

to the shoulder; a circular flat gland below each thigh, on its inner side. Dark brown above, minutely dotted with yellowish. Male without vocal sacs.

From snout to vent 123 millims.

Five specimens from Betsileo.

Though the tips of the fingers and toes are swollen into small but very distinct disks, the affinities of this species are not with those of the genera *Hylorana* and *Polypedates* of authors; it should take its place near to *Rana Kuhlii* and *R. Liebigii*. *R. guttulata* is the only Madagascar form of either *Rana*, *Hylorana*, or *Polypedates* which has the tympanum hidden.

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XXXVI.—*Supplementary Report on Specimens dredged up from the Gulf Manaar, together with others from the Sea in the Vicinity of the Basse Rocks and from Bass's Straits respectively, presented to the Liverpool Free Museum by Capt. H. Cawne Warren.* By H. J. CARTER, F.R.S. &c.

[Plate XVIII.]

AFTER my "Report" on the specimens from the Gulf of Manaar had been published ('Annals,' 1880, vol. v. p. 437), I received for examination, through my friend Mr. Thomas H. Higgin, F.L.S., of Liverpool, a few more specimens dredged up from the Gulf of Manaar, together with some from the sea in the vicinity of the Basse Rocks off the S.E. coast of Ceylon, and from Bass's Straits, between Australia and Tasmania, respectively, forming the remaining portion of the same collection presented to the Liverpool Free Museum by Capt. H. Cawne Warren in 1879 (viz. bearing the register number "26. 9. 79").

With reference to the specimens from the Gulf of Manaar, which were obtained opposite Tuticorin, and those from the sea in the vicinity of the Basse Roks (all together very few in number), there is little to be said beyond the fact that they present the same facies and are of the same kind as those already noticed (*op. et loc. cit.*); but as they contain a few new species as well as a repetition of others already mentioned, it will only be necessary to describe the former here, and give the rest together in a list at the end of the Report.

Among the new species is a *Rotalia* which is almost a facsimile of *R. spiculotesta*, but with an arenaceous covering, which enables me, in the "Observations," once more to state my reasons for regarding *Squamularia varians* and *S.*

*scopula* as not only allied, but as furnishing instances of the lowest and least complicated forms of the nautiloid test among the Foraminifera; while the presence of *Gypsina melobesioides*, intercalated with the layers of a *Melobesia* and plentifully accompanied by *Holocladina pustulifera* and *Carpenteria utricularis*, together with a variety of sponges and other minute organisms in small quantities, testifies not only to the great part which the Foraminifera have taken in the formation of many of these so-called "Melobesian nodules," but to the number of beings which have lived on and have become overgrown by the laminae of which they are chiefly composed, during their progressive formation.

Among the new species of sponges may be mentioned *Cliona Warreni* (so designated to commemorate not only the gift of these valuable specimens, but their having been dredged from the bottom of the sea also by Capt. Warren), together with two new species of Discodermida.

Again, with reference to the specimens from Bass's Straits referred to me for observation, it may be stated briefly that they chiefly consist of calcareous Polyzoa, which have overgrown different kinds of sponges, whose forms they now respectively represent; for in many instances the sponge may be seen inside the case formed by the Polyzoon. Indeed it looks as if these specimens had been dredged from a bed of sponges which had become invaded, overgrown, and thus more or less destroyed by a colony of Polyzoa.

Among the sponges, however, there are a few interesting forms which can easily be recognized as *new species*; and these will be described in their proper places:—viz. two which appear to belong to the genus *Axos*, also a *Dictyocylindrus* marked by an unusual development in quantity of the echinating spicule, and a specimen of *Echinonema typicum*, which, together with *E. anchoratum*, from other collections, I have for the first time fully described, having hitherto only mentioned them by name. There are also several specimens of *Dysidea Kirkii*, Bk., an Australian species of my group "Arenosa" among the "Psammonemata," which appears to be exceedingly abundant everywhere on the southern coast of this great continent, although the Bass's-Straits specimens in particular are not very fine; still it has afforded me an opportunity of going into the whole history of *Dysidea*, and of giving a full description of the Australian species from the total number of specimens of the latter that have come under my observation.

It should be remembered, as stated in the first "Report," that all the specimens are dry.

*Specimens from the Gulf of Manaar and Basse Rocks.*

## FORAMINIFERA.

*Gypsina melobesioides.*

I observe that many of the "Melobesian nodules" in the Gulf of Manaar are chiefly made up of layers of *Melobesia* intercalated with *Gypsina melobesioides*, *Holocladina pustulifera*, and *Carpenteria utricularis*; so that, as before stated, the Foraminifera are as much engaged in forming them as the Calcareous Algæ. How far they may be built upon by various kinds of sponges and other organisms afterwards (that is, as they are progressively enlarged by such lamination) must depend a great deal on accidental circumstances; but there can be no doubt that, if ever fossilized, they will each contain a great variety of organic remains. Hence we should not be surprised at finding nodules in the Chalk similarly constituted in this respect.

*Rotalia arenacea*, n. sp. (Pl. XVIII. fig. 10.)

Test translucent, parasitic, sessile, subcircular, subtrochoid, flat towards the margin. Trochoid portion formed of a spire of nautiloid chambers (fig. 10, *a*), contrasting strongly in its brown colour, as seen through the test, with the flat part (fig. 10, *b*), which *appears* to be without chambers and colourless. Composed throughout of a heterogeneous mixture of minute angular grains of quartz mixed with the remains of microscopic organisms. Size of largest specimen about 1.45th inch in diameter, of which the central half is occupied by the coloured or nautiloid part mentioned.

*Hab.* Marine, on hard objects; in company with *Rotalia spiculotesta*.

*Loc.* Gulf of Manaar and Basse Rocks.

*Obs.* This is almost a facsimile of *R. spiculotesta*, with which it is associated; and but that the test of the latter is formed of calcareous spiculiform bodies produced by the animal itself, while that of the former is composed of foreign material (grains of quartz &c.), with which the peculiar spiculiform bodies of the latter, too, are often mixed, I think there would be hardly any appreciable difference. It is much more abundant than *R. spiculotesta*, whose shell is somewhat larger, whiter towards the margin or in the uncoloured portion, and darker in the centre. The flattened rim, although extremely thin, still may be chambered.

It is remarkable that *R. concamerata* (Williamson, Recent

Foram. of Great Britain, 1857, p. 52, fig. 104, pl. iv.), which has a poriferous calcareous test, and, in its parasitic form, is very common on the root-portion of *Laminaria bulbosa* here (Budleigh-Salterton, Devon), is always surrounded by an accumulation of quartz-sand, apparently taken up by its sarcodic cuticle, which accumulation often extends so far up as to cover the summit, and thus conceal the original test, when it so far very much resembles *R. arenacea*. Indeed Williamson's *R. inflata* (*op. cit.* p. 50, figs. 93, 94, pl. iv.), which was found on *this* coast, has an arenaceous test; and it may be that this form, after all, is his *R. concamerata*, in which the arenaceous layer has been retained; while the calcareous one still presents the nautiloid spire of chambers *inside*, as in *R. arenacea*. Thus, as I have before stated ('Annals,' 1877), the arenaceous test may be as much perforated as the original calcareous one, whose pores or perforations may for some time be seen through it, although, from the heterogeneous character of the material in every respect, they cannot be so regular or so distinct. I have made a similar statement before regarding the perforated state of arenaceous tests termed by authors "imperforate" ('Annals,' 1877, vol. xix. pp. 204, 205, pl. xiii. figs. 7*f* and 23-29). In short, it seems to me to be an *axiom* that *every Foraminifer possessing a calcareous, may have an arenaceous representative test*, which also seems to hold good among the sponges, wherein the same form may at one time belong to the Psammonemata and at another to the Rhabdonemata, &c.; that is, the fibre in the first instance may be axiated with foreign bodies, and in the second with bodies (spicules) formed by the sponge itself ('Annals,' 1875, vol. xvi. p. 126, Notes Introductory to a Study of the Spongiada).

Here, too, I might allude to *Squamularia varians* ('Annals,' 1870, vol. v. p. 321, pl. v. fig. 1, &c.), which, having appeared to me to be the "arenaceous representative" of Max Schultze's genus, justified this name. All are aware that Max Schultze in his 'Organismus,' &c., and Dr. Carpenter, in his 'Introduction,' took the form to which Max Schultze gave the name "*Squamulina*" for the *basis* of their classifications, on account of its simplicity; but Max Schultze's specimen was smooth, imperforate, and calcareous, as the original diagnosis points out, viz. :—"Schale einer planconvexen, flachen Linse gleichend, mit der planen Seite festgeheftet, kalkig, eine einfache, ungetheilte Höhlung einschliessend. Eine grössere Oeffnung auf der convexen Seite; feine Poren fehlen" ('Organismus der Polythalamien,' Foraminiferen, 1854, p. 56, Tab. vi. figs. 16, 17). Hence objections

have been made to my nomenclature; but if I am right in assuming the "axiom" just mentioned, then *S. varians* is as much a *Squamulina* as the smooth (*glatt*) calcareous test first observed by Max Schultze on the sides of "the glass" at Ancona. *Polymorpha silicea*, which Max Schultze also found at this place, and has figured next to his *Squamulina levis* (*op. cit.* Tab. vi. fig. 10), is an arenaceous form of D'Orbigny's calcareous Foraminifer, and therefore an instance in point.

Perhaps I may be also pardoned for again introducing *Squamulina scopula* (*Haliphysema Tumanowiczii*, Bk.), which most observers will not admit to be a species of *Squamulina*. Thus Möbius, in his late valuable work on Foraminifera of the Mauritius ('Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen, mit 14 Tafeln, 1880,' a copy of which he kindly sent me), observes at p. 75, "Da aber Bowerbank's *Haliphysema* mit Schwammnadeln und diesen ähnlichen Fremdkörpern besetzt war, so durfte sie dem Schultze'schen Gattungsbegriff *Squamulina* nicht untergeordnet werden, sondern sie musste als eine eigene Thiergattung erhalten bleiben." But in his arrangement *Squamulina scopula* (*Haliphysema Tumanowiczii*, Bk.) is placed at the commencement (that is, at the bottom of his Foraminifera), under the heading "Imperforata;" so that at least it would come near to *Squamulina*. Still, from what I have stated about the perforation of arenaceous tests being, *mutatis mutandis*, the same as that of the poriferous calcareous ones, and his figures of "*Haliphysema Tumanowiczii*" (Taf. i. fig. 4) actually representing an extension of the sarcode in pseudopodiform filaments from *all parts* of its arenaceous test, I am still more at a loss to conceive how this kind of test generally can be called "imperforate."

Admitting, then, for argument that *Squamulina scopula* should form a distinct genus under the term "*Haliphysema*," it may be asked, "upon what grounds is this done when its podal disk so closely represents *Squamulina varians* that this part must be considered the *test*, and the erect development a prolongation in this form of the oral aperture?" This may be answered by another question, viz. "Was *Carpenteria*, in 1858, so named from a similar prolongation of *its* oral aperture to that of *Squamulina scopula*, which was not discovered until 1877 ('Annals,' vol. xx. p. 68)?" Then it is the *test*, and *not* the *appendages*, which should afford the generic name; hence I cannot help thinking that *Squamulina varians* and *S. scopula*, which abound *here* together on the root of *Laminaria bulbosa*, are, with perhaps a very slight approach to a

polythalamous interior of the podal part, which is the test in the latter, generically the same. Otherwise of what calcareous foraminiferal test is the arenaceous *Squamulina scopula* the representative?

## SPONGIDA.

### CARNOSA.

*Halisarca rubitingens*, n. sp. (provisional).

Amorphous, indefinitely spreading and agglomerating together every thing in its course, at the same time that the whole is tinged externally by its red colour, appearing in the form of a thin membrane when stretched across cavities, composed of polygonal divisions (cells) in juxtaposition, filled with granular contents in which the pigment is situated. Divisions varying in size under 5-6000ths inch in diameter.

*Hab.* Marine.

*Loc.* Gulf of Manaar.

*Obs.* At first *Halisarca rubitingens* appears like a *Hildenbrantia*; but the absence of distinct cellular structure, no conceptacles, and its greater thinness are opposed to this view; at the same time these characters do not satisfy me as to its being a species of *Halisarca*; hence I have named it "provisionally" (that is, until it has received examination in the living state).

### PSAMMONEMATA.

*Hircinia clathrata*, n. sp.

Skeleton kerataceous, massive, sessile, lobate; lobate portions passing into thick digital processes, subbranched, hollow, clathrate. Texture stiff, resilient. Colour light brownish yellow. Surface irregularly clathrous, covered with minute points (conuli). Structure uniformly reticulate, chiefly composed of simple, solid, translucent, amber-coloured fibre, here and there charged with foreign bodies (quartz-grains and sponge-spicules), especially towards the surface, where the "points" are all areniferous; forming an irregularly fissured, clathrous, thin wall, varying under a quarter of an inch in thickness, which presents itself under the general form mentioned. Size varying from 6 to 12 inches in height and breadth.

*Hab.* Marine.

*Loc.* Gulf of Manaar; Red Sea.

*Obs.* I have never seen to my knowledge any thing but specimens of the skeleton of this sponge, which, being very tough and durable, have in all probability been picked off the beach; at the same time, if they had been taken alive and

preserved in spirit with the sarcode present, they would have so much resembled other species of *Hircinia* of a like kind that, after all, we should have to fall back upon the skeleton for specific differences. Here, however, the clathrous character and *hollow* condition of the mass (for its general form is only represented by a comparatively thin wall of sponge) are so striking, together with its great abundance and luxuriant growth, if one may judge by the specimens, that it can hardly fail to be recognized.

There is a similar sponge at the Mauritius; but although it presents the same clathrous character, it is massive and *solid* throughout, with a dark purple-red sarcode; so there is no confounding the two. But the sarcode of *H. clathrata* may have been so coloured, or it might have had a dark dermal sarcode; for both the *outer* part of the Mauritius specimen and *H. clathrata* generally are, by "washing out," of the *same* colour. So far, then, it is desirable to see these sponges alive, when, of course, the sarcode is present. Such remarks apply to specimens of the Hircinida generally. My Mauritius specimen came to me through Dr. Dickie in 1872, to whom Col. Pike, U.S. Consul there, had sent it; but in all probability the hollow species, viz. *H. clathrata*, is also to be found in the sea about that island.

## RHAPHIDONEMATA.

### Family 2. Cavochoalinida.

#### Group 5. TUBULODIGITATA.

##### *Tubulodigitus communis*, n. sp.

Rhizomatous at the base, consisting of a mass of short, bullate, subbranched, more or less laterally united, erect digital processes, rising from an irregular spreading growth of a similar kind. Stiff, resilient. Colour purple, becoming light brown when washed out. Processes tubular; vents single, terminal. Spicule of one form only, viz. acerate, fusi-form, gradually sharp-pointed, smooth; smaller in the axis than at the circumference of the fibre. Size of specimen about 9 inches in diameter each way, by 3 inches high.

*Hab.* Marine.

*Loc.* Gulf of Manaar.

*Obs.* In my "Notes Introductory to a Study of the Spongiida" ('Annals,' 1875, vol. xvi. p. 141) this kind of Chalina has been described; but although the character of the "Family" is recorded, I had not time then to give an illus-

tration of the "Group" at p. 194 (*ibid.*), which is herewith done and named for this purpose. I expect that the species is common; but it differs from the group "Digitata," which is even perhaps still more common, in the processes being hollow or tubular instead of solid; that is, the vents of the excretory system open interiorly into the general tube ("cloaca," Bk.), terminating at the extremity in the former, instead of here and there, laterally, along the outside of the cylindrical process in "Digitata."

#### ECHINONEMATA.

##### *Halichondria plumosa*, Johnston.

A small patch of the microcioniform variety (see Bowerbank's 'British Spongiadae,' 1874, vol. iii. pl. xxiv. figs. 7-13), about three quarters of an inch in diameter.

*Loc.* Gulf of Manaar.

*Obs.* In company with *Microciona affinis* and *Hymerhaphia unispiculum*, each about the same size, also *Leucortis indica*, Häckel, a calcareous sponge, and *Polytrema cylindrica*, growing together on a Melobesian nodule about  $1\frac{1}{2}$  inch in diameter.

##### *Hymerhaphia eruca*.

Of this sponge only one small specimen was found among the first set of Melobesian nodules that I examined; but in these, the second set, it has been found in three or more places in abundance; so the existence of this remarkable species is thus established.

*Loc.* Basse Rocks.

#### HOLORHAPHIDOTA.

##### *Amorphina megalorhaphis*, n. sp.

Massive, irregularly lobed, tender, white. Surface irregular. Structure amorphous, confused; traversed by branches of the excretory canal systems, which are large and terminate respectively in scattered vents. Spicule of one kind only, viz. acerate, curved, fusiform, gradually sharp-pointed, smooth; varying in length from 1-128th to 1-23rd inch. Size of specimens about  $1\frac{1}{2}$  inch in diameter each way.

*Hab.* Marine. Growing over *Balani* and sea-bottom.

*Loc.* Basse Rocks.

*Obs.* This seems to be a variety of the common British species *Halichondria panicea*, chiefly differentiated by the size of its largest spicules, which is double that of the English



one. The spicules also of the specimens brought home by the Rev. A. E. Eaton from Kerguelen's Island, and others dredged up by H.M.S. 'Porcupine' in the Atlantic Ocean, are much larger than those of the common British species; so that this variation may extend even to our own shores, while the single form, great variety in size, and long attenuation towards the end of the spicule generally characterize the species everywhere.

*Halichondria infrequens*, n. sp.  
(Pl. XVIII. fig. 9, a-d.)

Of this sponge I can only record its spiculation, which was found to the extent of half an inch on the surface of *Discodermia sinuosa* (to be hereafter mentioned). Spicules of four forms, viz.:—1, skeleton, acerate, curved, fusiform, obtusely pointed at the ends, thickly microspined throughout (fig. 9, a); 2, subskeleton (tibiella), cylindrical, straight or undulatory, inflated at each end, smooth (fig. 9, b); 3, flesh-spicule, bihamate, simple, contort, large (fig. 9, c); 4, flesh-spicule, equianchorate, rather inclined to the "angulated" (Bowerbank) kind (fig. 9, d). No. 1 forms the body structure; and 2 is chiefly confined to the surface, where the flesh-spicules are also most numerous.

*Hab.* Marine.

*Loc.* Gulf of Manaar.

*Obs.* The chief character here is the thickly microspined acerate skeleton-spicule, which may perhaps be the representative of the spined acerate in *Halichondria incrustans*.

*The Tibiella.* (Pl. XVIII. fig. 9, b.)

From time to time, as it becomes evident that a certain form of spicule is common to many sponges under various modifications, it is desirable that a generic name should be given to it, to avoid periphrasis in description; and thus I propose "tibiella" for that spicule so common among the Fibulifera, Halichondrina, and some of the Suberitida, which has a distant resemblance to the shin-bone, in which the shaft may be straight or crooked, cylindrical or fusiform, long or short, thick or thin, with the extremities simply pointed or obtuse, or inflated and hastate, or inflated and clavate, spined all over or only at the extreme end. Such are some of the modifications which may be presented by Dr. Bowerbank's "biclavated cylindrical" spicules ('British Spongiadae,' vol. i., Terminology, p. 231, pl. i. fig. 19), and by "no. 2" in the above description of *Halichondria infrequens* (Pl. XVIII. fig. 9, b).

*Cliona Warreni*, n. sp.  
(Pl. XVIII. fig. 6, *a-d*.)

Burrowing under a layer of *Melobesia*, and coming to the surface through circular apertures scattered irregularly over the Melobesian nodule (fig. 6, *a*). Colour dark brown now. Apertures 1-16th to 1-8th inch in diameter; the smaller ones poriferous and filled with a tuft of pin-like spicules held together by dark brown sarcode, with their points outwards (fig. 6, *b*); the larger ones, being vents, are empty and open (fig. 6, *c*). Spicule of one form only, viz. pin-like; head almost spherical, neck much constricted; shaft large, fusiform, thicker than the head, curved, gradually sharp-pointed, the whole smooth (fig. 6, *d*), total length 1-51st inch. Size of nodule about 1½ inch in diameter.

*Hab.* Marine. Burrowing under *Melobesia*.

*Loc.* Gulf of Manaar.

*Obs.* The form of the spicule generally and there being no others, together with the dark brown sarcode (when dry), contrasting strongly with the light-coloured *Melobesia* through the circular openings, characterizes this species. As regards the present colour, it does not differ much from that of *Cliona celata* when dry, which in its fresh state may be golden or chrome-yellow.

*Suberites fistulatus*.

In the description of this sponge (in the former report) I have omitted to mention the presence of a minute, simple, tricurvate flesh-spicule, about 5-6000ths inch long—that is, about half the length of the equianchorate, which anchorate, again, in its full development, is so much bent as to cause the middle arms to be closely approximated.

*Thoosa socialis*.

Having found a good specimen of this species lining the sponge-eaten cavities of a Melobesian nodule, and stretching across them in thin films, a bit of the latter was placed in water under the microscope for examination, when the peculiar spicule characterizing this species ('Annals,' 1880, vol. vi. pl. v. fig. 23, *a*) was found to be accompanied by the same kind of flesh-spicules as those of *Alectona Higgini* (*ibid.* fig. 25, *b, c*), while the cake-shaped form (fig. 23, *b, c*) was not present.

This at first appeared to me inexplicable; but on comparing the characteristic skeleton-spicule of *Thoosa socialis* (*l. c.*) with that of *Alectona Higgini* (fig. 25, *a*) it became evident

that the two are very nearly allied in form; and as no flesh-spicules were formerly found with *Thoosa socialis*, it is not improbable that one is but a variety of the other. The scap-trellum, however, although alike in form, is more than twice the size of that in *Alectona Higgini*, while the linear spicule is not so long. The "bit of film" examined having had no direct connexion with the rest of the sponge lining the cavity, is proof that these sponge-spicules formed part of the spiculation of *Thoosa socialis*, and were not accidental occurrences.

*Stelletta crassicula*, n. sp.

Globular, firm. Colour brown-grey. Surface even, areolar, formed by the spreading heads of the bundles of zone-spicules, through which those of the anchoring-spicules project, tympanized in the intervals by the dermal sarcode. Pores in the dermal sarcode. Vents single, scattered here and there. Internal structure, as usual, hard and tough; the bundles of zone- and body-spicules extending nearly to the centre, as they are large and the specimen very small. Spicules of six forms, viz. four skeleton- and two flesh-spicules. Skeleton-spicules:—1, zone-spicule trifold, arms spreading laterally, slightly extending forwards, and recurved, shaft long and smooth, gradually sharp-pointed, head 1-360th inch in diameter, shaft 1-9th inch long; 2, body-spicule large, acerate, curved, fusiform, gradually sharp-pointed, smooth, 1-9th inch long; 3 and 4, anchor and fork, head of largest anchor about 1-150th inch in diameter, shaft variable, 1-9th inch long or more. Flesh-spicules:—5, minute acerate, thin, curved, fusiform, gradually sharp-pointed, smooth, about 1-80th inch long; 6, stellate, as usual minute, delicate, with a variable number of straight arms radiating directly from the centre without nucleus, about 1-3000th inch in diameter. Nos. 1-4 are in bundles, the anchors and forks projecting a little beyond the surface, and the flesh-spicules chiefly confined to the dermal sarcode. Size  $\frac{1}{2}$  inch in diameter.

*Hab.* Marine. On a Melobesian nodule, attached by the anchoring-spicules.

*Loc.* Basse Rocks.

*Obs.* The smallness of this specimen compared with the large size of its skeleton and anchoring-spiculation, especially the projecting heads of the anchors, at once characterizes it; but when the dermal acerate flesh-spicule is added, the distinction of the species becomes complete so far, since I do not know another instance in which the dermal flesh-spicule is at the same time smooth and so large.

*Discodermia sinuosa*, n. sp.  
(Pl. XVIII. fig. 1, a-h.)

Surface even, discophorous; disks (fig. 1, a) at first simple, in juxtaposition, peltate, then foliate, with shallow denticulate margin (fig. 1, b); afterwards more deeply notched and foreshadowing a trifid division, with a tendency in some of the notches to assume a circular form (fig. 1, c); then the same more intensified and larger, when, overlapping each other *in situ*, the circular notches become converted into apertures, and then more especially present the sinuous lines which characterize the species (fig. 1, d); finally transmuted into branches which, becoming subdivided towards the extremities, end in filigree expansions (fig. 1, e), which, in the deeper and fully-developed structure, interlock with their neighbours by subround tubercles constricted at the neck, which thus form a grape-like mass (fig. 1, f). Disk at the commencement or when first recognizable simple, subcircular, with even margin and short, central, smooth-pointed shaft projecting inwards, nail-like, from the lower surface, and encircled above by faint, broken, concentric lines, about 1-300th inch in diameter (fig. 1, a). Flesh-spicule minute, fusiform, somewhat inflated in the centre, microspined and slightly curved (fig. 1, g, h), abundant throughout, but especially over the discophorous or external layers. Size of largest specimen, which is considerably worn and has been deprived of its disks, about half an inch in diameter each way; that of the smallest, which is thin and spreading, hardly more than the discophorous or outer layers thick.

*Hab.* Marine. On Melobesian nodules.

*Loc.* Gulf of Manaar; Basse Rocks.

*Obs.* The circular notches of the disks separately, and the sinuous lines which they present when overlapping each other *in situ*, are almost identical with what is seen in *Kaliapsis cidaris*; but the absence of papillary projections on the surface in the former at once points out the difference.

*Discodermia sceptrellifera*, n. sp.  
(Pl. XVIII. fig. 2, a-h.)

Surface even, discophorous. Colour yellow, becoming reddish brown under the influence of nitric acid. Disk simple, circular, with even margin, presenting faint, irregular, concentric lines; provided with a short, sharp-pointed, smooth shaft, projecting inwards, nail-like, from its under surface (fig. 2, a); soon becoming irregular in its outline (fig. 2, b), which assumes a trifid division (fig. 2, c), still more developed

in fig. 2, *d*; ultimately passing into a four-armed, lithistid spicule, whose branches, becoming subdivided towards the extremities, end in filigree expansions (fig. 2, *e*), which, in the deeper and fully developed structure, interlock with their neighbours by a few straggling subround tubercles (fig. 2, *f*). Flesh-spicule short, thick, seeptrelliform, coarsely spined round the centre and at each of the ends (fig. 2, *g, h*); extremely abundant throughout, but especially on the surface. Size of specimen about  $\frac{1}{4}$  inch in all ways.

*Hab.* Marine. On a Melobesian nodule.

*Loc.* Gulf of Manaar.

*Obs.* The specimen of this species had become overgrown with a layer of *Melobesia*, and would have remained thus concealed but for an accidental fracture, which, passing through, caused it to separate into two portions, one of which, having been boiled in nitric acid, revealed the character of its spiculation all but the circular form of the disk (fig. 2, *a*), whose existence, in description and delineation, is thus inferred. The specimen is not only small but imperfectly developed; so that I am not quite certain that fig. 2, *f*, represents the ultimate development of the filigree—that is, as it would be in the deeper structure.

On the same small nulliporiform nodule, which is not more than an inch in diameter, there is a portion of *Discodermia aspera*, which presents a similar yellow colour, one of *Coralistes verrucosa* overgrown by *Hymenophyllum eruca*, *Carpenteria utricularis*, *Rotalia spiculotesta*, *Polytrema miniaceum*, &c., showing how many different organisms may exist on one small Melobesian nodule.

### *Specimens from Bass's Straits, South Australia.*

#### CARNOSA.

#### *Halisarca bassangustiarum*, n. sp. (provisional).

Among the "dredgings" from Bass's Straits are two more or less thin, light, corrugated, even-margined, subcircular specimens about an inch in diameter each, one of which is dark purple, almost black, and the other brown in colour. Both are charged with globular bodies like cells, about  $3\frac{1}{2}$  6000ths inch in diameter; but while these are indistinct in one of them, they are well-defined, spheroidal, and capsular in the other. How far these specimens may have been brought to this state by exposure in the waves and on a hot dry beach I cannot say; but to expect *Halisarca* after such exposure to

present any of its original features is out of the question. All, therefore, that I can add is that the "brown" specimen in a smaller state appears again attached to *Dictyocylindrus reticulata* (to be described hereafter) from the same locality, and charged with the same kind of spherical capsular bodies (? ova), where it so far manifests all the appearance of *Halisarca*, that I can hardly doubt that both are dried specimens of one and the same, for which I propose the name above given. Neither becomes gelatinous when soaked in water, although when dry the brown specimen presents here and there the appearance of dried glue, which the dark specimen does not. I admit that this description is not satisfactory; but under the circumstances it cannot be otherwise; at the same time it is desirable that it should be recorded, to induce future observation.

*Loc.* Bass's Straits.

#### PSAMMONEMATA.

##### *Dysidea Kirkii*, Bk., 1841.

Massive, sessile, more or less contracted at the base, thick, erect, more or less compressed, simple, lobate; lobes passing into mamilliform, digital, or subbranched processes; sometimes digitate and branched, *Chalina*-like. Texture subfragile. Colour, when fresh, purplish or grey. Surface even, fibro-reticulate, with the interstices tympanized by the dermal sarcode. Vents terminal, large, situated at the *ends* of the lobate, mamilliform, or digital processes, which are often in a line on a serrated crest or ridge. Pores in the dermal sarcode. Internal structure fibro-reticulate, traversed by channels of the excretory canal-systems, which terminate in the vents just mentioned; fibre composed of foreign bodies (quartz-grains, sponge-spicules entire and fragmentary, &c.) held together by a minimum of sarcode in the form of crooked anastomosing threads, whose interstices being also tympanized by sarcode, produce a uniformly areolated tissue, which may be slightly interrupted by a little development in excess of the vertical over the transverse fibre. Size variable; the largest specimen I have seen was about 5 inches long, 4 inches high, and 1½ inch thick.

*Hab.* Marine. Growing on hard objects, which, if hollow, frequently have their interior filled with it.

*Loc.* The whole coast of South Australia; Mauritius and Cape of Good Hope.

*Obs.* In the year 1840 "Rupert Kirk, Esq.," of Sydney, Australia, sent to Dr. Bowerbank "about fifty species of various genera of sponges" (Trans. Micr. Soc. London, 1841, vol. i.

p. 32); and among them Dr. Bowerbank noticed one almost identical with *Dysidea fragilis*, Johnston, to which he gave the name of "*Dysidea Kirkii*" (*ibid.* p. 63, pl. vi.). This species in structural composition appeared to Dr. Bowerbank to be, if any thing, still more arenated than *D. fragilis*; thus he states, "in *D. fragilis*, Johnston, the primary fibres are often as abundantly arenated as those of the Australian species, while the secondary ones are only partially filled with extraneous matter; and in this condition they are more or less tubular" (*Brit. Spongiadæ*, 1864, vol. i. p. 212). After this, viz. in 1874, Dr. Bowerbank gave some very good representations of *Dysidea fragilis* from specimens now in the British Museum, which I have examined, but, *as they appear when dry and washed out upon our beach* (*op. cit.* vol. iii. pl. lxix.).

Now Col. Montagu, in 1812, who appears to have first noticed this sponge on the "south coast of Devon," called it *Spongia friabilis* (*Wernerian Mem.* 1818, vol. ii. p. 114, pl. xvi. figs. 1, 2), which Johnston, who states that Montagu's account was "read to the Society on the 9th March, 1812" (*Hist. Brit. Sponges*, 1842, p. 37, footnote), changed generically to "*Dysidea*;" so that, besides having examined Dr. Bowerbank's type specimens now in the British Museum, I am living on the coast where Montagu found the original specimens; and, so far as the dead and "dried form washed out on the beach" goes, the descriptions and delineations respectively are accurate; but *not so* as regards the appearance of this sponge while growing *in situ* on the rocks; for there it is almost identical with the representation of *Spongelia incrustans* given by Schmidt (*Spong. Adriat. Meeres*, Taf. iii. fig. 7). Schmidt himself has identified *Dysidea fragilis* with *Spongelia*, Nardo (*op. cit.* 1866, 2nd Suppl. p. 11), but *provisionally*, because he had only seen one of the "dried" and washed-out specimens to which I have alluded. It seems to me therefore that Montagu's *Spongia friabilis* of 1812 is Johnston's *Dysidea fragilis* of 1842 and Nardo's *Spongelia* of 1847, of which the best representation in the free state that I have seen has been given by Prof. F. E. Schulze of *Spongelia pallescens* (*Zeitschrift f. wiss. Zoologie*, Bd. xxxii. Taf. v. fig. 2), the slight variation in appearance between *Spongelia pallescens* and *S. incrustans* here being of no consequence.

To return to *Dysidea Kirkii*, Bk., I cannot see much difference in structure between it and *Dysidea fragilis*, both with and without the sarcode; but in general form, colour, and perhaps in the form of the points (*conuli*) on the surface being less prominent, it differs, as will have been seen by the above description.

There is, however, a large specimen (? 3 inches in its longest diameter) in the Bowerbank collection now in the British Museum labelled "coast of Suffolk, Dr. W. B. Clarke," in which these conuli are turned into little round balls that, touching each other, give the whole surface a granulated appearance; in short they are the *conuli* thus inflated, which, again, are the circumferential terminations of the vertical fibre, that in this species or variety (for which I would suggest the name of *Dysidea granulata*) are more than ordinarily enlarged.

In my classification, this genus forms the type of the group "Arenosa," which is the last of the family "Hircinida" in my order "Psammonemata," and represents the opposite state to that of the group "Euspongiosa," viz. the first of this order, with respect to the amount of foreign material which its fibre contains, inasmuch as, while there is hardly a trace in the Euspongiosa (ex. gr. *Spongia officinalis*), there is so much in *Dysidea* that it is barely removed from sand itself. Thus *Dysidea* bears to *Spongia officinalis* the same kind of relation that some of the order Holorhaphidota, whose fibre is almost entirely composed of spicules, bear to the kerataceous fibre of some of the Rhaphidonemata, in which the spicules are frequently very scanty.

As regards geographical distribution, the very fact of the genus *Dysidea* being the first step towards the development of the Psammonemata, which may be said to culminate in *Spongia officinalis*, where the kerataceous element is almost every thing, and the arenaceous one or that of foreign bodies almost *nil*, it might be fairly assumed that, if any part of the order more than another is prevalent over the world, it will be *Dysidea* = *Spongelia*, Nardo; at least, this is the case in the British Isles, as may be seen by reference to Dr. Bowerbank's 'British Spongiadæ' (vol. iii. 1874), where, with the exception of a few insignificant specimens of his *Spongionella pulchella* (pl. lxxv. figs. 5-8) and *Verongia zetlandica* (pl. lxx. figs. 9-11), nothing but the representations of *Dysidea fragilis* is given. Yet the whole order appears to exist in the greatest luxuriance on the south coast of Australia, especially about the south-west angle, judging from the specimens (skeletons for the most part) which have been picked up and sent to England alone, of which the collections in the British Museum (that is, including those which belonged to the late Dr. Bowerbank) represent perhaps the finest and most varied specimens of the greatest number of species brought together in Europe. Among these are a vast number of specimens of *Dysidea Kirkii* in all states, from crumbling fragility, owing



to the absence of sarcode destroyed chiefly by the presence of sea-salt, to comparative firmness, with the dried sarcode still left about them; and it is from this numerous collection, together with several belonging to the Liverpool Free Museum, which were dredged off Curtis Island, in Bass's Straits, by Capt. H. Cawne Warren, that the description above given has been taken. Among the latter is one on the branches of a specimen of *Mopsea (Isis) encrinula*, Milne-Edw., to which I might add another from Algoa Bay on a specimen of *Mopsea gracilis*, Milne-Edw., sent me by my friend Dr. Dickie in 1873.

The kind of arenaceous foreign material in *Dysidea Kirkii* will of course depend upon that of the locality: viz. if only arenaceous, it will be chiefly composed of sand-grains; if spiculiferous, of sponge-spicules and their fragments, &c. But there is one element, viz. a little prism of calcite, generally banded with brown, yellow, or red, singly or in conjunction, that might puzzle the observer if it were not stated that this comes from the disintegrated structure of very thin bivalve shells like *Pinna*; hence the prismatic form and banded colours.

The ubiquitous parasite *Spongiophaga communis* also occasionally infests *Dysidea Kirkii*. Again *Oscillaria spongeliæ*, Schulze, appears apparently as a commensal in *Spongelia pallescens*, wherein Prof. Schulze has found it *even* in the embryo, as his published accounts will show (*Zeitschrift f. wiss. Zoologie*, Bd. xxxii. Taf. v. fig. 7, &c.), and also preparations which he kindly sent me. Marshall, too, represents an Oscillatorian in the "syncytium" of his *Psammoclema ramosum* = *Dysidea ramosa*, Häckel in sched. (*ib.* Bd. xxxv. p. 111, Taf. vii. fig. 15). *Spongiophaga communis*, however, is a destroyer, and not a commensal. At what period these parasites enter the sponge may be a matter for speculation, but can hardly be one of certainty, as in Schulze's case they were found *in the embryo*.

All the specimens of *Dysidea Kirkii* that I have seen have been *dry*; but as *Dysidea* is one and the same with *Spongelia*, which Prof. Schulze has studied in the Adriatic while *fresh*, I cannot do better than refer the student to his paper for all this part of the subject (*Zeitschrift f. wiss. Zoologie*, Bd. xxxii. p. 117 &c. Taf. v.-vii. 1878).

#### ECHINONEMATA.

*Dictyocylindrus reticulatus*, n. sp.  
(Pl. XVIII. fig. 7, a-c.)

Feathery, branched, tufted, stiff. Colour brown. Surface

rough, composed of lacinulated tufts projecting through the reticulate structure, which tufts are the ends of the ultimate branches flattened and divided into penicilliform processes; reticulated structure consisting of sarcode echinated with small spined spicules. Neither the pores nor the vents seen, from the contracted state of the tissues; but probably the former in sarcode tympanizing the interstices of the dermal reticulation, and the latter numerous and small, as is usual in the Echinonemata. Spicules of two kinds, viz.:—1, skeleton-, acute, curved, slightly inflated at the large end, gradually sharp-pointed, smooth, about 1-40th by 1-1500th inch in its greatest dimensions (fig. 7, *a*); 2, flesh- or echinating spicule, clavate, without enlarged head, sharp-pointed, spined throughout, spines recurved from the point backwards, about 1-240th by 1-2000th inch in its greatest dimensions (fig. 7, *b c*). The skeleton-spicules form the axial structure, appearing setaceous at the ends of the penicilliform processes; while the flesh-spicules echinate the meshes of the reticular sarcode most profusely. Size of branches, of which there are two that appear to have grown with others from the same point on some hard object,  $2\frac{1}{2}$  inches high by  $1\frac{1}{2}$  inch broad in the expanded head.

*Hab.* Marine.

*Loc.* Bass's Straits.

*Obs.* The characteristic feature of this species is its dermal reticulation, in which the meshes are densely charged with the echinating spicules, thus presenting a beautiful and equally characteristic feature of the Ectyonida or first family of the order. The spiculation is like that of *Dictyocylindrus* in general, but not the same in particular, while the general form is different from that of all hitherto described species.

It is on a part of this specimen that the specimen of *Hali-sarca bassanjustiarum* to which I have alluded is attached.

While the rough lacinulated surface above noticed is common to many of the Echinonemata, there are others which are as equally and uniformly smooth, like that of the following species:—

*Echinonema typicum*, n. sp.

Shrubby, cauliculate, more or less compressed bunch-like or clustral, consisting of a great number of digital, more or less branched stalks spreading upwards from a contracted sessile base; more or less covered throughout by a whitish incrustation; branches cylindrical, round, or slightly compressed, more or less subdivided, terminating in obtuse round ends. Consistence firm, resilient. Colour white, or brown when the incrustation has been rubbed off. Surface even,

covered with the white incrustation mentioned, in which the vents appear like small pin-holes scattered numerously over the whole specimen, connected superficially with branched stelliform grooves, which are the collapsed channels of the excretory canal-systems to which they respectively belong. Pores not seen, but, in all probability, in the dermal sarcode supporting the incrustation. Internal structure tough, fibrous, kerataceous. Spicules of two kinds, viz. :—1, skeleton-, acute, smooth; 2, flesh- or echinating spicule, clavate, spined; the former chiefly confined to the centre of the kerataceous fibre, and the latter echinating its surface, while both combined make up the white incrustation with which the surface is covered. Size variable, under perhaps 18 inches in diameter.

*Hab.* Marine.

*Loc.* South and S.W. coast of Australia.

*Obs.* This is perhaps the most abundant species on the south coast of Australia; and my description has been taken from at least a bushel of specimens, but all dry, and therefore only preliminary to that which may one day be made of this species when in the fresh state or well preserved in absolute alcohol, and studied after the satisfactory manner followed by Prof. F. E. Schulze of Gratz. (See "Structure and Arrangement of the Soft Parts in *Euplectella aspergillum*," Voyage of H.M.S. 'Challenger,' 1880.)

*Echinonema anchoratum*, n. sp.

Flat, fan-shaped, thin, more or less stipitate. Like the last species in every thing but form and spiculation, the latter only differing in the presence of a small naviculiform equianchorate flesh-spicule. Size variable, under 8 inches in diameter.

*Hab.* Marine. Common.

*Loc.* South coast of Australia.

*Obs.* The presence of the equianchorate, together with the general form, distinguishes this from the last species; yet I have seen some specimens with round cylindrical stalks, like those of *E. typicum*, also charged with this little navicular form of equianchorate, which is the same as that of the *Microcionina*; so its presence or absence, probably, in the *Ectyonida* does not go for much in specific determination.

I have given descriptions of these two species, not only because the former is among the specimens dredged by Capt. Warren, but because I have alluded to this *type* by name only in my "Notes Introductory to a Study of the Spongida" ('Annals,' 1875, vol. xvi. p. 195), as promised in the "third part"

of this publication, for the illustration of one of the genera, to be hereafter included in the provisional group "Pluriformia."

*Acanthella stipitata*, n. sp.  
(Pl. XVIII. fig. 8.)

Head globular, branched, aculeate, supported on a long naked stem. Stiff. Colour now brownish green. Surface composed of aculeations which are the ultimate divisions of the branches, united together by fenestral expansions of sarcode. Spicule of one form only, viz. acuate, slightly curved or undulating, abruptly sharp-pointed, smooth, 25 by  $\frac{2}{3}$ -1800th inch in its greatest dimensions (fig. 8); arranged in bundles in the branched head so as to project a little beyond the sarcode; confusedly in the stem, which is hard and compact. Size:—head 2 inches in diameter; stem, up to where it commences to branch into the head, 2 inches long by 1-6th inch thick, much worn and pointed towards the end, which has been broken off from its original point of attachment.

*Hab.* Marine.

*Loc.* Bass's Straits.

*Obs.* This sponge differs very little from Schmidt's *Acanthella acuta* (Spong. Adriat. Meeres, p. 75, Taf. vi. fig. 7), except in the size of the spicule, which is about five times smaller than that of the type specimen in the British Museum.

HOLORHAPHIDOTA.

*Latrunclia purpurea*, n. sp.  
(Pl. XVIII. fig. 5, a-c.)

Flat, compressed, circular, thin, cake-like or fungiform, attached on one side by a constricted portion to a *mussel*-shell; texture compact, but not gelatinous. Hard. Colour dark brown-purple. Surface on the upperside, with which the peduncular portion is connected, ragged, proliferous, much darker than the (?) underside, which is even; margin thick, round, smooth, like the dark part generally. Internal structure compact, densely spiculous. Spicules of two kinds, viz.:—1, skeleton-, acerate, curved, subcylindrical, gradually sharp-pointed, smooth, 1-75th by 1-4000th inch in its greatest diameters (fig. 5, a); 2, flesh-spicule, sceptrelliform, consisting of a straight shaft spined over each end entirely and discoidly, and in two separate rings around the shaft on one side the middle line, the latter often commingled by an irregular disposition of the spines, about 1-857th inch long (fig. 5, b, c).

Skeleton-spicules chiefly confined to the body; flesh-spicules to the circumference, on the (?) upperside and darker portions, arranged perpendicularly in juxtaposition, with the spinous disk of one end outwards. Size of largest specimen (for there are two) about  $1\frac{1}{2}$  inch in horizontal diameter and 1-8th inch thick.

*Hab.* Marine.

*Loc.* Bass's Straits.

*Obs.* I have already described and illustrated a species of this kind from the Red Sea ('Annals,' 1879, vol. iii. p. 298, pl. xxvii. figs. 1-4), but with a differently formed sceptrellum and of a light colour; the form of the skeleton-spicule, however, is nearly the same—that is, acerate, not acuate like that of another much larger and light-coloured undescribed species from the south-western coast of Australia, viz. "Freemantle," that of the species dredged up by H.M.S. 'Porcupine' in the Atlantic Ocean, and that first named and described by Bocage, viz. *Latrunculia cratera* from St. Iago, in all of which the sceptrellum is differently formed.

In consistence *Latrunculia purpurea* is very much like *Halichondria suberea*, Johnston, = *Suberites domuncula*, Sdt., and in the manner of growth upon the mussel-shell very much like *Halichondria ficus*, Johnston.

#### AXONA.

In 1867 Dr. Gray gave the name of *Axos Cliftoni* to an unknown sponge whose spicule *only* had been figured by Dr. Bowerbank in 1864; and in 1873 Dr. Bowerbank described the sponge itself under the name of *Dictyocylindrus dentatus*, without any allusion whatever to Dr. Gray (for reference *in extenso* see 'Annals,' 1879, vol. iii. pp. 284-285, where the subject is fully considered and therefore need not be repeated in detail here). Taking Dr. Gray's name "*Axos*" for the genus, I have added two new species (*op. et loc. cit.*), and now find among Capt. Warren's dredgings from Bass's Straits (for all the species so far come from the south coast of Australia) two more, which, however, differ so much from the original one, viz. *Axos Cliftoni* = *Dictyocylindrus dentatus*, Bk., that, if they are found to be still further multiplied, it may be necessary hereafter to divide them into genera; wherefore it seems desirable at once to make a group of them under the name "*Axona*," with the following characters:—

#### AXONA, n. group.

Form variable, surface aculeated; aculeations consisting of

a condensation of the skeleton-spicules extended from a general axis similarly composed, or from the reticulated fibre of a general areolation. Spicules of two kinds, viz. skeleton- and flesh-spicules.

*Axos anchorata*, n. sp.  
(Pl. XVIII. fig. 3, a-f.)

Cauliform, cylindrical, cactus-like, long, straggling, sessile, growing from a small root-like expansion on a mussel-shell (fig. 3); sometimes branched?; bent and twisted upon itself, snake-like *in the specimens*, apparently by accident, united where in contact. Caulis small at the commencement, slightly increasing afterwards and ? diminishing towards the extremity. Texture firm, but not hard. Colour now brown. Surface aculeated throughout with short, conical, or obtuse or terminally inflated processes, supported on reticulate ridges tending to a longitudinal arrangement; processes projected from the points of the intersection of the ridges (fig. 3, a). Vents numerous, scattered (fig. 3, c). Structure interiorly areolar throughout, not axiated; cells of the areolation formed by the sarcode tympanizing the interstices of the reticulated fibre (fig. 3, b). Spicules of two kinds, viz. :—1, skeleton-, acerate, nearly straight, fusiform, gradually sharp-pointed, smooth, 1-85th by 1-2000th inch in its greatest dimensions (fig. 3, d); 2, flesh-spicule, very minute, equianchorate, shaft round, much curved, arms *falcate-linear*, much spread, the central one almost in continuation with the curve of the shaft, and the other two at nearly right angles to it, about 1-1500th inch long (fig. 3, e, f). Skeleton-spicules arranged longitudinally in the reticulated fibre and aculeations; flesh-spicules scattered throughout the sarcode generally. Length of caulis in the specimen indeterminate; diameter near the base about 1-6th inch, further up 1-3rd inch.

*Hab.* Marine.

*Loc.* Bass's Straits, South Australia.

*Obs.* The cactus-like character of this stem at once points out its affinity with the genus *Axos*, although the original species, viz. *Axos Cliftoni*, is axiated by a condensation of the skeleton-spicule, like that of *Cladorhiza abyssicola*, Sars, and *Chondrocladia virgata*, Sir Wy. Thomson, from the Atlantic Ocean, whose position also among the Holorhaphidota is not yet determined. In general form, when fresh, *Axos anchorata* seems to have been something like that species of *Cactus* commonly called "creeping cereus" (*C. flagelliformis*); and so far again it resembles the long stems of *Axos Cliftoni* (see Dr. Bowerbank's excellent figure, Proc. Zool. Soc. Lond.

1873, pl. xxix.), which, however, branch off in great plurality from a short thick stipes and are not single and sessile as in *Axos anchorata*; but the specimens from which I have been obliged to take my description are so imperfect that, although there is sufficient to establish the species, especially in the peculiar form of the equianchorate, further observation is necessary for its completion; and such is the case with the following fragment, which amounts to nothing more than 3 inches of the stem, with neither root nor termination, but yet again presents sufficient for specific determination, and may be described under the proposed designation of "*fibulata*" as follows:—

*Axos fibulata*, n. sp.  
(Pl. XVIII. fig. 4, a-c.)

In general form and structure this species appears to have been the same as the foregoing, differing only in its spiculation, which consists of two kinds of spicules, viz. :—1, skeleton-, acerate, curved, fusiform, gradually sharp-pointed, smooth, 1-111th by 1-2400th inch in its greatest dimensions (fig. 4, a); 2, flesh-spicule, very minute, simple, bihamate (*fibula*), 1-2400th inch long (fig. 4, b, c). Spicules arranged as in the foregoing species. Size of specimen, including the bends of its contorted condition, about 4 inches long by  $\frac{1}{4}$  inch in diameter.

*Hab.* Marine.

*Loc.* Bass's Straits, South Australia.

*Obs.* This, as before stated, is a very poor specimen and requires even still more observation to complete its description than that of *A. anchorata*, especially as the bihamate is simple and therefore does not afford the peculiar character of the equianchorate in *A. anchorata*.

Following is the supplementary list of Foraminifera and Spongida obtained from dredgings in the Gulf of Manaar and the sea in the vicinity of the Basse Rocks, together with one of the Spongida dredged in Bass's Straits, South Australia.

*Specimens from the Gulf of Manaar and the Basse Rocks indicated by the abbreviations G. M. and B. R. respectively.*

#### FORAMINIFERA.

Polytrema miniaceum. G. M.	Rotalia spiculotesta. G. M. and
— cylindricum. G. M.	B. R.
Carpenteria utricularis. G. M.	— arenacea, n. sp. G. M. and
Gypsina melobesioides. G. M.	B. R.
	Holocladina pustulifera. G. M.

## SPONGIDA.

## Ord. i. CARNOSA.

*Halisarca rubitingens*, n. sp. prov. *Chondrilla nucula*. G. M.  
G. M. and B. R.

## Ord. iii. PSAMMONEMATA.

*Hircinia fusca*. G. M. and B. R. *Hircinia clathrata*, n. sp. G. M.

## Ord. iv. RHAPHIDONEMATA.

*Tubulodigitus communis*. G. M. *Oceanapia* (*Desmacidon*, *Bk.*) *Jeffreysii*. Australian variety, viz. without bihamates. B. R.

## Ord. v. ECHINONEMATA.

*Microciona atosanguinea*. G. M. *Hymerhaphia eruca*. G. M. and  
— *affinis*. G. M. B. R.  
— *quinqueradiata*. G. M. — *unispiculum*. G. M. and  
— *fascispiculifera*. G. M. B. R.

## Ord. vi. HOLORHAPHIDOTA.

*Amorphina megalorhaphis*, n. sp. *Geodia ramodigitata*. G. M. and  
B. R.  
*Esperia serratohamata*. G. M. *Stelletta euastrum*. G. M.  
*Hymedesmia stellivarians*. G. M. — *crassicula*, n. sp. B. R.  
and B. R. *Corallistes verrucosa*. G. M.  
*Cliona Warreni*, n. sp. G. M. *Discodermia aspera*. G. M.  
*Placospongia melobesioides*. B. R. — *laevidiscus*. G. M.  
*Samus anonymus*. G. M. — *sinuosa*, n. sp. G. M. and  
*Thoosa socialis* (with flesh-spicules). B. R.  
G. M. — *sceptrellifera*, n. sp. G. M.

## Ord. viii. CALCAREA.

*Leucortis indica*, *Häckel*.

*Specimens of Spongida from Bass's Straits.*

*Halisarca bassangustiarum*, n. sp. *Acanthella stipitata*, n. sp.  
(prov.). *Halichondria incrustans*.  
*Dysidea Kirkii*, *Bk.* *Spirastrella cunctatrix*, *Sol.*  
*Oceanapia* (*Desmacidon*) *Jeffreysii*. *Latrunculia purpurea*, n. sp.  
The Australian variety *D. fistulosa*, *Bk.*  
*Axos anchorata*, n. sp.  
*Echinonema typicum*, n. sp. — *fibulata*, n. sp.  
*Dictyocylindrus reticulatus*, n. sp. *Tethya lyncurium*, ? *Cliftoni*, *Bk.*  
*Halichondria plumosa*. Variety. *Leucetta* ? *primigenia*, *Häckel*.

Besides the above there are more or less of the remains of many other species, once fine specimens, but now encased by calcareous Polyzoa, and more or less destroyed, as before mentioned.



## EXPLANATION OF PLATE XVIII.

N.B. All the spicules are drawn to the scale of 1-12th to 1-1800th inch, except fig. 9, which is on the scale of 1-24th to 1-6000th inch, and the "more magnified" flesh-spicules in figs. 1 *h*, 2 *h*, 3 *e*, 4 *b*, and 5 *b*, which are on the scale of 1-12th to 1-6000th inch. Figs. 3 and 6 are of the natural size, and fig. 3, *a*, *b*, enlarged views of the former.

- Fig. 1. *Discodermia sinuosa*, n. sp. *a-e*, transformation of the disk to the lithistid form; *f*, interlocking of the filigreed extremities in the fully developed spicule; *g*, flesh-spicule; *h*, more magnified view of the same.
- Fig. 2. *Discodermia sceptrifera*, n. sp. *a-e*, transformation of the disk into the lithistid form; *f*, interlocking of the filigreed extremities in the fully developed spicule; *g*, flesh-spicule; *h*, more magnified view of the same.
- Fig. 3. *Axos anchorata*, n. sp. (nat. size), growing on a mussel-shell. *a*, magnified view of surface; *b*, the same of internal structure in the transverse section; *c*, vents; *d*, skeleton-spicule; *e*, flesh-spicule; *f*, the same, more magnified.
- Fig. 4. *Axos fibulata*, n. sp. *a*, skeleton-spicule; *b*, flesh-spicule; *c*, the same, more magnified.
- Fig. 5. *Latrunculia purpurea*, n. sp. *a*, skeleton-spicule; *b*, flesh-spicule, a sceptrillum; *c*, the same, more magnified.
- Fig. 6. *Cliona Warreni*, n. sp., *in situ*. *a*, Melobesian nodule; *b*, pore-head; *c*, vent; *d*, spicule.
- Fig. 7. *Dietyocylindrus reticulatus*, n. sp. *a*, skeleton-spicule; *b*, flesh- or echinating spicule; *c*, the same, more magnified.
- Fig. 8. *Acanthella stipitata*, n. sp. Skeleton-spicule.
- Fig. 9. *Halichondria infrequens*, n. sp. *a*, skeleton-spicule; *b*, "tibiella" or subskeleton-spicule; *c*, flesh-spicule, bihamate; *d*, flesh-spicule, equianchorate, front and lateral views.
- Fig. 10. *Rotalia arenacea*, n. sp. *a*, trochoid portion; *b*, flat rim.

XXXVII.—Note on *Papilio nebulosus*, Butler.

By LIONEL DE NICÉVILLE.

IN the Ann. & Mag. of Nat. Hist. 5th ser. vol. vii. p. 33. n. 2, pl. iv. fig. 3, Mr. A. G. Butler describes and figures a new *Papilio* from Darjiling under the name of *nebulosus*. The Indian Museum, Calcutta, has lately had presented to it, by Capt. G. F. L. Marshall, R.E. (to whom Mr. F. Du Cane Godman gave one of the specimens which had recently been purchased by him at Darjiling), a very similar (male) specimen. On the upperside it differs from *P. nebulosus* in the ground-colour of the whole of the fore wing being dull black, except that portion of it which is internal to the subbasal black band present in ordinary Sikkim specimens of *P. anti-phates*, Cramer, and which in my specimen is sap-green instead of cretaceous white. In *P. nebulosus* there are said to

