

REPORT

ON THE

POLYZOA

COLLECTED BY

PROFESSOR HERDMAN, AT CEYLON, IN 1902.

BY

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[WITH ONE PLATE.]

INTRODUCTORY.

THERE are at least 116 species of Polyzoa in this collection from Ceylon. Of these, 31 had already been found in Indian seas, 32 of the remainder have been reported from Australian waters, 13 from the China Sea, and several from neighbouring but outlying waters to the east, west, and south of the Indian Ocean. Of the rest, some have not been, I believe, recorded from nearer than Florida (7 species), the Queen Charlotte Islands (1), and the Mediterranean Sea (2). Several are cosmopolitan in their distribution, and 19 are British species. Finally there are 16 species and 1 variety which I consider to be new, and which will be described below as:—

Onychocella cucullata, n. sp.
Schizoporella avicularis, n. sp.
 „ *viridis*, n. sp.
 „ *collaris*, n. sp.
Rhyncopora incisor, n. sp.
 „ *corrugata*, n. sp.
Gemellipora protrusa, n. sp.
Lepralia multidentata, n. sp.
 „ *purpurea*, n. sp.

Lepralia nitida, n. sp.
 „ *ceylonica*, n. sp.
 „ *fissa*, n. sp.
 „ *triangula*, n. sp.
Smittia trispinosa, var. *protecta*, n.
Phylactella spiralis, n. sp.
Retepora pocillum, n. sp.
Cellepora compacta, n. sp.

Polyzoa are well distributed round the coast of Ceylon. No less than 89 species were found in the Gulf of Manaar, and 32 off Galle. Many of them were obtained in

several distinct localities and in great abundance, while other species are represented by one colony each. From the large number of specimens obtained, and the manner in which the colonies are crowded together on the foreign bodies to which they are attached, it may be inferred that the Ceylon seas are a favourable locality for the Polyzoa; but at the same time, from the multiplication of avicularia and of spinous processes of various sorts which characterise these Ceylonese specimens, the impression is derived that there is severe competition and that the colonies have a struggle to hold their own. It is possible that the avicularia, spines and other roughnesses on the surface of the zoarium may protect such species from being smothered by overgrowths of colonies of their own kind; and this seems a very necessary protection in this case, and the need may account for some of the extraordinary calcareous outgrowths of the zoecia which I have to describe below.

Comparatively few collections of Polyzoa have been made in Indian seas. HINCKS (16) reported in 1887 upon a collection made by Dr. ANDERSON in the Mergui Archipelago. KIRKPATRICK (22) described in 1895 a collection made by Mr. THURSTON in the Gulf of Manaar. Among HINCKS's series of papers, entitled "Contributions towards a History of the Marine Polyzoa," in the 'Annals and Magazine of Natural History' (8), there is a report upon a small collection from Indian seas, and here and there among other papers of this series may be found descriptions of a specimen or two from Ceylon. In all, perhaps, 45 species have been previously described from the seas around Ceylon. Of these, 31 are represented in the present collection; and 85 additional species, including 16 new to science, are now recorded for the first time.

The work has been carried out chiefly in Liverpool, but it is a pleasure to record the help that has been freely given to me in Cambridge and in London. Dr. S. F. HARMER has kindly allowed me to consult his private collections of specimens and notes, and Mr. R. KIRKPATRICK has helped me with those at the British Museum; to both gentlemen I am indebted for advice and suggestions. In conclusion, I should like to express my gratitude to Professor HERDMAN for the privilege of being allowed to handle and name his valuable collection of Polyzoa.

ORDER: ECTOPROCTA.

SUB-ORDER: CHEILOSTOMATA.

FAMILY: ÆTEIDÆ.

Ætea anguina, LINN.

Localities:—Station I., off Negombo, 12 to 20 fathoms; and Station XLVI., off Mount Lavinia, 7 to 12 fathoms.

FAMILY: CATENARIIDÆ.

Catenaria lafontii (AUD.).

Locality:—North of Cheval Paar, 7 to 10 fathoms.

Catencella elegans, BUSK (1).

Locality : Gulf of Manaar (attached to floating oyster cages).

FAMILY: CELLULARIIDÆ.

Scrupocellaria cervicornis, BUSK (2).

Locality :—Navakaddu Paar, Gulf of Manaar.

Scrupocellaria diadema, BUSK (2).

Localities :—North of Cheval Paar, in Gulf of Manaar, 7 to 10 fathoms; and Station LXIII., west of Periya Paar, 17 to 55 fathoms (large quantities).

Scrupocellaria scrupea, BUSK (2).

Locality :—Gulf of Manaar.

Caberea retiformis (POURTALES).

The peculiar, unequal development of the fornix, mentioned by Miss PHILLIPS (25), is a characteristic of these Ceylon specimens. The upper half is developed into a long, sharp process, while the lower is scarcely produced below the stem by which it is attached to the zoecium. Avicularia are present both along the median line and on the oecia.

Locality :—Off Galle in deep water.

FAMILY: BICELLARIIDÆ.

Diplœcium simplex, KIRKPATRICK (20).

Localities :—North of Cheval Paar, 7 to 10 fathoms; off Manaar; and off Galle.

Bugula neritina, LINN.

There is one specimen in the present collection which differs from the others, being lighter in colour, less rigid in growth, and with avicularia. HINCKS (12) mentions these last as present on some of his specimens, therefore there does not seem sufficient reason for separating the two forms. The avicularia are large, placed on the outer sides of the zoecia, and have long mandibles. Oecia are present in the position usual for the species.

Localities :—Palk Bay; and Gulf of Manaar.

Beania mirabilis, JOHNSTON.

Locality :—Cheval Paar.

FAMILY: CELLARIIDÆ.

Cellaria johnsoni, BUSK.

Localities :—Gulf of Manaar; off Galle, deep water; and Station XL., 10 miles off Watering Point, 34 fathoms.

Nellia oculata, BUSK (2).

Locality :—Gulf of Manaar.

FAMILY : TUBUCCELLARIIDÆ.

Tubucellaria cereoides (ELLIS and SOL.).

Localities :—Off Galle and onwards up the West Coast of Ceylon, deep water ; Navakaddu Paar, Gulf of Manaar (several colonies).

FAMILY : MEMBRANIPORIDÆ.

Membranipora favus, HINCKS (8).

normaniana, D'ORB. [1906, p. 449]

There are tubercles between some of the zoecia in the colonies of this species which otherwise agree with HINCKS's description of the species.

Locality :—Gulf of Manaar (on *Conus* shells).

Membranipora irregularis, D'ORBIGNY.

Locality :—Gulf of Manaar.

Membranipora hastilis, KIRKPATRICK (21).

coronata, Hincks [1906, p. 449]

Locality :—Gulf of Manaar.

Amphiblestrum cervicorne, BUSK (2).

radicifera, var. *intermedia*, Kirkp. [1906, p. 44]

Locality :—Off Manaar Island (several colonies).

Amphiblestrum papillatum, BUSK (1).

Localities :—Station XLVI., off Mount Lavinia, 25 to 30 fathoms ; Navakaddu Paar, Gulf of Manaar.

Amphiblestrum granuliferum (HINCKS, 3).

Localities :—Gulf of Manaar ; off Galle ; and off Mount Lavinia (several colonies).

Amphiblestrum marginella (HINCKS, 8).

The lateral avicularia of these specimens are more pointed than in HINCKS's description, and are directed upwards instead of downwards. The large avicularia occupying a whole zoecial area are present.

Locality :—Gulf of Manaar.

Amphiblestrum delicatulum (BUSK).

The Ceylon specimens show the serrated denticle of this form and have no avicularia. The zoecia are not quadrangular but of a diamond shape, resembling one of the zoecia in HINCKS's figure (3, plate xi.) of this species. There are no knobs such as HINCKS describes on his specimens. Oecia are present, not described before ; they are sunk

below the membrane of the zoecium, above the one to which they belong, are finely punctured and have a calcareous arch above the zoecial orifice. The colony is of a brownish colour and adheres closely to the bivalve shell on which it is growing.

Locality:—Gulf of Manaar.

Siphonoporella bursaria (MACGILLIVRAY, 23).

The Ceylon colonies of this species have avicularia with spatulate mandibles, interspersed here and there among the zoecia, on separate areas. In old specimens the front wall of the zoecium is distinctly punctured. With these slight differences the specimens have all the appearance of *Membranipora rossellii* (AUD.) which MACGILLIVRAY (23, plate xxvi., fig. 4) later named *Amphiblestrum bursarium*. There is even an indication, in his drawing of one of the zoecia, of a siphon, which is clearly present in the Ceylon specimens. I believe the specimens undoubtedly belong to MACGILLIVRAY'S species.

Localities:—Off Galle; off Trincomalee; and from the Gulf of Manaar (several good colonies).

FAMILY: ONYCHOCELLIDÆ.

Onyhocella antiqua (BUSK).

Locality:—East Cheval Paar, Gulf of Manaar.

Onyhocella abyssicola (SMITT, 26).

Localities:—Gulf of Manaar; and off Galle at Station XL., 10 miles off Watering Point, 34 fathoms.

Onyhocella cucullata, n. sp.—Plate, fig. 1.

Zoarium incrusting or erect, branching and bilaminar. Zoecia large and irregularly oval, raised towards the upper end, where the margin is often coarsely beaded. Operculum large and horse-shoe shaped, bent forward along with the raised portion of the zoecium. Cryptocyst coarsely granular and punctured on the front wall, descending as in *Steganoporella lateralis*, MACGILLIVRAY (24), to the basal wall of the zoecium and pierced by a tubular orifice which has an everted rim. Avicularia curved over the top of the zoecium, usually branched on one side and having the tips of the branches more or less forked. A triangular swollen area, probably oecial, is seen above some zoecia, having an oval opening covered by a membranous operculum, situated in the centre of the beaded upper margin of the zoecium to which it belongs.

Localities:—Gulf of Manaar; and off Trincomalee.

This species appears to be closely allied to *Steganoporella* in the form of zoecium, but has a smaller operculum and avicularia of the *Onyhocella* type. The two forms present in this collection, incrusting and erect, have the same zoecial and avicularian characters, and cannot therefore be separated. The erect form is represented by

broken specimens of about 2 centims. in height, flat and branched in various ways and of a grey colour. The incrusting form has all the appearance of a *Steganoporella* to the naked eye.

FAMILY: MICROPORIDÆ.

***Steganoporella buskii*, HARMER (17).**

There is a large colony of this species measuring about 10 square centims. It is growing in a loose honeycomb-like form and is of a remarkably light and brittle texture. Another colony, the same in detail, is incrusting a seaweed and is much smaller in every way.

Locality :—Cheval Paar, Gulf of Manaar.

***Steganoporella sulcata*, HARMER (17).**

Locality :—Gulf of Manaar.

***Steganoporella simplex*, HARMER (17).**

Localities :—Gulf of Manaar ; and off Trincomalee.

***Thalamoporella rozieri* (AUD.), form *indica*, HINCKS (3).**

Localities :—Gulf of Manaar ; Palk Bay ; and off Galle.

***Thalamoporella rozieri* (AUD.), form *falcifera*, HINCKS (3).**

Locality :—Generally distributed round the Ceylon coast.

FAMILY: CRIBRILINIDÆ.

***Cribrilina radiata*, MOLL.**

Localities :—Off Galle ; Gulf of Manaar ; off Mount Lavinia ; and Station XL., 10 miles off Watering Point, 34 fathoms.

FAMILY: MICROPORELLIDÆ.

***Microporella violacea*, JOHNSTON, form *plagiopora*, BUSK.**

Locality :—Gulf of Manaar.

***Microporella ciliata* (PALLAS).**

Locality :—North of Cheval Paar, 7 to 10 fathoms.

***Microporella ciliata*, var. *personata*, BUSK (2).**

The avicularia on the Ceylon specimens have wing-like membranous extensions of the sides of the mandible. Two of the colonies are of a pink colour.

Localities :—Gulf of Manaar ; and Station XXXIII., south-east of Ceylon, 18 fathoms.

Microporella decorata, REUSS.

Locality :—Gulf of Manaar.

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p. 450 } [**Berenicea prominens**, LX. [=] **Chorizopora brongniartii** (AUD.)].

Localities :—Gulf of Manaar ; off Galle, deep water ; and Station XL., off Watering Point, 34 fathoms.

FAMILY: PORINIDÆ.

Porina magnirostris (MACGILLIVRAY, 23).

Locality :—Gulf of Manaar.

Gigantopora fenestrata, RIDLEY.

On the most perfect of the few, small, incrusting colonies of this form there are little branched spines, in between the perforations of the front wall of the zoecia. The secondary, tubular orifice has a 4-toothed margin and avicularia are very long, reaching from the base of the tube and extending beyond its margin. Where an avicularium is absent the tube has a fissure in its place. Oecia are present, low down at the back of the tubular orifice, and perforated like the front wall of the zoecia.

Localities :—Gulf of Manaar ; and off Galle.

Lagenipora spinulosa, HINCKS (8).

Locality :—Gulf of Manaar.

Lagenipora tuberculata, MACGILLIVRAY (23).

There are several colonies corresponding to MACGILLIVRAY'S description of this species, but there are also among them some that have the hollow tubercles very much lengthened, ending in points, or being jagged and irregular in outline. These specimens have also simple or branched spines round the margin of the much raised peristome. The front walls of the zoecia have punctures in between the spines ; the peristome is granular. There are no avicularia, and no oecia are present.

Locality :—Off Galle.

FAMILY: MONOPORELLIDÆ.

Monoporella albicans, HINCKS (6).

An interesting point in the present example of this form is that the oecia are in most cases set a little "awry," a fact that HINCKS thought merely a peculiarity of the colony in his collection. There are none of the large avicularia present here.

Locality :—Gulf of Manaar.

Monoporella lepida, HINCKS (5).

Locality :—Station LIII., north of Cheval Paar, 7 to 10 fathoms.

FAMILY: MYRIOZOIDÆ, SMITT.

Schizoporella spongitis (PALLAS).

Localities:—Gulf of Manaar ; and off Mount Lavinia.

Schizoporella ampla, KIRKPATRICK (20).

Localities:—Gulf of Manaar ; and Navakaddu Paar.

Schizoporella argentea, HINCKS (6).

In the single small colony of this species the sinus is wider than HINCKS describes and there are no oval avicularia, but in their place the elongated kind as in some of his specimens. There are the two spines above and the granular, silvery surface of the zoecia with foramina between the granulations.

Locality:—Gulf of Manaar.

Schizoporella aperta, HINCKS (6).

There are two spines on the upper margin of some of the orifices of these specimens not described before. No oecia are present, but in other points the characters agree with those of the species.

Localities:—Gulf of Manaar ; and Navakaddu Paar.

Schizoporella cecilia (AUD.).

The one small colony of this species has raised, irregular-shaped ridges of calcareous matter on the oecium, and a decided arch above the orifice at the base of the oecium, also a screen-like process on the front of the zoecium.

Locality:—Gulf of Manaar.

Schizoporella unicornis, JOHNSTON.

The present specimen has the peculiar long avicularia of the form *longirostris*, HINCKS (11), but not the more important feature of that variety, namely the loop-shaped sinus.

Locality:—Navakaddu Paar.

Schizoporella nivea, BUSK (1).

There are numerous colonies of this species, loosely attached, being, as it were, folded round the stems of the large zoophyte, *Campanularia juncea*, and having the opposed edges of the zoarium adhering to one another. (See Part II., p. 115, fig. 2.)

Locality:—Gulf of Manaar.

This is a figure of Campanularia juncea.

Schizoporella circinata, MACGILLIVRAY (23).

The zoecia of these specimens have the ridge-like mucro of HINCKS's (10) species, but not the avicularium. There is a single row of large punctures at the edge of the zoecium. No oecia are present on the two small colonies in the Ceylon collection.

Localities:—Off Mount Lavinia ; and off Galle.

Schizoporella sanguinea (NORMAN).

Avicularia are usually present on these specimens. They are long and pointed and raised, a pair on each zoecium, situated at their extreme upper angles, above the orifice and directed downwards and inwards.

Locality :—Off Galle.

Schizoporella magnifica, HINCKS (11).

The peculiar distinctive oecia of this species are not present on the one colony in this collection, which is deep red in colour. The long pointed sinus, the pairs of upward pointing avicularia, and the reticulate front wall of the zoecium, without a raised margin, accord with HINCKS's description of the species.

Locality :—Off Galle.

Schizoporella depressa, PHILLIPS (25).

There are some colonies of a pink colour corresponding with the figure and description of this species. The orifice of the zoecium is deeply sunk, the front wall rising into almost an umbo below it, and calcareous ridges radiate from this to the margin, leaving large, loop-shaped areolations between them. The small rounded avicularia, on one or both sides of the orifice, are sunk below the surface, together with the orifice. Oecia are smooth and hyaline or ridged, and have an oval area on either side of them.

Localities :—Gulf of Manaar ; and off Mount Lavinia.

Schizoporella triangula, HINCKS (5).

The specimens of this form in the present collection have the triangular orifice, the raised margins and punctured surface of the zoecium, with small avicularium pointing downwards from just below the orifice, although this last is smaller and never raised on an elevation. There is a second avicularium lying transversely on a separate area above the orifice. BUSK (1) mentions, but does not figure, a second avicularium with a slender, spear-shaped mandible which corresponds with these, with the exception that his are described as lying vertically and these are transversely placed. Where oecia are present, they take the place of these. They are large, covering nearly the whole of the zoecium above the one to which they belong, as described by BUSK, but are sub-immersed and have no nodules, being punctured like the zoecium.

Localities :—Gulf of Manaar ; and East Cheval Paar.

Schizoporella subsinuata (HINCKS, 9).

There are a few colonies of a grey-white colour, incrusting pieces of broken shell, having the zoecial characters of this form with the addition of numerous avicularia, which in HINCKS's specimens did not exist and which were rare in MACGILLIVRAY's (23). They have long, pointed mandibles, and are usually pointing downwards, like those in

MACGILLIVRAY's figure (plate cxxxviii., fig. 5), from an upper angle of the zoecium; but are sometimes below the orifice, transversely placed, or they may be on separate, raised areas.

Localities :—Gulf of Manaar; and Navakaddu Paar.

Schizoporella avicularis, n. sp.—Plate, fig. 2. *inclusa*, n. sp. [1906, p. 450]

Zoarium adnate, of a pink colour; zoecium punctured, with slightly raised margins. Orifice with a broad sinus and umbo below it. Avicularia here and there large and spatulate, starting from above the umbo, covering over the oral aperture and resting on an extended portion of the zoecium above. Oecia large, more finely punctured than the zoecium and with a calcareous arch over its summit.

Locality :—Gulf of Manaar.

I do not know of any species having an avicularium in the position described above. When the mandible is removed, the zoecial orifice, with its operculum, appears beneath, in its usual form. There is a specimen, in this collection too, of *S. triangula*, which has apparently a similar arrangement of the avicularium and zoecial orifice, but it will be necessary to examine more material before coming to a definite conclusion as to the exact relations of these parts.

Schizoporella collaris, n. sp.—Plate, fig. 4.

Zoarium incrusting, of a dull white colour. Zoecia rhomboidal, punctured, the upper portion slightly narrowed to a neck and bent forward. Orifice with a broad shallow sinus, peristome thickened and forming a triangular bracket-like process in front. Oecia punctured like the zoecia, the sides extending to form with the peristome a collar round the orifice.

Locality :—Station XLVI., off Mount Lavinia.

Schizoporella pulcherrima (MACGILLIVRAY, 23).

There is a strong resemblance between the "small colony," described by MACGILLIVRAY, of this species and the large specimens from Ceylon, although the former has no punctures on the zoecium, nor is it coloured, while the latter have punctures as well as radiating lines and are coloured a deep red, excepting for one colony, probably old, which is white. The raised margins of the broad zoecia, the shallow sinus and avicularia on either side of the orifice are the same; these are sometimes quite up to the edge and in an angle of the zoecium. Oecia, not described before, are large, covering almost entirely the zoecium above and embedded in it, punctured like the zoecium. The orifices of the zoecia which bear oecia are larger than those of the others. It is a very striking species.

Localities :—East Cheval Paar; off Galle; off Mount Lavinia.

Schizoporella viridis, n. sp.—Plate, fig. 3.

Zoarium incrusting and forming very large colonies, extending to nearly two feet (50 centims. or upwards) across.

It has a coarse looking, roughened surface and is of a greenish colour, somewhat obscured by a brownish surface layer or membrane; zoecium prostrate, irregularly oval, ventricose and punctured closely all over the front wall; often with an umbo in its centre, or to one side, which may become tall and massive. Orifice with a deeply rounded sinus, peristome raised above.

Avicularia small and pointed, one or two transversely placed below the orifice, and a few long and sword-shaped, on separate areas, scattered over the zoarium.

Locality:—Coral banks, Gulf of Manaar.

This fine species forms thick massive colonies of many superimposed layers, and spreads over other objects to form very large masses; one colony measures upwards of 53 centims. in length by 18 centims. in breadth and 23 millims. in thickness. The verdigris-green colour is a striking feature, best seen in the thickness of the superimposed layers at the edges of broken pieces; a brown membrane which envelops the zoarium conceals it, somewhat, on the surface. The large ventricose zoecia and oecia can be seen by the naked eye as small pimples covering the irregularly undulating surface of the zoarium. The zoecia are always prostrate, but are heaped and turned in various ways and are seen at various levels.

Schizoporella incrassata, HINCKS (6).

The great variety in appearance of the zoecia in different parts of one colony is quite as marked in the present specimens as it was in HINCKS's, and, although the variations do not always agree with his, the differences seem to belong to unimportant characters. The primary orifice has, here, sometimes from 2 to 4 spines on its upper margin. A large process, bearing an avicularium, is sometimes to be seen on both sides of the orifice instead of on one side only. The surface of the zoecium is usually grooved, the grooves radiating towards the centre. Avicularia on raised processes are scattered irregularly over the zoecia. The peristome forms sometimes a spinous collar, open in front, or the points of the edges of the opening join and leave the opening below like an oval pore. The oecium agrees with that of HINCKS's species, but that the flat plate covering its aperture is of a dead white, contrasting with the glassy appearance of the rest of the zoarium.

Localities:—Gulf of Manaar; Station XL., 10 miles off Galle, 34 fathoms.

Mastigophora dutertrei, var. *pes-anseris* (SMITT, 26).

Locality:—Station XL., 10 miles off Galle, 34 fathoms.

Rhyncopora bispinosa, JOHNSTON.

Rhynchozoom [1906, p. 450]

The primary orifice of this species varies in one specimen from the usual shallow sinus form to one with a deeper, narrower sinus, which variety has also a crenulated margin as in *Rhyncopora crenulata*, WATERS (27), a species which has, however, no sinus.

Localities:—Gulf of Manaar; and Station XLVI., off Mount Lavinia.

Rhyncopora *corrugata*, n. sp.—Plate, fig. 5.

Rhynchozoon [1906, p. 450]

Zoarium incrusting, yellow-white in colour. Zoecia large, distinct throughout, with the secondary orifice prolonged into a tube, widening from the base up and with an uneven margin. An uncinat process at the base of the tube a little to one side of the centre, and an avicularium of small size on the corresponding other side, its beak pointed and forming with the uncinat process a loop-shaped sinus.

Locality :—Gulf of Manaar.

The raised secondary orifice of this species gives it the appearance of a *Lagenipora*, but that the tube is irregularly fluted in outline. It is a good deal smaller than *Rhyncopora incisor*, n. sp., although at first taken to be the same when the two were growing together.

Rhyncopora *incisor*, n. sp.—Plate, fig. 6.

Rhynchozoon [1906, p. 450]

Zoarium incrusting, of a white colour. Zoecia crowded, hexagonal, with a deeply areolated margin, a long tubular peristome and even rim.

Primary orifice orbicular with a transversely placed avicularium a little to one side of the centre, an uncinat process on the opposite side becoming very long and pointed. Oecia behind the tubular orifice, smooth with a circular area on either side.

Localities :—Gulf of Manaar; and off Galle, 34 fathoms.

The characters of this species are very simple and constant; the most striking feature is the elongated uncinat process which sometimes projects almost across the orifice, so as to bar the entrance to the tube, and has a curved needle-like point. There is no avicularium to be seen when this stage is reached.

One perfectly preserved colony has the appearance to the naked eye of the pile of white velvet; the zoecia almost approach those of *Lagenipora tuberculata* in size and appearance.

Hippothoa flagellum, MANZONI.

Locality :—Chilaw Paar.

Gemellipora glabra, form *striatula*, SMITT (26).

Localities :—Gulf of Manaar; Trincomalee; and off Mount Lavinia.

Gemellipora lata (SMITT, 26).

The Ceylon specimens of this form have the yellow colour of the colony, the dark colour of the opercula, more brown than green in these specimens, the conspicuous pores of the zoecia, the form of orifice and peculiar fold of the peristome below this, as figured by SMITT (26, plate vii., fig. 157).

Avicularia are distributed among the zoecia, on separate areas, but are much larger than he describes and spatulate, not oval.

Oecia, not described before, are more broad than high, perforated like the zoecia,

with, sometimes, an umbo. The orifices of fertile zoecia are much larger than those of the others.

Locality :—Gulf of Manaar.

Gemellipora protrusa, n. sp.—Plate, fig. 7.

Zoarium incrusting, of a pale brown colour. Zoecia rhomboidal, smooth or slightly roughened, front wall much raised, punctured round the margin. Orifice of the usual *Gemellipora* form, sometimes much elongated; peristome often raised above and irregularly lobed. A large avicularium on the front of the zoecium, directed across it, supported on a raised process; mandible wide at the base, becoming long and pointed; a small avicularium, with rounded mandible, on a raised process on one or both sides of the orifice. Oecia granular and minutely punctured, open in front, and leaning forward over the orifice.

Locality :—Gulf of Manaar (numerous colonies on Nullipore balls).

There are sometimes two avicularia, in place of the one large transversely placed one; they point outwards to either side of the zoecium. There is some resemblance in the appearance of this species to *Schizoporella ampla*, KIRKPATRICK (20).

FAMILY: ESCHARIDÆ.

Lepralia robusta, HINCKS (8).

The central circular pore, alluded to by HINCKS, is quite evident on the present specimens, and is sometimes multiplied to three or more of irregular shapes, as seen in an old, worn specimen.

Locality :—Gulf of Manaar (in large quantity on broken shells).

Lepralia poissonii, AUDOUIN.

Localities :—Navakaddu Paar; off Galle and onwards up West Coast, deep water.

Lepralia mortoni, HASWELL (19).

Localities :—Gulf of Manaar; off Trincomalee; north end of East Cheval Paar.

Lepralia triangula, n. sp.—Plate, fig. 8.

Zoarium incrusting. Zoecia punctured all over, covered by a yellow membrane. There are usually scattered spinous processes on the front wall of the zoecium and also two curved horn-like processes, one on either side below the orifice, which may be avicularia. Orifice longer than broad, with a much raised, thin, often irregularly pointed peristome, forming a collar round it. Operculum with a triangular excrescence having its base attached to the base of the operculum. No oecia.

Locality :—Gulf of Manaar.

It is possible this species may be a variety of *L. pallasiana*, MOLL., as it resembles *L. canthariformis*, BUSK, which is probably a variety of *L. pallasiana*, but the

peculiar processes on the cell wall and that on the operculum give it a distinctive character.

Lepralia turrita, SMITT (26).

The fresher looking colonies of this species are pink in colour and have pointed tubercles round the margin of the orifice; with age they become white and the tubercles worn down into blunt knobs. There are large spatulate avicularia on the sides of large massive tubercles and small oval ones on more slender tubercles, and also scattered over the zoëcia.

There are very few oëcia, and I have not been able to see perforations on them. They have a semicircular, marked area in front.

Localities :—Gulf of Manaar; Station XL., 10 miles off Galle, 34 fathoms; Navakaddu Paar.

Lepralia multidentata, n. sp.—Plate, fig. 9.

Zoarium incrusting, white. Zoëcia very small, rotund, irregularly placed, usually lying flat, but occasionally standing upright, surface roughened. Orifice arched above, sides widening downwards, base slightly convex, six long slender spines on the upper margin and a long, pointed rostrum below. Sometimes avicularia with rounded mandibles are present on either side of the orifice. Oëcia granular above, smooth in front, with an arched rib between the rough and the smooth portions.

Localities :—Gulf of Manaar; and off Trincomalee.

Lepralia cucullata, BUSK (2).

Localities :—Cheval Paar, Navakaddu Paar and elsewhere in Gulf of Manaar (common on Ascidians and pearl oyster shells).

Lepralia depressa, BUSK (2).

Avicularia in various forms, long and seta-like, or thick and spear-like, or the mandible branched, looking like the leg and foot of a bird.

Localities :—Gulf of Manaar and off Galle.

Lepralia gigas, HINCKS (10).

Localities :—Station LIII., north of Cheval Paar, 7 to 10 fathoms; Palk Bay; Trincomalee (many large colonies, up to 3 inches across); Welligam Bay; and various parts of Gulf of Manaar (growing on pearl oyster shells).

Lepralia purpurea, n. sp.—Plate, fig. 13.

Zoarium forming purplish grey patches, incrusting. Zoëcia small with thick walls, sub-immersed, diamond-shaped, occasionally heaped and upright, smooth and shining or slightly roughened. Orifice arched above, widening downwards, with an almost straight lower lip, peristome slightly thickened with five marginal spines and a sub-

oral mucro below the orifice. The tip of this, the bases of the spines and the peristome are of a purple tint. Sometimes an avicularium on a raised process at one side of the zoecium, varying in size, spatulate and large or small and pointed. Oœcia small, narrow, open in front, two of the spines showing in front.

Locality :—Gulf of Manaar.

Lepralia nitida, n. sp.—Plate, fig. 10.

adhaerens, n. sp. [1906, p. 450]

Zoarium closely adhering, with a shining surface, pale yellow in colour. Zoœcia flat but rising to a prominent umbo situated below the orifice, granular, the granules radiating from the umbo to the margin of the zoecium which is punctured there. Orifice arched above, narrowing, then widening, and with a convex lower lip. A small round avicularium on either side on a level with the lower margin of the orifice. Oœcia small, rising to a prominent umbo, orifice of the fertile zoecium much larger than the usual orifice.

Locality :—Gulf of Manaar.

This is a small neat species with little variation of form. The oœcia are merely like a triangular extension of the zoecium above the orifice.

Lepralia adpressa, BUSK (2).

The surface of the zoecium in the present specimen is granular, punctured round the margins only; the upper portion of the zoecium is considerably raised; the lateral lumps carry small round avicularia; when in old specimens these are absent the lateral processes are seen to be hollow tubes. Sometimes two or three of these processes are present above the orifice and one below in addition.

Locality :—Off Galle, deep water.

Lepralia feegeensis, BUSK (2).

The oœcium of this species has not been described before. There is one well preserved oœcium on the Ceylon specimen. It is large and irregular in shape, the front wall is marked with large circular pitted areas, punctured in their centres, giving the oœcia a much coarser appearance than the zoœcia, the reverse of what is seen in *Lepralia gigas*, HINCKS (10). The orifices of fertile zoœcia are broader at their bases than those of others. Avicularia of the usual type, and in the usual position for *L. feegeensis*, are often present in pairs, but usually singly, or there may be none.

Locality :—Gulf of Manaar.

Lepralia cleidostoma, SMITT (26).

There is one small colony of this species. It has no oœcia to show the characteristic striæ as a help to identification, and the avicularia are always directed upwards, not outwards. On one of the zoœcia, on the outside of the colony, jointed spines are to be seen, as in SMITT'S (26), plate xi., fig. 217. A larger, loosely incrusting colony from

another locality resembles this so nearly as to make it probable it is one of the same species. The zoecia are larger, avicularia are smaller and turned sideways, as in SMITT's figures. Oecia are present here, but are punctured, not striated, and they are often half buried in the calcification of the zoarium. There is still a third variety, smaller than either of the above, and with a smooth and glistening surface, with avicularia turned sideways and oecia faintly striated, but with a small arched area in front. As all these three specimens have the same key-shaped orifice and pointed avicularia I am inclined to think them varieties of the one species.

Localities :—Gulf of Manaar ; and off Galle.

***Lepralia ceylonica*, n. sp.**—Plate, fig. 11.

Zoarium adhering, of a yellowish-white colour. Zoecia in linear series closely set, becoming upright in places, with glistening front walls, pitted and punctured and lumpy. Orifice arched above, with straight sides and slightly concave lower lip, six long sharp spines above and several bosses below the orifice, carrying small avicularia with pointed mandibles on their summits. Oecia roughened like the zoecia and having scattered raised avicularia upon them.

Locality :—Gulf of Manaar.

***Lepralia fissa*, n. sp.**—Plate, fig. 12. *gallensis, n. sp.* [1906, p. 450]

Zoarium incrusting, forming brown patches. Zoecia finely punctured at the outside of the colony, becoming coarsely ridged further in and having a large umbo occupying most of the area, and a large avicularium on its outer side, with the mandible directed upwards. Orifice broader than long, with a pouting lower lip. Oecia rounded, smooth, with a large cone-shaped fissure in front.

Locality :—Off Galle, deep water.

***Lepralia subimmersa*, MACGILLIVRAY (23).**

There is one colony, greyish-white in colour, and covering the shell of a univalve mollusc inhabited by a hermit crab. Another colony is of a deep red colour, from a membranous covering still adhering to the zoarium.

Locality :—Gulf of Manaar.

***Escharoides verruculata* (SMITT, 26).**

Localities :—Gulf of Manaar ; and off Mount Lavinia.

***Porella malleolus*, HINCKS (8).**

Localities :—Gulf of Manaar ; off Galle ; Navakaddu Paar.

***Smittia trispinosa* (JOHNSTON).**

There is great variety in the form of zoecia and avicularia among the Ceylon

specimens of this species. It is widely distributed around the coast, and apparently very abundant.

Localities :—Gulf of Manaar ; off Galle ; off Mount Lavinia ; and Navakaddu Paar.

Smittia trispinosa, var. *spatulata* (SMITT, 26).

Locality :—Station XLVI., off Mount Lavinia.

Smittia trispinosa, var. *protecta*, nov.

This large variety has the peristome raised and in front, below the orifice, produced into a long spout-like extension. Avicularia, not on every zoecium, are of enormous size, reaching from above the orifice and bending and spreading so as to cover the whole front wall of the zoecium, and having a blunt extremity.

There are sometimes two small raised avicularia, one on either side of the orifice. The finely punctured oecium has a narrow, prominent arched rib across the front.

Locality :—Gulf of Manaar.

Smittia tubula, KIRKPATRICK (20).

The present specimens of this form are of a pink colour. There are usually two avicularia, one on either side of the tubular secondary orifice, pointing upwards. Two of the oral spines, of which there are six, remain in front of the oecium when present.

Locality :—Gulf of Manaar.

Smittia rostriformis, KIRKPATRICK (20).

Avicularia on these specimens are sometimes pointing downwards, as figured by KIRKPATRICK, but sometimes upwards with the appearance of a spine on either side of the orifice. In both cases the peculiar serrated edge of the beak is plainly visible. Oral spines vary in number from two to six. In other respects the specimens agree with the original description of the species.

Locality :—Station XLVI., off Mount Lavinia.

Phylactella spiralis, n. sp.—Plate, fig. 14.

Zoarium forming small pink patches on shells. Zoecia arranged in radiating lines, smooth or slightly roughened, areolated round the margin, with a much raised tubular peristome and an avicularium raised to the margin of this on a semi-spiral tube. Primary orifice, having a very wide denticle with sharp lateral points. Secondary orifice, with from two to four spines above. Oecium behind the tubular peristome, smooth or slightly roughened like the zoecium.

Localities :—Gulf of Manaar ; off Mount Lavinia ; and off Galle.

This species approaches most nearly to *Phylactella geometrica*, KIRKPATRICK (21), in form, but the one broad denticle instead of three and the difference in the position of the avicularium, which resembles that of *Lagenipora nitens* (MACGILLIVRAY, 23), makes it impossible to mistake the two species.

Mucronella coccinea, ABILD.

Localities:—Gulf of Manaar; and off Galle.

From a specimen given to the Trustees of the British Museum this appears to be (*Exochelis*) *longirostris* Jullien

Mucronella tubulosa, HINCKS (3).

In the Ceylon specimens, which I believe to belong to this species, there is an enormous development of the central mucro, which is here long and spinous; there is also an avicularium on the inner side of this, either at its base, lying in front of the primary orifice, or at varying heights up this process, always transversely placed and with a sharp curved beak, but varying in size.

These points add to the resemblance between *M. tubulosa* and *Rhyncopora longispinosa*, which Miss JELLY regards as synonymous, but there is missing still, in these specimens, the uncinat process of *Rhyncopora*, unless the curved beak of the avicularium takes the place of this. In the faint indication of a sinus of the primary orifice, the spinous mucro and markings of the oecia, there is a likeness to a species of quite another genus, *i.e.*, *Cellepora longirostris*, MACGILLIVRAY, as described by Miss PHILIPPS (25).

Localities:—Off Trincomalee; off Mount Lavinia; Navakaddu Paar and elsewhere in the Gulf of Manaar.

Mucronella thenardii, AUD.—Plate, fig. 15.

The cross-shaped process, situated below the orifice of the zoecium in this species, is greatly developed (see fig. 15). Its upright portion is often occupied by a large spatulate avicularium, and, where this is so, one of the arms of the cross is missing, giving a one-sided appearance to the process. Sometimes the arms are duplicated, one pair below the other, and they are always much branched, each branch bearing a small, rounded avicularium on its summit. Slender, spinous processes, resembling the branches in size, are scattered over the front wall and round the margin of the orifice of the zoecium, and there are sometimes ordinary spines, from two to five in number.

There is a strong resemblance between the characters of this species and those of *M. aviculifera*, HINCKS (14). The slender, spinous, aviculiferous processes are present there, but the cross-shaped mucro is only represented by a small simple mucro, and there are large, lateral avicularia. There is, however, much variation in form and position of the avicularia and of the processes which carry them, even in one small specimen of the present collection, so that it seems possible that the differences represent various stages in the development of one and the same species.

Localities:—Gulf of Manaar; and off Galle.

Mucronella vultur, HINCKS (7).

There are in the present collection specimens having all the important characteristics of *M. vultur*, as described by HINCKS (7) and MACGILLIVRAY (23) with this exception, that the avicularium on the central mucro has a rounded, instead of a

pointed, mandible. There are sometimes small, raised, rounded avicularia scattered over the front wall of the zoecium in great profusion. Some of the specimens have spinous knobs in front of the oecia and also one on the summit of this.

Altogether, with the addition of the usual six long marginal spines of the orifice, the colony has a formidable appearance, especially in specimens where the zoecia are crowded together. The largest colony is partly incrusting and partly sends off free expansions. It measures 8 centims. by 4 centims. and is of a dull pale brown colour and of a very brittle and light substance.

Locality:—Gulf of Manaar (growing over a colony of *Lepralia gigas*, HINCKS).

***Retepora tubulata*, BUSK (1).**

Locality:—Gulf of Manaar.

***Retepora simplex*, BUSK (1).**

Locality:—Off Galle and onwards up west coast of Ceylon.

***Retepora apiculata*, BUSK (1).**

Locality:—Ceylon seas.

***Retepora pocillum*, n. sp.—Plate, fig. 16.**

These colonies correspond with *Retepora avicularis*, MACGILLIVRAY (23), in size, and the zoecia in having triangular teeth within the orifice, and below this a loop-shaped fissure, but there are some other additional marked characteristics in these specimens. The zoecia are rhomboidal in form and have slightly tubular necks crowned by about six spines, which are beautifully jointed in the Equisetum-like form described for *R. monilifera*, MACGILLIVRAY (23). These are often broken, but their bases, which, united, form the tubular neck, are visible, and when oecia are present two are to be seen in front of it, not always of the jointed form. The oecia have a fissure faintly visible. There is generally a small avicularium with a rounded mandible below the orifice, more or less in the middle of the zoecium; sometimes there are two of these, one below the other, or rarely one large spear-shaped one, lying across the zoecium and pointing upwards.

Locality:—Gulf of Manaar.

FAMILY: ADEONIDÆ.

***Adeonella subsulcata* (SMITT, 26).**

The largest colonies of this species in the present collection are about 8 centims. in height. They correspond entirely with SMITT's description, but that there is also a serrated denticle within the orifice, corresponding to that of *A. pectinata*, BUSK (1).

Localities:—Station I., off Negombo, Gulf of Manaar; Station XXIX., Trincomalee; Station XLVI., off Mount Lavinia, 25 to 30 fathoms; Station XL., 10 miles off Watering Point, 34 fathoms; and off Galle, deep water.

FAMILY: CELLEPORIDÆ.

Cellepora albirostris (SMITT, 26).

Localities :—Gulf of Manaar ; off Mount Lavinia ; off Kaltura ; and off Galle, deep water. There are large quantities of this species.

Cellepora megasoma, MACGILLIVRAY (23).

There is usually a raised avicularium to one or both sides of the orifice on the present specimens and large scattered spatulate ones here and there. The zoecia are smooth or slightly ridged. Oecia thickly punctured all over, with no marked area.

Localities :—Off Galle and onwards up west coast of Ceylon, deep water ; Gulf of Manaar (several colonies on worm tubes and stems of Zoophytes) ; Station XXXII., off south-east coast of Ceylon (on Sponge).

Cellepora rota, MACGILLIVRAY (23).

Localities :—Station LIII., north of Cheval Paar, 7 to 10 fathoms ; and elsewhere in Gulf of Manaar.

Cellepora cidaris, MACGILLIVRAY (23).

There is a large quantity of material resembling the description of this form excepting that the columnar processes in between the zoecia are solid instead of hollow. *C. albirostris*, SMITT, has, in the "Challenger" collection, occasional, solid columns of this sort on the older parts of a colony, but, although the two species *C. albirostris* and *C. cidaris* of the present collection resemble each other pretty closely in some points, neither the long pointed rostrum, nor the broad one with serrated beak, nor the dark operculum, characteristic of *C. albirostris*, are present on the specimens I have considered to be *C. cidaris*. Oecia, said in *C. cidaris* to be globular and immersed, have an arched area in front, which, being often absent, leaves a cave-like space. There are occasional large spatulate avicularia to be found on raised areas in between the zoecia, but these are the only points of difference to be seen between the present specimens and MACGILLIVRAY'S description of *C. cidaris*.

Localities :—Off Mount Lavinia ; Station XL., off Galle, 34 fathoms ; and in Gulf of Manaar.

Cellepora compacta, n. sp.—Plate, fig. 17.

Zoarium incrusting, white or purplish in colour. Zoecia small, upright, rounded, smooth, with a few marginal punctures.

Orifice rounded, with a loop-shaped sinus, and below, rather to one side, a large thick rostrum, sometimes pointed above, having a long pointed avicularium on its side ; often other slenderer processes round the orifice and long hollow columns in between the zoecia. Oecia standing upright, smooth and shining, with a narrow arched ridge in front.

Locality :—Gulf of Manaar.

SUB-ORDER: CYCLOSTOMATA.

FAMILY: CRISIIDÆ.

Crisia holdsworthii, BUSK (2).

Localities:—Station LIII., north of Cheval Paar, 7 to 10 fathoms; Station I., and elsewhere in Gulf of Manaar; and Palk Bay.

FAMILY: TUBULIPORIDÆ.

Idmonea milneana, D'ORB.

Localities:—Navakaddu Paar; and Station XL., 10 miles off Watering Point, 34 fathoms.

FAMILY: LICHENOPORIDÆ.

Lichenopora hispida, FLEMING.

Localities:—Navakaddu Paar, and elsewhere in Gulf of Manaar.

Lichenopora novæ-zelandiæ, BUSK (2).

Locality:—Navakaddu Paar.

SUB-ORDER III.: CTENOSTOMATA.

FAMILY: ALCYONIDIIDÆ.

Alcyonidium mytili, DALYELL.

Locality:—Gulf of Manaar. [Add] Galle [1906, p. 450]

Pherusa tubulosa, LX.

The largest colony among the few present in the present collection is about 3 centims. in height, and its branches spread to about the same in width. Zoecia are on both sides of the branch, not as in the original description only on one surface.

Locality:—Station LIII., north of Cheval Paar, 7 to 10 fathoms.

FAMILY: ARACHNIDIIDÆ.

Arachnidium fibrosum, HINCKS (15).

Locality:—Gulf of Manaar.

FAMILY: VESICULARIIDÆ.

Amathia distans, BUSK (1).

Locality:—Gulf of Manaar.

Farrella atlantica, BUSK (1).

Locality:—North of Cheval Paar.

FAMILY: BUSKIIDÆ.

Buskia setigera, HINCKS (16).

Localities:—Station LIII., north of Cheval Paar, 7 to 10 fathoms; and Palk Bay.

FAMILY: CYLINDRŒCIIDÆ.

Cylindrœcium dilatatum, HINCKS (15).

Localities:—Station LIII., north of Cheval Paar, 7 to 10 fathoms; off Galle; and Station I., off Negombo.

FAMILY: VALKERIIDÆ.

Valkeria uva, LINN.

Locality:—Station LIII., north of Cheval Paar, 7 to 10 fathoms.

ORDER: ENTOPROCTA.

FAMILY: PEDICELLINIDÆ.

Ascopodaria discreta, BUSK (1).

One small colony of a reddish colour, growing on a sponge.

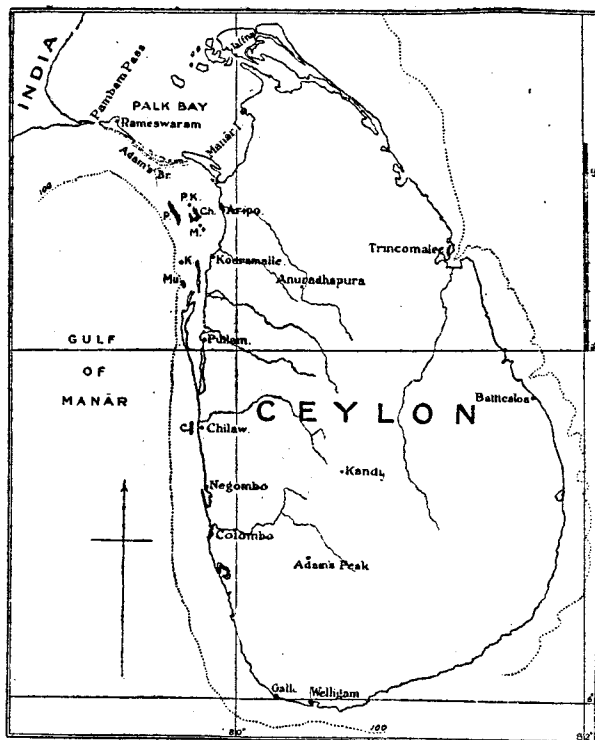
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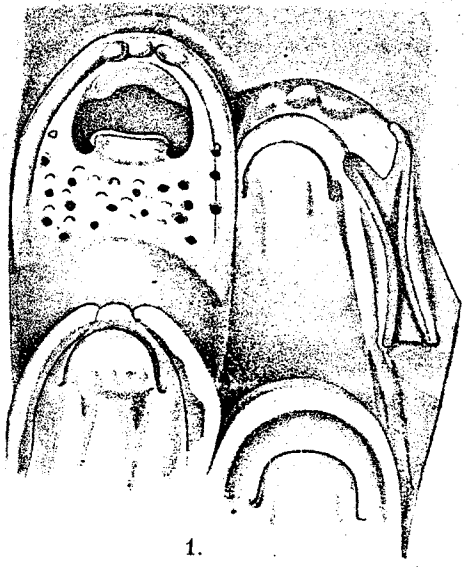
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- (6.) ——— " " " " 5, " ix.
- (7.) ——— " " " " 5, " x.
- (8.) ——— " " " " 5, " xiii.
- (9.) ——— " " " " 5, " xiv.
- (10.) ——— " " " " 5, " xv.
- (11.) ——— " " " " 5, " xvii.
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EXPLANATION OF PLATE.

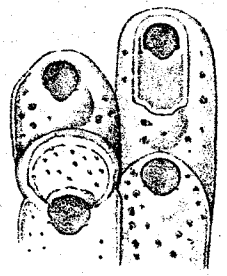
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|---|---|
| 1. <i>Onychocella cucullata</i> , n. sp. | 10. <i>Lepralia nitida</i> , n. sp. = <i>L. adhaerens</i> |
| 2. <i>Schizoporella avicularis</i> , n. sp. = <i>S. inclusa</i> | 11. „ <i>ceylonica</i> , n. sp. |
| 3. „ <i>viridis</i> , n. sp. | 12. „ <i>fissa</i> , n. sp. = <i>L. gailletensis</i> |
| 4. „ <i>collaris</i> , n. sp. | 13. „ <i>purpurea</i> , n. sp. |
| 5. <i>Rhynchopora corrugata</i> , n. sp. | 14. <i>Phylactella spiralis</i> , n. sp. |
| 6. „ <i>incisor</i> , n. sp. | 15. <i>Mucronella thenardii</i> , AUD. |
| 7. <i>Gemellipora protrusa</i> , n. sp. | 16. <i>Retepora pocillum</i> , n. sp. |
| 8. <i>Lepralia triangula</i> , n. sp. | 17. <i>Cellepora compacta</i> , n. sp. |
| 9. „ <i>multidentata</i> , n. sp. | |



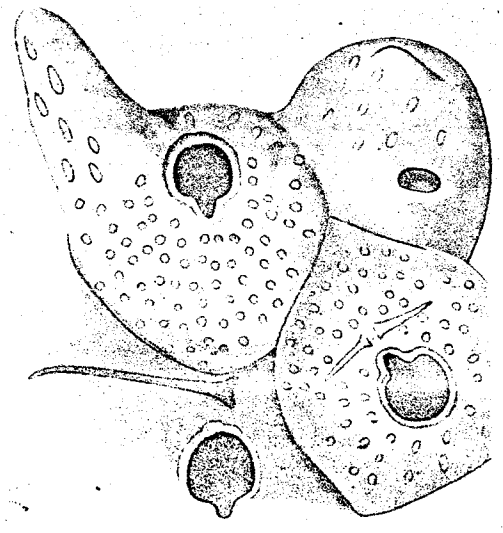
Sketch-map of the Ceylon coast, showing the principal localities from which specimens were collected. C., Chilaw Paar; Ch., Cheval Paar; K., Karativo Paar; M., Modragam Paars; Mu., Muttuvaratu Paar; P., Periya Paar; P.K., Periya Paar Kerrai.



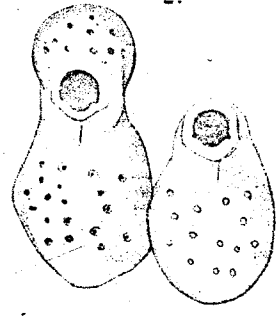
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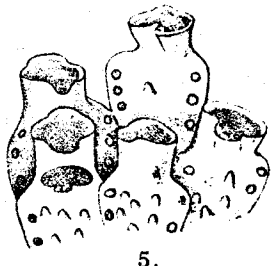
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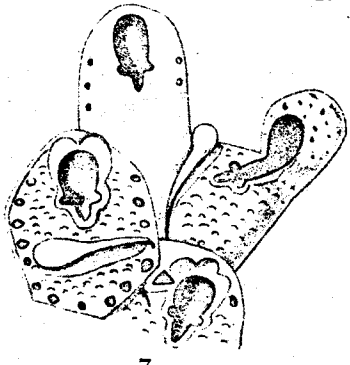
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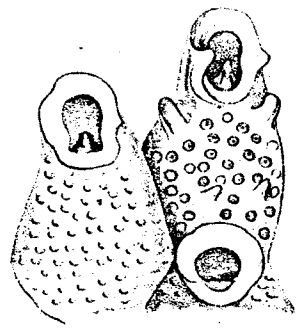
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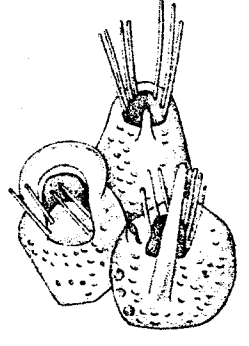
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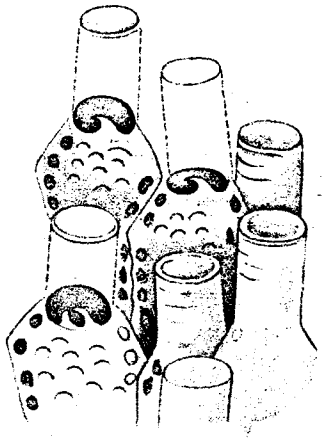
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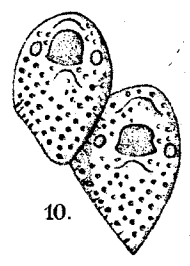
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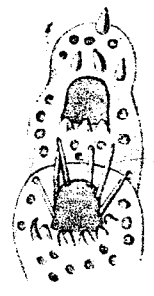
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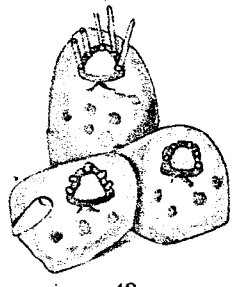
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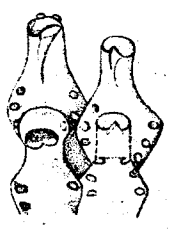
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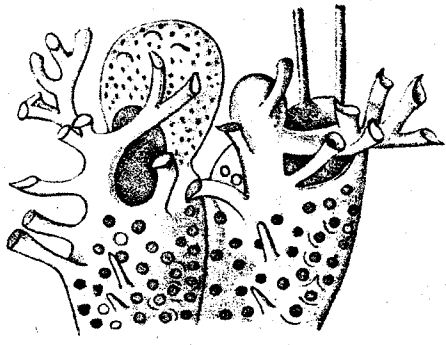
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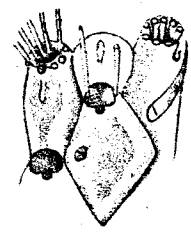
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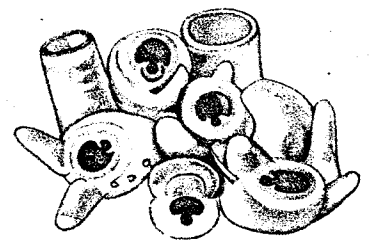
14.



15.



16.



17.