *Grant*, p. 458.
Vioa Johnstonii, *Sdt.*, p. 458.
Stelletta ochracea, p. 458.
Stellettinopsis lutea, p. 459.
—— purpurea, p. 459.
Tethya stipitata, p. 460.

Order VII. Hexactinellida.

None.

Order VIII. Calcarea.

The specimens of this order which came from "Port Western" are included in the list of those from "Port Phillip Heads," as above given.

Conclusion.

Thus have I described all the principal specimens of the Spongida which have been sent to me by Mr. J. Bracebridge Wilson, M.A., F.L.S., of the Church-of-England Grammar School, Geelong, Col. Victoria, South Australia. It might have been done better and more elaborately had time and youth been on my side, but could hardly have been done more correctly; therefore, so far as it goes, it places before the reader those facts which, if he be a spongologist, will not only serve to introduce him to the sponge-fauna of the locality of which it treats, but induce him to pursue the subject still further. If I have succeeded in doing this I shall be satisfied, for my sole object, like that of the generosity of Mr. Wilson, has been to advance our knowledge of this branch of natural history to the best of my ability. When we consider that, for this purpose, these sponges were at his own cost dredged by Mr. Wilson, numbered, and at the same time placed by him in a galvanized-iron vessel containing spirit, and the vessel with its contents hermetically sealed and forwarded to my address with a catalogue of the colour of the specimens respectively in accordance with their numbers and with their depths—while we (Mr. Wilson and myself) are totally unacquainted with each other personally, and I fear now (at my age) will never be otherwise—it must be admitted that, in a scientific point of view, there never was a more praiseworthy or disinterested act.

It must not be expected that the forms presented by the specimens are the only ones that may be assumed by the various species, for among the Spongida these are almost endless; but the elementary structure is *persistent*, and it is towards this for recognition that the student should direct his attention, since in this he will not be disappointed. A single fragment may afford this information, while to say what forms a sponge may assume in its adult state may require years of observation and an unlimited number of specimens.

I began the description of these sponges with, among other things, the fact that the inhalant or pore-areas might open directly into excretory canals, and thus the nutritive particles which passed into them with the water have to be deflected afterwards to the ampullaceous sacs or elsewhere where they were required ('Annals,' 1885, vol. xv. p. 117 &c. pl. iv. fig. 5 &c.); and in *Phlœodictyon birotuliferum*, which I have described and illustrated *suprà* (p. 447, Pl. X. figs. 4 and 5), this "mode of circulation" has been established by there being no *canals* at all present, in short nothing between the pore-areas

together with their subdermal cavities and the general cavity of that part of the sponge which is provided with this inhalant structure.

Again, with reference to the sponges which afford typical illustrations of the structure of two of my orders in one, nothing can be more decisive than that of *Pseudoceratina typica* (p. 287), *Pseudohalichondria clavilobata* (p. 454), and *Pseudoesperia enigmatica* (p. 455) respectively; since wherever they may be relegated hereafter, the fact of such opposite structures existing together as parts of the same sponge is established.

The type specimens of those species which I have described have, in accordance with Mr. Wilson's request, been deposited in the British Museum. It may be added that they were dredged in the month of January, and are mostly charged with ova.

EXPLANATION OF PLATE X.

Fig. 1. *Phlœodictyon birotuliferum*, nat. size. *a*, main trunk; *b*, branches; *c*, bud; *d*, portion of internal layer hanging out of the main trunk; *e*, smooth portion; *f*, poriferous portion, represented by the puncta.

Fig. 2. The same. Skeletal spicules and flesh-spicule relatively magnified to the scale of 1-12th to 1-1800th inch. *a*, large skeletal spicule; *b*, smaller one; *c*, flesh-spicule.

Fig. 3. The same. Flesh-spicule more magnified. *a*, lateral view; *b*, end view. Scale 1-12th to 1-6000th inch.

Fig. 4. The same. Surface of internal layer of poriferous portion of branches, magnified to the scale of 1-48th to 1-1800th inch. Diagrammatic, showing:—*a*, internal, clathrous, sarco-fibrous layer; *b b b b*, infundibular depressions of the same; *c c c c*, external apertures of infundibular depressions; *d d d d*, pore-structure of the surface as seen through the infundibular depressions when the object is placed between the eye and the light.

Fig. 5. The same. Surface of external layer of poriferous portion of branch, magnified to the scale of 1-48th to 1-1800th inch. Diagrammatic, showing:—*a a a a*, middle layer or large skeletal structure; *b b b b*, external layer, including epithelium and pore-structure; *c c*, spicular framework of this layer; *d*, pores; *e e e*, circles representing external apertures of "infundibular depressions" of inner layer, which can only be seen when the object is placed between the eye and the light.

Fig. 6. *Pseudohalichondria clavilobata*, half nat. size. *a a a*, lobes; *b b b b*, monticular elevations on the surface; *c c c*, vents.

Fig. 7. The same. Spiculation relatively magnified to the scale of 1-24th to 1-6000th inch. *a*, skeletal spicule; *b*, flesh-spicule, lateral and front views.

Fig. 8. The same. Flesh-spicule more magnified. *a*, lateral view; *d*, front view.

Fig. 9. The same. External surface relatively magnified to the scale of 1-96th to 1-1800th inch. *a a*, sarco-fibro-reticulate structure of surface generally; *b b*, pore-areas occupying the interstices of the same, in which the pores are represented by the little circles; *c*, monticular elevation of surface; *d*, projection of the sand-fibre.


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