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XII.—Contributions to our knowledge of the Spongida. Order II. Ceratina

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rings near their ends, and black tips. The extremities are clad with pale isabelline hairs above, and ashy-coloured ones below; the feet-pads are black and the claws dusky. The ears are rounded, dusky in colour, and sparsely clad with ash-coloured hairs.

Length of head and body 6·1 inches, nose to eye 0·75, nose to ear-orifice 1·35, length of ear from meatus 0·87, hind foot from heel *s. u.* 1·1, fore foot 0·52, length of hair on middle of back 0·65.

The following are measurements of the skull of this specimen :—

	metre.
Total length	·039
Breadth across zygomatic arches	·021
Length of nasal bones	·013
Width of nasal bones behind	·0045
Width of nasal bones in front	·0053
Width of frontal between orbits	·005
Length of palatine opening	·011
Antero-posterior diameter of bony palate	·002
Width of palate between last pair of molars ..	·007
Length of series of upper molars	·008
Length of lower jaw from angle to symphysis ..	·025
Height to condyle	·016

This specimen is, I believe, correctly referred to *L. Roylei*, notwithstanding the difference in coloration and size from the typical example. The type seems not to have had any rufous patches on the fur; but the presence or absence of rufous colours in this genus seems to be of no specific importance. The Deosai *Lagomys* agrees well in size, colours, and cranial characters with an example from Sikkim in Mr. W. T. Blandford's collection.

XII.—Contributions to our Knowledge of the Spongida.

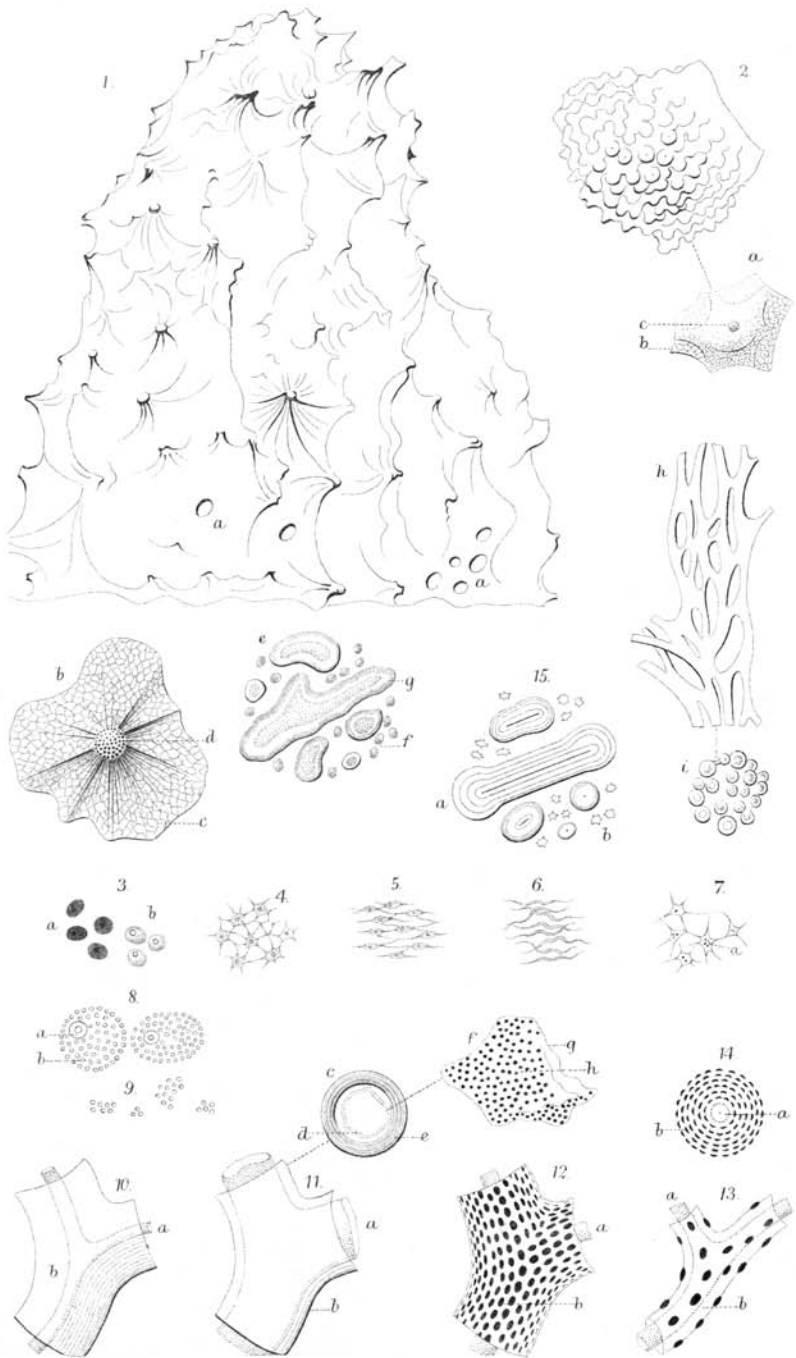
Order II. Ceratina. By H. J. CARTER, F.R.S. &c.

[Plate IX.]

Class SPONGIDA.

Order II. CERATINA.

ON reconsideration of the order Ceratina ("Notes Introductory to a Study of the Spongida," 'Annals,' 1875, vol. xvi. pp. 134, 135), which was proposed, among others, after an examination of *all* the specimens of Sponges then in the British Museum, I find, since having gone over, in a similar manner, those of



the late Dr. Bowerbank, which by purchase have been added to the Museum, that I have something to alter in and add to, respectively, the characters of the three families into which the Order has been divided.

Family 1. *Luffarida*.

As regards the general characters of the first family, viz. the *Luffarida*, I have little to state more than that the digitate, branched forms, which may be hollow or solid, closely resemble those of the digitate *Chalinida* in having, when solid, the vents in plurality scattered over the branches, and when tubular or hollow, single only, at the ends of the branches respectively; also that, in addition to the other forms mentioned, they may be thick and fan-shaped,—thus pointing out, in both instances, that form in the *Spongida* is not to be depended on alone in specific description, while as to size, under favourable circumstances, there seems to be no limit; for the specimen of *Luffaria Archeri*, Higgin, vulg. “Neptune’s Trumpet” (‘Annals,’ 1875, vol. xvi. p. 223), found by Dr. Archer at Belize, and presented to the British Museum by Mr. Thomas H. Higgin, F.L.S., of Liverpool, is 5 feet 5 inches long and $4\frac{1}{2}$ inches thick in its greatest diameter, which is about a foot from the mouth, as I am informed by Mr. Stuart O. Ridley, F.L.S., of the British Museum, to whom I am indebted for these measurements.

Geographically the *Luffarida*, which appear to abound in the seas between the two Americas, *ex. gr.* Caribbean Sea (De Fonbressin et Michelotti), are also to be found on the S.W. coast of Australia (Bowerbank collection, from George Clifton, Esq.) and in the Levant (British Museum, from Admiral Spratt).

Family 2. *Aplysinida*.

Here the distinction from the *Luffarida* is chiefly in the relative size of the granular axis to the thickness of the horny fibre, which is the opposite to that in the *Luffarida*, where the horny element is greatest, and thus the fibre rendered more or less rigid; while that of *Aplysina*, on the contrary, by its thickness, becomes more or less flaccid (Pl. IX. figs. 10, 11), to which may be added, perhaps, a more or less massive lobate form generally, spreading laterally rather than vertically.

Having entered into the history of the *Aplysinida* preparatorily to describing the species *A. corneostellata* = *Darwinella aurea* (‘Annals,’ 1872, vol. x. p. 101 &c., pl. vii.), I need

not repeat any part of this here; but among the late Dr. Bowerbank's sponges I found some more specimens, from the S.W. coast of Australia and Ceylon (Trincomalee) respectively, which require notice.

Thus, among those from the S.W. coast of Australia is one which, on account of its black colour, nodulated form, and doughy consistence (now hard from dryness), closely resembles the type specimens of *A. aërophoba* from the Adriatic Sea, sent to the British Museum by Prof. Oscar Schmidt; but the "fibre" is different, inasmuch as it is not cylindrical although branched, but scanty and made up of several small incompletely developed fibrils longitudinally fasciculated in an irregularly fluted form (Pl. IX. fig. 1, *h*); so that, in the *transverse* section, it presents a crenulated outline, agate-like, in which the horny laminae do not entirely surround the axial substance of the different fibrils indicated (fig. 1, *i*), thus constituting a confused composite structure of ill-developed and ill-formed horny material contrasting strongly with the simple, single, perfectly cylindrical fibre of other species (fig. 11). Besides this, it differs from *A. aërophoba* in the presence of dark black-purple pigmental cells (figs. 1, *f*, and 3, *a*), which are so abundant throughout the specimen as greatly to obscure the scantily developed fibre. What the colour when fresh might have been I cannot say; for *A. aërophoba* also, although nearly black in the dried state, is, according to Schmidt's diagnosis, "greenish yellow" when fresh. That the Australian is the same as that which I have noticed under the name of "*Aplysina purpurea*" in my first report on the Manaar specimens ('Annals,' 1880, vol. vi. p. 36), I have no doubt; but having had a very poor supply of the latter for description, this, of course, is correspondingly imperfect. Now, however, I find that not only some of the Australian specimens, but that from Trincomalee, to which I have alluded ('Annals,' *ibid.*), are all of the same species, and among them furnish sufficient for the following amended description.

Aplysina purpurea. (Pl. IX. figs. 1, *a-i*, and 2, *a-c*.)

Form of specimen pyramidal, somewhat compressed, cactus-like externally, light (Pl. IX. fig. 1, Ceylon), or nodular, compact, and heavy (fig. 2, Australia). Colour black-purple. Surface, in the Ceylon specimen, even minutely reticulated in relief (fig. 1, *c*, and 2, *b*) in the dried state, interrupted irregularly by large puckered monticular or cactiform elevations (fig. 1, *b*) more or less obtuse on the summit, where, in a granular form, still darkened by the pigmental cells of the dermis and on a level with the latter, may be seen the termination

of the fasciculated fibre in a truncate-like condition (fig. 1, *d*), or, in the Australian specimens, nodular instead of monticular elevations, &c. (fig. 1, *a, b*). Pores not seen. Vents scattered here and there in the dermal sarcode (fig. 1, *a a*). Internal structure cellulo-cavernous in the Ceylon species, more compact in the Australian ones. Dermal sarcode fibrous below, charged abundantly with purple pigment-cells above, which also extend throughout the sarcode, but do not enter into the composition of the horny fibre. Pigmental cells now (in the dried state) compressed and oval, but more inflated and globular, probably, when fresh, consisting of a transparent colourless (?) cell-wall containing several spherical granules which are opaque and purple in colour, together with a nucleus (figs. 1, *f*, and 3, *a*); the whole frequently burst and the purple granules let free into the sarcode, where some at least seem to grow into forms respectively like that of the parent. Horny fibre scanty, not simply cylindrical although branched, but composed of a plurality of more or less imperfectly formed fibrils fasciculated longitudinally so as to present an irregularly fluted surface (fig. 1, *h*), the whole together possessing in the transverse section (fig. 1, *i*) an irregularly crenulated figure, agate-like in the linear outline of the horny laminae, which therefore do not always completely encircle the granular axis of the fibril to which they belong, although this substance occupies their concavities respectively; also, in the Ceylon or Trincomalee specimen, a great number of amber-coloured "horn-cells," whose composition and gradational growth longitudinally would appear to indicate that from such the fibre originated (fig. 1, *g*). Size of specimen from Trincomalee (which is pyramidal and compressed in shape, with a kind of shoulder in the form of another pyramidal lobe on one side) 5 inches high, with a base 5 inches long and 2 inches thick; that of the largest Australian specimen (for there are two, massive and irregular in form) 4 inches long, 2½ inches broad, and 1¼ inch high. (Pl. IX. fig. 1 represents the upper half only of the Ceylon specimen, natural size.)

Hab. Sea-bottom on hard surfaces.

Loc. Coast of Ceylon and S.W. Australia.

Obs. As the full-grown specimens of a sponge frequently differ in form, so the Ceylon specimens of the species are cactiform on the surface and cellulo-cavernous in the interior, while the Australian ones are nodular on the surface and more compact internally. How far the doughy compactness of the latter may arise from partial decomposition and drying afterwards, I am unable to state, for the specimens being filled with sand, appear to have been washed about in the waves

on the beach some time before they were picked up for preservation.

Pigmental Cells and Origin of the Sponge-Ovule.
(Pl. IX. figs. 3-9.)

The so-called "pigmental cells," which are by no means confined to the order Ceratina, are in most species of *Luffaria*, as well as in *Aplysina*, striking objects under the microscope, from their dark opaque carmine-purple colour, sharply defined outline, and compressed elliptical or globular form, averaging about 1-2000th inch in diameter (fig. 3, *a*); but in a dried specimen of a digitate branched species of *Luffaria* from the West Indies, in the British Museum (which is of a pinkish-brown tint), as, indeed, in the well-preserved specimen in spirit from the Levant, presented to the British Museum by Admiral Spratt, they are not so deeply coloured, although in other respects they present the same appearance (fig. 3, *b*); while in the European species of *Aplysina*, viz. *A. carnosa* and *A. corneostellata*, they are not only still lighter, but much less defined in their outline, possessing an elongate irregularly stellate form, in which the ray-like processes of the cells, more or less prolonged into thread-like forms, seem to be connected with each other. This is well seen in a large globular well-preserved specimen in spirit of the "fine Turkey sponge" of commerce (*Spongia officinalis*) from the Black Sea, where, on the upper surface, they are dark purple in colour, becoming *colourless* towards the base; and in another, but dry specimen, of the same kind of sponge from the West Indies, on which the dermal sarcode is *absolutely black*, the colour fades off gradually where extended into the sarcodic lining of the larger excretory canals, until, beyond a certain distance inwards, it disappears altogether, thus apparently indicating that, as in plants, the colour is deepest where the cells are most exposed to the light, and *vice versâ*: yet this can hardly be the case always; for the dark-purple pigmental cells are almost as abundant in the flesh of *Aplysina purpurea* and *Ianthella* (which will presently be described) internally as in the dermal sarcode.

In no instance have I found the pigmental cells so large or so defined as in *Stelletta aspera* and *Dercitus niger* (fig. 8), where they are elliptical or globular, and average 1-170th inch in diameter, contain a large colourless nucleus (fig. 8, *a*), and are otherwise filled with a great number of brown spherical granules (fig. 8, *b*), each of which is also nucleated and averages 1-6000th inch in diameter ('Annals,' 1871, vol. vii. pp. 7 and 4 respectively, pl. iv. figs. 14 and 6). The "gra-

nules" are just as brown and large in *Chondrilla sacciformis*, but in this, as well as in *C. nucula* (where they are smaller), have no definite arrangement, being grouped together irregularly in small parcels of four to twelve granules, each without any appearance of *cell-wall* whatever (fig. 9). Similarly composed are the pigment-cells of the Ceratina, to which I have alluded as "so-called," because in no instance have I been able to demonstrate a *cell-wall* by chemical reagents, any more than in *Amœba*; hence all that can be stated in this respect is that the nucleus and granules appear to be suspended in a sarcodic substance which, in some of the Ceratina, and in *Stelletta aspera* &c., has a definite elliptical or globular form like that of a "cell;" while the "parcels" of granules in the two *Chondrillæ* just mentioned have no defined form at all, and but for their being thus congregated might be generally distributed throughout the filamentous trama (fig. 6), of which the substance of these sponges is chiefly composed, for the colouring effect which they produce.

Again, if we return to the pigmental or coloured cells of *Aplysina carnosa* &c. and *Spongia officinalis*, they will be found to possess the irregularly stellate form mentioned, in which the ray-like processes are prolonged into pseudopodial appendages that unite with each other. This is particularly well seen in fresh specimens and those which have been preserved in spirit of *Dysidea (Spongelia) fragilis* (fig. 4), where, although colourless, or nearly so, on the surface as well as in the interior, these cells are the centres of a network of pseudopodial reticulation which spreads throughout the sponge, and is so soft and delicate that, on drying, the whole structure is irretrievably lost in the gum-like consistence which it then assumes.

Thus the well-defined pigmental cell with its deeply coloured purple granules, as well as the stellate form with its lighter ones, may be fairly assumed to have been produced by evolution from a pseudomorphous *uncoloured* condition; while, on the other hand, the dermal cell, when more elongated, might lead not only to the elliptical form (fig. 5), but to the fusiform filamentous element (fig. 6), of which the general structure of *Chondrilla* &c. is chiefly composed, whereby, still possessing its contractile or polymorphic power, the whole mass might, in combination, be subjected generally or partially to this motive influence; for change of form cannot be effected without motion.

Here it should be remembered that all the soft parts of a sponge are polymorphic, and that, as they are all evolved from a single cell at the commencement, they are only parts of the

same unit modified to meet their respective requirements (figs. 5, 6). Hence it has appeared to me that while the cells (spongozoa) of the ampullaceous sacs (Geisselkammer) are uniciliate and take in food, there may be others scattered through the parenchyma which have no cilium and are more particularly *ova-bearing*, whereby the presence of the ova in the midst of the parenchyma, and not in the ampullaceous sacs, might be explained. That there are sponge-cells there under an amoeboid form (that is, without cilium), but with pseudopodia, which are interunited and capable of taking in food (carmine, fig. 7), has been pointed out by Metschnikoff in *Halisarca Dujardinii* (Zeitschrift f. wiss. Zoologie, Bd. xxxii. p. 372, Taf. xxi. fig. 4), after which my illustration is taken.

The presence or absence of the cilium in the sponge-cell (spongozoon) is of no account; for, although provided with one when first liberated under water from the ampullaceous sac, the cilium may be seen to soon shrink back into the cell itself, which in its turn supplies the locomotive power by polymorphism, creeping about like an *Amœba*. This power of being able to put forth or retract the cilium I have long since pointed out in *Acineta tuberosa*, Ehr. ('Annals,' 1865, vol. xv. p. 287, pl. xii. figs. 9-11), as being worth remembering in a physiological point of view generally.

Returning once more to the "pigmental cells," it is remarkable that, although chiefly confined to the surface and outer part of the large excretory canals, they are not always so; for in *Ianthella*, as will be seen hereafter, they are not only present in the sarcode generally, but also enter largely into the composition of the horny fibre, both the dermal sarcode and the fibre being analogous in their skeletal uses according to the requirements of the case—thus affording an external skeleton in *Geodia* (the petrous crust), and an internal one in the fibrous sponges (viz. the "fibre").

Moreover the colouring-matter, which appears to be born on the surface of the granules, often becomes separated from them and diffused throughout the sponge, leaving the granules themselves more or less colourless (in fact, just as they might be if not exposed to the light); or the diffusion might be confined to the sarcode of the pigmental body suspending the granules, and thus the former present a defined outline similar to a cell-wall, especially when dry.

Aplysina fusca. (Pl. IX. fig. 11, *a-f*.)

There is another species of *Aplysina* in the Gulf of Manaar, of which I could only give a short description on account of the limited supply; but it also appears to grow on the south-

west coast of Australia, as a specimen among the late Dr. Bowerbank's sponges indicates. In size this specimen does not exceed 2 inches in diameter; thus, although sufficient for identification, it adds very little to my description of *A. fusca* in the first Report of the Manaar specimens (*loc. cit.* p. 36). The dried sarcode, too, presents the appearance of dry thick glue, and contains *no* purple pigmental cells, although an equal number of such cells without pigment (that is, nearly colourless) are especially congregated towards the surface, together with large cylindrical fibre (fig. 11), whose branches, intertympanized by the sarcode, give rise to a cavernous internal structure much coarser and larger than that of the Manaar specimen. On account of the large size of the fibre, averaging in its greatest thickness 1-24th inch in diameter, wherein the horny laminæ (fig. 11, *b*) are comparatively loosely united to each other and the granular axis very large (fig. 11, *a*), it affords a convenient object for microscopical dissection and examination of these elements, of which the former (that is, the horny laminæ), when viewed edgewise in a transverse section, appear to be composed of cells (especially the outer ones), like those of *Ianthella* (fig. 14), but of course without colour, and therefore very faintly foreshadowed. To this fact I shall have to allude again in the next article.

Aplysina inflata, n. sp.

Cylindrical, somewhat curved, hollow, closed at each end, rendered more or less irregular by the presence of mammiform bud-like projections here and there. Colour dark brown tinged with purple, becoming greenish black-grey after much exposure. Surface ciliated or fringed by the projection of the filamentous ends of the fibre beyond the reticulation of the interior. Vents large, scattered here and there over the surface, and terminating singly at the summit of each of the mammiform projections. Pores not seen. *Internally* hollow, bladder-like; wall very thin, composed of a single layer of reticulated fibre, whose interstices are tympanized by the sarcode, which, in the dried state, are translucent. Fibre round, aplysinoid (that is, more or less flaccid from the large size of the granular core or tube compared with the thickness of the kersine wall); kersine fibrillous in structure longitudinally, especially after much exposure and, perhaps, drying in the sun. Size $4\frac{1}{2}$ inches long by $1\frac{1}{2}$ inch in diameter.

Hab. Marine. Attached to a bivalve shell.

Loc. Coast of S.W. Australia, Freemantle.

Obs. The chief character of this species is its inflated bladder-like structure and consequently thin wall, together

with its filamentous surface and the fibrillous composition of the fibre after exposure.

Aplysina compacta, n. sp

There is still another specimen from the south-west coast of Australia in the Bowerbank collection, which, although much worn and only $2\frac{1}{2}$ inches in diameter each way, bears evidence of an altogether different species. The mass in form is irregularly lobed; black in colour, with an irregular although smooth surface; the sarcode charged throughout with intensely black-purple pigmental cells, and the fibre small, short-meshed, reticulated, and abundant, so that the internal structure is more compact than cavernous. On account of its massive amorphous state and the granular core of the fibre prevailing greatly in size over the thickness of its horny investment, I have named it "*Aplysina*;" but otherwise the fibre, from its uniformity in size and short uniform reticulation, yellow colour when denuded of the black sarcode, and great abundance, simulates that of *Luffaria*; so slightly do some of the species of these families differ from each other!

Family 3. **Pseudoceratida.**

Here I must at once correct an error which partly led me to propose the formation of this "family," viz. the impression that an Aplysian fibre internally might be combined with a spiculiferous one on the surface; hence I named the supposed species "*Aplysina chalinoides*," gave this as part of the character of the "family" ('Notes' &c., *loc. cit.* p. 132 &c.), and placed it among the typical illustrations (*ibid.* p. 192); but on examining it more particularly I found out that it was a tubular digitate *Chalina*, in which the acerate spicules of the fibre *internally* had become absorbed, leaving a granular axial tube or core with horny exterior, of a dark amber-colour, exactly like that of *Aplysina*, while the small fibre of the surface still retained its spicules. Hence "*Aplysina chalinoides*" must be expunged, as well as that part of the character relating to it, in the diagnosis of the Pseudoceratida (*loc. cit.*), viz. "or passing into a dermal layer of proper spicules like that of the Rhaphidonemata,"—a misleading change, which is not confined to one species of *Chalina* only, but may occur in others of a similar kind, and has thus been mentioned to prepare the student for dealing with it accordingly.

Aplysina capensis, n. sp.

This is the species to which I have alluded in my "Key to the Classification of the Spongida" (*loc. cit.* p. 192) as one of those illustrating the Pseudoceratida, whose description having been promised in the third part of my "Notes," is for convenience here given, as follows:—

Form massive, lettuce-like, foliate; leaves, fronds, or laminae continuous, plicate, thin, erect, proliferous; sessile. Colour pink or mulberry-purple. Surface uniformly papillated by a thick incrustation in the form of a reticulated structure in relief, wherein the interstices correspond to depressions and the knots to papillae, from the summits of which respectively the attenuated terminal end of a fibre for the most part projects. Incrustation composed of foreign bodies—*ex. gr.* quartz-grains, fragmentary sponge-spicules, frustules of Diatomaceæ, &c. Pores and vents respectively situated in the "depressions" of the incrustation, which are tympanized at the bottom by the dermal sarcode *alone*. Internal structure cellular; cellular cavities formed by the sarcode intertympanizing the intervals between the branches of the fibre. Sarcode dark purple when dry, pink by transmitted light, charged more or less with pink but not opaque dark purple cells: colour diffused, not confined to the cells; many foreign bodies in the sarcode, viz. quartz-grains &c. Fibre amber-coloured, branching, reticulated longitudinally by intertransverse portions, more or less flaccid when dry, from the small amount of horny element and the large size of the axial tube or core, which here and there also contains foreign bodies, *ex. gr.* quartz-grains &c. Size variable, that of the specimen about $2\frac{1}{2}$ inches in diameter all ways; a little broader than high, and somewhat expanded towards the top.

Hab. Marine, on hard objects.

Loc. Port Elizabeth, Cape of Good Hope.

Obs. This species, which is placed among the Pseudoceratida on account of the presence of foreign bodies here and there in the fibre, seems to be allied to *Aplysina carnosa* and *A. corneostellata*, as well as the British species *A. nævus*, dredged on board H.M.S. 'Porcupine' between the north of Scotland and the Färöe Islands ('Annals,' 1876, vol. xviii. p. 229, pl. xii. figs. 1 c and 2). *Aplysina capensis* is remarkable for the great variety of sponge-spicules and Diatomacean frustules in its incrustation, indicating the great variety also of Sponges and Diatomaceans that must exist in the locality where it grew; while the pink colour which characterizes it, being due to the presence of the dermal sarcode more or

less among the white foreign bodies, becomes much darker in the dried sarcode internally where it is without them (No. 1, reg. no. 71. 5. 12. 1, Brit. Mus.).

IANTHELLA, Gray.

This sponge is placed among the Pseudoceratida for having, like the foregoing, foreign bodies here and there in its fibre. The genus was first established by the late Dr. J. E. Gray (Proc. Zool. Soc. Lond., Jan. 14th, 1869, p. 49), although long before specialized by Pallas, followed by later authors under the names respectively of *Spongia basta* ("Vox basta pannum grossius significat") and *S. flabelliformis* (see Gray *l. c.*). There are three thin specimens in the British Museum under a glass case, bearing my "running no." 529. The central one, which is the largest, viz. *Ianthella flabelliformis*, Pall., registered "42. 6. 16. 5," is fan-shaped, 11 × 9 inches; and on either side are two others, one of which, bearing the name *Ianthella basta*, Pall., has no number, and the other, called by Dr. Gray "*I. Homei*," is registered 57. 11. 18. 200. The former of these two is vase-shaped, 8 inches high and 5 inches in diameter at the mouth, with a hole at the bottom, indicating that it also was fan-shaped first, and then, as usual, became converted into a vase-shape by approximation and union of the opposite borders, except at the bottom, where the "hole" or incomplected union now exists; the latter is but a flat, thin, fan-like fragment about 5 × 6 inches in diameter.

For this genus, as before stated, the late Dr. Gray proposed the name of "*Ianthella*;" and the three specimens to which I have alluded, which are noticed in his paper under the names respectively of *I. flabelliformis*, *I. basta*, and *I. Homei*, are generically and specifically described; but there is nothing stated of their histological character, which character renders the genus as remarkable as it is unique among the Spongida. I allude chiefly to the composition of the fibre, in which the dark purple pigmental cells of the sarcode generally are so numerous in each horny lamina, that the latter not only appear to have been produced by them, but the fibre throughout, when viewed under the microscope by transmitted light, presents in colour one of the most beautiful objects that can be conceived, on account of the contrast between the clear, transparent, amber-looking horny laminae and the purple pigmental cells in them, rendered bright carmine by transmitted light (Pl. IX. figs. 12-14).

All the specimens come from the Indian Ocean; and they

do not appear to be uncommon, although the unique histological structure to which I have alluded has not, to my knowledge, been heretofore pointed out by any one but myself.

I found one small, rugged specimen without label among the late Dr. Bowerbank's collection of sponges; but it appears to have come from the south-west coast of Australia or the Indian Ocean; and although only a fragment (consisting of the remains of two thin fronds united at their base) altogether measuring about 5×3 inches, the fibre and dry black-purple sarcode filling up the interstices of the thin lattice-like structure are quite sufficient for identification, while the former, from its large size, here 1-12th inch in diameter at the base of the specimen, seems to ally it to *I. Homei*, Gray; yet, as Dr. Gray states (*l.c.*) that the latter "chiefly differs from *I. basta* in the network appearing to be thicker and stronger," and "is only a young and partly-developed specimen," while *I. basta* has received its designation also from the coarseness of its fibre, being like "bast," it may be that future observation will identify the two, which thus differ from the more finely-fibred latticed one, viz. *I. flabelliformis*. The fibre, however, of Dr. Bowerbank's specimen not only appears to be coarser but more oblique in the interstices of its reticulation than that of *I. flabelliformis*, which, on the other hand, is more quadrate. As its histological character will be more particularly mentioned in the "Development of the Fibre in the Spongida" generally, which I propose to consider in the next article, there is no occasion for entering into it more at length here.

The generic description given by Dr. Gray (*loc. cit.* p. 50) may, however, be rendered more complete by adding to it the following histological characters, viz.:—"Sarcode charged with dark purple pigmental cells, especially numerous on the surface and in the horny laminae of the fibre, which appear to be secreted by them (fig. 12). Core of the fibre granular, grey or colourless, often enclosing foreign bodies, but no pigmental cells."

XIII.—On the Development of the Fibre in the Spongida.

By H. J. CARTER, F.R.S. &c.

[Plate IX.]

FOR a familiar example of the fibrous structure in the Spongida the sponge, of commerce may be instanced, as consisting of