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SUPPLEMENT TO
THE LITTORAL FAUNA OF KRUSADAI ISLAND
IN THE GULF OF MANAAR

PORIFERA
BY
M. BURTON, D.SC.

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PORIFERA OF KRUSADAI ISLAND

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This report on the sponges of Krusadai Island is so written that it shall serve not only as a faunal list for that area but may help non-specialists in the group in identifying specimens. Little enough can be done in this last respect with so complex a group and it can only be hoped that the brief notes appended and the diagnoses of species may serve to assist those with at best an elementary experience of the phylum.

NOTES ON THE CLASSIFICATION OF SPONGES.

Although the types of spicules composing the skeleton, and their arrangement within the skeleton, remain the most reliable criteria for the recognition of generic and, in many cases, of specific characters, yet many other features may be usefully employed in the identification of species. Thus external form, colour, texture and the arrangement of oscules and pores should all be carefully noted. At the same time it should be constantly borne in mind that all these features are subject to considerable variation.

The same range of variation will be found in the skeleton characters, especially in the matter of size, which varies within the individual, and from one individual to another. In identifying specimens and describing new species some authors prefer to give the range of size for each type of spicule, but in this report, as a rule, only average sizes are given.

PREPARATION OF SPONGES FOR MICROSCOPICAL EXAMINATION.

Although it is preferable that sponges should be preserved from the first in strong alcohol, it is sometimes necessary to make the original preservation in formalin. This should, however, be changed for spirit as soon as possible, and in all cases this medium should be used for permanent storage. Moreover, specimens should be hardened off in strong spirit before mounting for microscopical examination.

The following are in general use for the identification of sponges:—

1. Hand sections, cut with an ordinary hollow-ground razor, dehydrated in absolute alcohol (for 10 minutes), cleared in clove oil or cedarwood oil (for 10 minutes) and mounted in Canada Balsam.

2. Teased preparations, dehydrated and cleared as in (1).

3. Spicule preparations.

4. Microtome sections.
The examination of hand sections is usually sufficient for experienced workers for ordinary purposes of identification, preparations of boiled out spicules being used as a means of corroborative evidence in checking the various categories of spicules present in the skeleton. The beginner, however, advised to make preparations of boiled out spicules in identifying every specimen (except in the case of aspiculous Tetraxonida or in Keratosa). Faulty descriptions have frequently resulted in the past from workers of little experience failing to observe the presence of one or more categories of spicules (particularly microscleres) in a given sponge. Teased preparations should only be used where the specimen does not permit of sections being cut, as for example in encrusting forms or in extremely friable specimens. Microtome sections are usually needed only when anatomical features form the basis of identification, as in aspiculous Tetraxonida or in Keratosa.

The following notes on the preparation of sponges for identification may be added:

1. **Hand sections.**—These should be sagittal and tangential, to show the structure of the skeleton at right angles to the surface and to show the character of the dermal skeleton (if present). They should be cut as thinly as possible with a razor, or a very sharp scalpel in some cases. Experience will soon show whether a razor or scalpel should be used. Specimens with tough tissues usually respond more readily to the use of a sharp scalpel.

2. **Teased preparations.**—For encrusting or friable specimens. A small piece of the sponge should be removed with forceps and teased with a pair of needles.

3. **Spicule preparations.**—Calcareous sponges should be boiled in a test-tube in a solution of caustic potash, siliceous sponges in nitric acid, care being taken to prevent 'bumping' and the consequent loss of the contents of the test-tube. Small pieces of a maximum of 1 to 2 c.c. are usually sufficient to provide an adequate supply of spicules for several preparations. When all flesh has been boiled away and the spicules allowed to settle, the acid or potash should be decanted off and the test-tube filled with distilled water. With the thumb over the mouth of the test-tube, the contents should be gently shaken and afterwards the spicules allowed again to settle. Then the water should be decanted, the test-tube again filled and gently shaken and again allowed to stand. Three separate washings in this way are usually sufficient to remove all potash or acid. After washing, the spicules can be removed by means of a pipette and allowed to drop on to the microscope slides, which are then dried and completed with Canada Balsam and coverslip. The spicules should be numerous on the slides but well separated: light or heavy concentrations of spicules are tedious to work with.

4. **Microtome sections.**—The technique for these offers nothing unusual and need not be discussed here.
The scheme of classification here adopted is a modification of that used by various previous authors. In regard to the Tetaxonida it is modelled on that used by Dendy (1921) with the introduction of new names for the suborders and the inclusion of the Clavulidae and the Tetillidae in the same suborder as the Stellettidae and Geodiidae, namely the Astrophorida.

Phylum PORIFERA.
Subphylum NUDA.
Order Hexatinellida.
Subphylum Gelatinosa.
Order Calcarea.
Order Tetaxonida.
Order Keratosa.

The subdivision into the subphyla Nuda and Gelatinosa is adopted from Bidder (1929, p. 5).

The orders Hexatinellida and Calcarea are unrepresented in the fauna of Krusadai Island and need not concern us further here. The subdivision of the Tetaxonida may be carried further as follows:—

Order TETRAXONIDA.
Suborder Homosclerophora.
Suborder Streptastrosclerophora.
Suborder Astro sclerophora.
Suborder Sigmastosclerophora.

The classification of the Keratosa is at present in a state of uncertainty and it is not proposed here to subdivide the order into more than the suborders Dictyoceratida and Dendroceratida.

THE SPONGE-FAUNA OF KRUSADAI ISLAND.

The recorded fauna of Krusadai Island is confined to the orders Tetaxonida and Keratosa.

Order TETRAXONIDA.

Siliceous sponges with spicules constructed on a 4-rayed plan, or some modification thereof.
Suborder HOMOSCLEROPHORA.

(Not represented in the fauna of Krusadai Island).
Tetragonida in which the spicules are not differentiated into megascleres and microscleres.

Suborder STREPTASTROSCLEROPHORA.

(Not represented in the fauna of Krusadai Island).
Tetragonida with spicules differentiated into megascleres and microscleres, the typical microsclere being the streptaster.

Suborder ASTROSCLEROPHORA.

Tetragonida with spicules differentiated into megascleres and microscleres, the typical microsclere being an aster or some form derived from it.
Sponges of this suborder are usually corticate or subcorticate, with radial skeleton and with external form more or less symmetrical.

Family STELLETIDAE.

Astrosclerophora with skeleton of long oxea and, usually, long-shafted triaenes; the microscleres are cuasters, or some modified form of these, to which microrhabds may be added.

Genus Stelletta Schmidt.

Stellettidae with radial skeleton of oxea and triaenes, with cuasters only for microscleres.

Stelletta purpurea Ridley.

pl. i, fig. 1 a-d.

For description and illustration see Ridley 1884, p. 473 and Dendy 1905, p. 74 (under Pilochrota haeceli); for synonymy see Burton 1926, p. 45.

*Diagnosis.*—Sponge usually spherical, usually 5-20 mm. diameter, sometimes irregularly massive, with a single apical oscule; colour ranging from yellow to purple; skeleton composed of large oxea, orthotriaenes and anatriaenes, small ectosomal oxea and tylasters.

*Remarks.*—The measurements of the spicules are :
- large oxea (fig. 1 a), '9—3'7 × '012—'06 mm.,
- orthotriaenes (fig. 1 b), shaft, '10 — 3'6 × '015 — '12 mm., cladi, '07 — '37 mm.,
- anatriaenes (fig. 1 c), shaft, '10 — 3'5 × '009 — '06 mm., cladi, '04 — '19 mm., chord,
- ectosomal oxea, 1 — 4 × '001 — '01 mm.,
- tylasters (fig. 1 d), '006 — '025 mm., diameter.
Genus Ecionemia Bowerbank.

Stellettidae with cuasters and microrhabds for microscleres.

Ecionemia bacillifera (Carter).

_pl. i, fig. 2_

{
*Stelleta bacillifera* Carter 1887, p. 78, pl. vi, figs. 9-14; *E. rotundum* Sollas Id. 1888 r. c., p. 198; *Thalassomora nigra* Lendenfeld 1888, p. 49; *Ecionema rotundum* Topsent 1893, p. 175; *Stelleta lobata* Kieschnick 1896, p. 527; *Ancorina simplex* Lendenfeld 1897, p. 96, pl. ix, figs. 12-34; *Stelleta lobata* Kieschnick 1898, p. 27; *S. truncata* Id. l.c., p. 32; *Ecionema bacillifera* Lindgren 1897, p. 485; 1898, p. 335, pl. xvii, fig. 17, pl. xix, fig. 27; *E. bacillifera* Id. 1899, p. 88; *Ecionema agglutinans* Thiele 1899, p. 7, pl. iv, fig. 1, pl. v, fig. 2; *E. bacilliferum* Kirkpatrick 1900, p. 131; *E. cribrosa* Thiele 1900, p. 21, pl. ii, fig. 7; *E. cinerea* Id. l.c., p. 32, pl. ii, fig. 8; *E. nigrescens* Id. l.c., p. 34, pl. ii, fig. 9; *Ancorina amboinensis* Lendenfeld 1903, p. 63; *A. lobata* Id. l.c., p. 63; *A. nigra* Id. l. c., p. 64; *A. acervus* Id. l.c., p. 64; *A. rotunda* Id. l.c., p. 65; *A. agglutinans* Id. l.c., p. 65; *A. cinerea* Id. l.c., p. 65; *A. bacillifera* Id. l.c., p. 66; *Ecionemia carteri* Dendy 1905, p. 79, pl. i, fig. 5, pl. iii, fig. 1; Id. 1916, p. 242.

Diagnosis.—Sponge spheroidal or irregularly massive; colour ranging from brown to grey or black; skeleton composed of large oxea, orthotriaenes and anatriaenes, dermal microrhabds and micrasters (tylasters to strongylasters or spharasters).

Remarks.—The measurements of the spicules are:

- oxea, $1.6 - 2.3 \times 0.04 - 0.07$ mm,
- orthotriaenes (fig. 2 c), shaft, $1.5 - 2.5$ mm,
- cladi, $0.15 - 0.3$ mm, long,
- anatriaenes (fig. 2 b), shaft, $1.8 - 3.0$ mm, cladi, $0.28 - 0.1$ mm, chord,
- prototriaenes (fig. 2 a), shaft, $1.8$ by $0.1$ mm, cladi, $0.28$ mm, chord,
- microrhabds (fig. 2 c), $0.05 - 0.02$ mm, long,
- tylasters (fig. 2 d), $0.05 - 0.02$ mm, diameter.

Of the species of *Ecionemia* from the Indo-Pacific, to show a close resemblance not only in regard to their spicular characters but also in their external form and colour. These species, with their salient characteristics are included in the table on page 7.

From this table it is clear that we have to deal with one species only. All the types included here are massive to spherical, usually enclosing a certain amount of pebble, etc.,
in their substance and having a skeleton composed of oxea, orthotriacnes, anatriacnes, asters and microrhabds. The resemblances are very close indeed, the differences slight and including one or more of the following:

1. Presence or absence of dermal oxea or anatriacnes.
2. Presence or absence of protriacnes.
3. Differentiation of the asters into categories.

These differences may, however, be shown to be negligible.

1. It is commonly found in species of Stellettidae that dermal oxea and hair-like dermal anatriacnes are interchangeable modifications of the same spicule-form, and that their distribution is both variable and sporadic.

2. While it is probable that protriacnes form a normal constituent of the spiculation, they are usually few in number and often completely lacking from some parts of the sponge. The fact that they have been recorded from 6 only of the types under discussion merely means that in the rest they have been overlooked, or are very few in number. A similar state of affairs is frequently seen in species of Geodia, in which both protriacnes and anatriacnes are normally found but may often be absent.

3. In 4 of the types tylasters only were found, in 4 others tylasters and spherasters of approximately the same size are recorded, and in 3 others tylasters and strongylasters with roughened rays (i.e., anthasters) are figured. These represent, almost certainly, successive stages in differentiation.
Table showing the main characteristics of the holotypes of a group of ten species of *Ecionemia* from the Indo-Pacific region.

<table>
<thead>
<tr>
<th>Species</th>
<th>Orthotriene</th>
<th>Anatriene</th>
<th>Microrhabd.</th>
<th>Aster.</th>
<th>Colour.</th>
<th>Shape.</th>
<th>Locality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oxes.</td>
<td>L = shaft.</td>
<td>L = shaft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B = cladus.</td>
<td>B = cladus.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia agglutinans</em> Thiele</td>
<td>2.0 x 0.07</td>
<td>L 1.7 x 0.07</td>
<td>L 2.5</td>
<td>0.01</td>
<td>Tylaster 01</td>
<td>Brown</td>
<td>Massive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2.5</td>
<td>B 1</td>
<td>...</td>
<td>Spheraster 01</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia cribrata</em> Thiele</td>
<td>2.0 x 0.04</td>
<td>L 1.75 x 0.07</td>
<td>L 2.0 x 0.02</td>
<td>0.013</td>
<td>Tylaster 01</td>
<td>Do.</td>
<td>Oval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2.5</td>
<td>B 1</td>
<td>...</td>
<td>Spheraster 01</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia cinerea</em> Thiele</td>
<td>2.0 x 0.04</td>
<td>L 1.7 x 0.06</td>
<td>L 2.0 x 0.017</td>
<td>0.014 - 0.018</td>
<td>Tylaster 008</td>
<td>Reddish</td>
<td>Massive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2</td>
<td>B 0.05</td>
<td>...</td>
<td>Anthaster 016</td>
<td>Grey.</td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia nigricans</em> Thiele</td>
<td>2.0 x 0.04</td>
<td>L 1.9 x 0.05</td>
<td>L 2.0 x 0.015</td>
<td>0.014</td>
<td>Tylaster 01</td>
<td>Blackish</td>
<td>Massive or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2</td>
<td>B 0.045</td>
<td>...</td>
<td>Anthaster 015</td>
<td>Grey.</td>
<td>Irreg.</td>
</tr>
<tr>
<td><em>Ecionemia amboinensis</em> Lendenfeld</td>
<td>2.3 x 0.05</td>
<td>L 2.5 x 0.065</td>
<td>L 2.0 x 0.019</td>
<td>0.005</td>
<td>Tylaster 007</td>
<td>Do.</td>
<td>massive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2.5</td>
<td>B 11</td>
<td>...</td>
<td>Anthaster 012</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia bacillifera</em> Carter</td>
<td>2.0 x 0.06</td>
<td>L 2.0 x 0.05</td>
<td>L 2.4 x 0.015</td>
<td>0.005 - 0.018</td>
<td>Tylaster 006</td>
<td>Dark-green</td>
<td>Do.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>B 0.045</td>
<td>...</td>
<td>Anthaster 011</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia carteri</em> Dendy</td>
<td>1.8 x 0.037</td>
<td>L 1.5 x 0.033</td>
<td>L 1.8 x 0.01</td>
<td>0.02</td>
<td>Tylaster 016</td>
<td>Pale grey.</td>
<td>Do.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 148</td>
<td>B 0.028</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Stellatella lobata</em> Kieschnick</td>
<td>...</td>
<td>L 2.0 x 0.1</td>
<td>L 2.3 x 0.018</td>
<td>0.009</td>
<td>Tylaster 005</td>
<td>Grey-black.</td>
<td>Do.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2</td>
<td>B 0.045</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Thalassosoma nigra</em> Lendenfeld</td>
<td>1.6 x 0.058</td>
<td>L 1.8 x 0.056</td>
<td>L</td>
<td>...</td>
<td>Tylaster 016</td>
<td>Black</td>
<td>Spherical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 3</td>
<td>...</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ecionemia rotundum</em> Sojias</td>
<td>2.1 x 0.039</td>
<td>L 1.6 x 0.05</td>
<td>L 2.0 x 0.013</td>
<td>0.016</td>
<td>Tylaster 012</td>
<td>Do.</td>
<td>Ovate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 2</td>
<td>B 0.038</td>
<td>...</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

All measurements in mm.
Family GEODIIDAE

Astrosclerophora with skeleton of long oxea and, usually, long-shafted triaenes; the chief microsclere is a sterraster, confined to a cortical crust, and euasters of various sorts, to which microrhabds may be added, are present in addition.

Genus Geodia Lamarck

Geodiidae with radial skeleton of long-shafted triaenes and oxea; without microrhabds or spherules.

Geodia areolata Carter

pl. i, fig. 3

G. areolata Carter 1880, p. 133, pl. vi, figs. 36-37; Sollas 1888, p. 246; Sidonops areolata Lendenfeld 1903, p. 103; Geodia areolata Dendy 1905, p. 87.

Diagnosis. —Sponge spherical in young stages sometimes becoming irregular as growth proceeds, up to 10 cms. or more across; colour, in spirit, yellow or brown, often mottled with two more of these colours; skeleton composed of a dermal crust of sterrasters, with internal radially-arranged oxea, orthotriaenes, anatriaenes and prototriaenes; small dermal oxea usually present; micrasters of two kinds, small oxyasters, or strongylasters, forming a dermal layer and scattered in choanosome, and larger oxyasters (varying to strongylasters) found only in choanosome.

Remarks. — The measurements of the spicules are :

  large oxea, 1.6 — 2.0 × .016 — .042 mm.,
  orthotriaenes (fig. 3 a), shaft, 1.6 — 2.8 × .016 — .07 mm.,
    cladi, .17 mm. long.,
  anatriaenes (fig. 3 b), shaft, 3.0 × .008 mm.,
    cladi, .03 — .07 mm. chord,
  prototriaenes (fig. 3 c), shaft, 3.0 × .008 mm.,
    cladi, .05 — .07 mm. long,
  dermal oxea, .25 × .007 mm.,
  sterrasters (fig. 3 d), .07 × .07 mm. (but variable in size),
  micrasters of dermal layer and choanosome (fig. 3 f), .008 mm. diameter,
  micrasters of choanosome (fig. 3 e), .017 — .02 mm. diameter.

It is difficult to give exact details of either the size or the shape of the micrasters because the variation in both is fairly considerable. Typically the smaller micrasters are strongylasters and the larger micrasters are oxyasters, but both may be either strongylasters or oxyasters or a mixture of both. In addition, although the two kinds are typically of different sizes, it sometimes happens that numerous intermediates occur.
Note.—*Geodia areolata* and *G. picteti* are closely related species and it is possible that they will be shown ultimately to be identical. Moreover, they are both closely related to a large group of species distributed over the eastern North Atlantic, Mediterranean, Indian Ocean, Malay area and the coasts of Eastern Australia, most or all of which may also be shown later to be synonymous with *G. areolata* and *G. picteti*. These species are: *G. inaequalis* Bowerbank, *G. inconspicua* Bowerbank, *G. paupera* Bowerbank, *G. arabica* Carter, *G. globostellifera* Carter, *G. ramodigitata* Carter, *G. berryi* (Sollas), *G. glariaea* (Sollas), *G. nitida* (Sollas), *G. exigua* Thiele, *G. alba* (Kieschnick), *G. kukenthali* Thiele, *G. distincta* Lindgren, *G. arripiens* Lindgren, *G. lindgreni* Lendenfeld, *G. micropunctata* Row and, finally, *G. mulleri* (Fleming) sensu Lendenfeld 1903, p. 113.

*Geodia picteti* (Topsent).

*Sidonops picteti* Topsent, 1897, p. 431, pl. xviii, fig. 2; *Sidonops picteti* Kirkpatrick 1900, p. 130; Lendenfeld 1903, p. 193.

Diagnosis.—Sponge spherical or irregularly massive; colour, in spirit, white or whitish-yellow; skeleton composed of a dermal crust of sterrasters, with internal, radially-arranged oxea, orthatriaenes, anatriaenes and proatriaenes; micrasters of two kinds, small spherasters, with pointed or truncated rays, confined mainly to dermal layer, and oxyasters scattered in choanosome.

Remarks.—The measurements of the spicules are:—

- large oxea, '5 — '6 × 'o3 mm.,
- orthatriaenes, shaft, '5 — '6 mm.,
  cladi, 'o9 mm. long,
- anatriaenes, shaft, '6 × '01 mm.,
  cladi, 'o4 mm. chord,
- proatriaenes, shaft, 'o6 × '001 mm.,
  cladi, 'o4 mm. chord,
- sterrasters, 'o97 by '085 mm.,
- micrasters of dermal layer, '004 — '006 mm. diameter,
  choanosome, 'o35 — 'o4 mm. diameter.

Family CHONDROSIIDAE.

Astrosclerophora without megacleres; microscleres, when present, euasters.

Genus *Chondrilla* Schmidt.

Chondrosiidae with microscleres.
Chondrilla australiensis Carter.

pl. i, fig. 4.

*C. australiensis* Carter 1873, p. 23, pl. i, figs. 10-14, 16; Lendenfeld 1886, p. 153; *C. papillata* Id. l.c., p. 153, figs. 13-16; *C. corticata* Id. l.c., p. 154, figs. 17-20; *C. papillata* Carter 1886, p. 278; *C. corticata* Lendenfeld 1888, p. 70; *C. australiensis* Id. l.c., p. 71; *C. papillata* Id. l.c., p. 71; *C. globulifera* Keller 1891, p. 327, pl. xviii, figs. 34-35; *C. ternatensis* Thiele 1900, p. 65, pl. iii, fig. 19; *C. australiensis* Lindgren 1897, p. 484; Id. 1898, p. 38; Dandy 1905, p. 132; *C. australiensis* var. lobata Id. l.c., p. 132; *C. australiensis* Hentschel 1909, p. 377; Id. 1912, p. 320; Dandy 1916, p. 101; *Chondrella australiensis* Topsent 1918, p. 634; *C. papillata* Id. l.c., p. 606; *C. corticata* Id. l.c., p. 606; *C. globulifera* Id. l.c., p. 607; *C. ternatensis* Id. l.c., p. 608; *Chondrilla australiensis* Dandy and Frederick 1924, p. 496; Burton 1924, p. 207; Burton and Rao 1932, p. 325.

*Diagnosis.*—Sponge encrusting to lobose; greyish-white to reddish brown or purple. Often with dark specks; surface smooth; consistency tough; skeleton of two forms of micraster, spheraasters (fig. 4 a), 0.19 — 0.36 mm. in diameter, and oxyasters (fig. 4 b), 0.02 — 0.03 mm. in diameter.

Genus Chondrosia Nardo.

Chondrosiidae without microscleres.

**Chondrosia reniformis** Nardo.

*C. reniformis* Nardo 1847, p. 272; *Gummaea gilicauda* Schmidt 1862, p. 38, pl. iii; *G. ecaudata* Id. l.c., p. 38, pl. iii; *Chondrosia reniformis* Id. l.c., p. 40; Id. 1864, p. 30; *G. gilicauda* Id. l.c., p. 30; *Gummaea ecaudata* Källiker 1864, p. 69, pl. viii; *Chondrosia reniformis* Schmidt 1868, p. 1; *C. plebeja* Id. l.c., p. 1; *C. reniformis* Schultze 1877, p. 97, pl. viii; Carter 1881, p. 248; Greffe 1882, p. 315; *C. ramayi* Lendenfeld 1886, p. 147, pl. iii, figs. 6-9; *C. reniformis* Vosmaer 1887, p. 325, pl. vi, vii, x; Leviusen 1887, pp. 512-513; Lendenfeld 1889, p. 458, pls. xxviii—xxxiii; *C. plebeja* Topsent 1892, p. 54; *C. reniformis* Topsent 1896, p. 124; Lendenfeld 1896, p. 38, pl. i, figs. 7, 11, 12, pl. ix, figs 118, 119; Topsent 1897, p. 428; Kirkpatrick 1900, p. 129; *C. plebeja* Id. l.c., p. 129; *C. corticata* Thiele 1900, p. 67, pl. iii, fig. 21; *C. debilis* Id. l.c., p. 68; *C. reniformis* Dandy 1905, p. 133; Topsent 1906, p. 568; Hentschel 1909, p. 378; *C. reniformis* var. rugosa Id. l.c., p. 379, pl. xxiii, fig. 19; *C. plebeja* Kirkpatrick 1910, p. 128, pl. vii, figs. 4-8; *C. reniformis* Hentschel 1912, p. 322; Stephens 1915, p. 437; *C. plebeja* Id. l.c., p. 437; Topsent 1918, p. 609; *C. reniformis* Id. l.c., p. 610; Babić 1921, p. 13; Id. 1922, p. 269; Topsent 1925, p. 630; Id. 1928, p. 143; Burton and Rao 1932, p. 324; Topsent 1934, p. 8. (For description and illustration see Schultze 1877 and Lendenfeld 1896).

* The inclusion of *Chondrosia spura* as a synonym of *C. reniformis* is wrong; it should be called *Thysmios spura* (Carter).
Diagnosis.—Sponge massive or rounded, often spreading; surface smooth and shiny; texture firm and tough; oscules simple, large; colour yellowish-white or violet-brown; cortex fibrous, firm, elastic.

"LITHISTIDA."

An aberrant, probably polyphyletic, group of the Tetraxonida, characterised by the possession of a skeleton of interlocking desmas, with various other spicules, triaenes, styli, etc., for accessory megascleres, and with various kinds of astrose and sigmatose microscleres.

Genus Lophocanthus Hentschel.

Lithistida with main skeleton of tetracrepid desmas; with dermal skeleton of lophotriaenes and with styli and rhabdostyli projecting at the surface.

Lophocanthus rhabdophorus Hentschel.

Pl. v, fig. 31.

L. rhabdophorus Hentschel 1912, p. 306, pl. xvii, fig. 1.

Diagnosis.—Sponge thinly encrusting; surface even, minutely hispid; oscules and pores not seen; colour, in spirit, greyish-white or bluish-grey; main skeleton of tetracrepid desmas, dermal skeleton of lophotriaenes, with styli and rhabdostyli projecting at surface.

Dimensions of spicules:—

desmas (fig. 31 a-b), \( \cdot15 \) mm. long,

lophotriaenes (fig. 31 c), shaft \( \cdot18 \) to \( \cdot26 \) mm. long,

cladi, \( \cdot1 \) to \( \cdot2 \) mm. long,

styli and rhabdostyli (fig. 31 d-e), \( \cdot26 \) to \( \cdot65 \) by \( \cdot007 \) to \( \cdot016 \) mm.

Family TETILLIDAE.

Astrosclerophora with radial skeleton of long oxea and long-shafted triaenes, to which, occasionally, short-shafted triaenes may be added; microscleres sigmaspirae.

Genus Chrotella Sollas

Tetillidae of, usually, rounded form, with porocalices; without amphitriaenes or subdermal layer of short-shafted triaenes.

Remarks.—The genus corresponds to Cinachyra Auctt.
Chrotella australiensis (Carter).

_Tethya cranium var. australiensis_ Carter 1886, p. 127; _Cinachyra australiensis_ Burton 1934, p. 523. (For synonymy and literature see Burton l.c., for illustration see Dendy 1905, pl. vi, fig. 4 and 1921, pl. i, figs. 4, 5, pl. ii, fig. 1, pl. x, figs. 2, 3).

_Diagnosis._—Sponge more or less spherical, surface usually coated with a layer of sand; oscules small and inconspicuous, porocalices usually small and scattered over surface; skeleton composed of radial bundles of oxea which tend to spread out in divergent brushes at surface; anatriacnes or protraencae may be present in small quantities. Microscleres, microoxea, which may be sometimes absent, and sigmaspirae.

Family TETHYIDAE

Astrosclerophora of globular or (more rarely) massive form, with radial skeleton of stronglyloxea or (rarely) tylostylia; with a well-differentiated cortex; microscleres, when present, euasters to which microrhabs may be added.

Genus _Tethya_ Lamarck.

_Tethya_idae with main skeleton of stronglyloxea (pl. ix, figs. 54 a, 55 a, 56 b) more rarely tylostylia; microscleres differentiated into megasters, large spherasters (pl. ix, figs. 54 b, 55 b, 56 b) forming a cortical layer, and micrasters of one or more kinds distributed throughout both cortex and choanosome; with surface marked by polygonal or rounded areas separated by pore-bearing grooves.

_Remarks._—The species of _Tethya_ are so alike in external form and in their anatomy that these details can be omitted from their diagnoses.

_Tethya repens_ Schmidt.

_pl. ix, fig. 54._

_T. repens_ Schmidt 1870, p. 51; _Donatia stella-grandis_ Dendy 1916, p. 266, pl. xliv, fig. 5; _Donatia repens_ Burton 1924, p. 1036.

_Diagnosis._—Micrasters typically stronglylasters with roughened rays, which may become tylote or occasionally, oxeote (fig. 54 c—e); rays of megasters long, often branched (fig. 54 b); megascleres range from stronglyloxea to tylostylia (fig. 54 a).

_Tethya diploderma_ Schmidt.

_pl. ix, fig. 56._

_T. diploderma_ Schmidt 1870, p. 52, pl. iv, fig. 11; _Donatia diploderma_ Topsent 1918, p. 574; Burton 1924, p. 1039.
**Diagnosis.**—Micrasters tyllasters (fig. 56 d), often with ends of rays spined, and long-rayed oxyasters (fig. 56 c); rays of latter may be smooth, roughened, tuberculate or laterally spined, often branched.

**Tethya robusta** (Bowerbank).

pl. ix, fig. 55.

*Tethya robusta* Bowerbank 1873, p. 10, pl. ii, figs. 12-17; *Donatia robusta* Burton 1924, p. 1037.

*Diagnosis.*—Micrasters typically strongylasters of two kinds: (a) with short rays bearing at ends a number of small spines (fig. 55 c); (b) with long rays, usually bearing a crown of small spines at ends, sometimes sharply-pointed (fig. 55 d).

**Tethya japonica** Sollas.

*T. japonica* Sollas 1888, p. 430, pl. xlii, figs. 7-14; *Donatia japonica* Burton 1924, p. 1039.

*Diagnosis.*—Micrasters tyllasters only.

**Genus Aaptos** Gray.

Clavulidace of encrusting or rounded form with skeleton of radial bundles of strongylloxea (fig. 55 a) and small, scattered dermal styli; microscleres absent.

**Aaptos aaptos** (Schmidt).

*Ancorina aaptos* Schmidt 1864, p. 33, pl. iv, fig. 11; *Tuberella aaptos* Topsent 1900, p. 285, pl. viii, figs. 12-13; *Aaptos aaptos* Dendy and Frederick 1924, p. 508. (For synonymy see Topsent l.c. and Dendy and Frederick l.c.).

*Diagnosis.*—Sponge irregularly encrusting or massive and rounded; surface smooth or finely hispid; oscules scattered; texture firm, fleshy; colour, in life, white, yellow, brown or red (colour often preserved in spirit); skeleton of radial bundles of strongylloxea, 1.0 by .04 mm., and small dermal styli, .5 by .007 mm.

Family CLAVULIDAE.

Astrosclerophora with radial skeleton of tylostyli, rarely styli or oxea, with various sorts of pseudasters for microscleres.

**Genus Pseudosuberites** Topsent.

Clavulidace with main skeleton an irregular reticulation of tylostyli, with a dermal, tangential reticulation of similar spicules; without microscleres.
Pseudosuberites andrewsi Kirkpatrick.
pl. viii, fig. 48.

P. andrewsi Kirkpatrick 1900, p. 135, pl. xii, fig. 2, pl. xiii, fig. 7.

Diagnosis.—Sponge encrusting or massive; surface smooth, with subdermal canalicular markings; oscules small, scattered; texture soft, friable; colour, in spirit, white or pale yellow; main skeleton irregular with tendency to form ascending fibres; spicules '35 by '006 mm.

Genus Laxosuberites Topsent.

Clavulidae with skeleton of ascending fibres of tylostyle, usually plumose, often connected by loosely-arranged transverse spicules; spicules not divided into categories.

Laxosuberites cruciatus (Dendy).
pl. viii, fig. 47.

Suberites cruciatus Dendy 1905, p. 132, pl. v, fig. 10; Id. 1916, p. 135.

Diagnosis.—Sponge erect, stipitate, branching; surface uneven, minutely hispid; pores in areas, oscules small, scattered; texture soft, flexible; colour, in spirit, pale brown; skeleton of loose longitudinal fibres, with distal ends bending towards surface, connected by scattered spicules; spicules tylostyle, with cruciform bases, '3 by '005 mm.

Laxosuberites lacustris Annandale.
pl. viii, fig. 49.

L. lacustris Annandale 1915, p. 45, pl. v, figs. 2-3, text-figs. 10-11.

Diagnosis.—Sponge encrusting; surface smooth; oscules small, scattered; texture soft; colour alive, white, orange-yellow, or green, in spirit, white; skeleton of ascending plumose fibres of tylostyle, varying from '2 to '6 by '004 to '008 mm.

Spirastrella inconstans (Dendy).
pl. viii, fig. 51.

Suberites inconstans et varr. maandrina, digitata, globosa Dendy 1887, pp. 154-157, pls. ix-x; Spirastrella inconstans Burton 1934, p. 570.

Diagnosis.—Sponge massive or composed of a bunch of stout, erect, digitate processes springing from a basal mass; surface minutely hispid, even or thrown into meandrine folds, often plentifully beset with commensal cirripedes; oscules scattered in massive forms, at summits of processes in digitate forms; texture hard, incompressible; colour, in life,
orange or brick-red; skeleton a coarse isodictyal, multispicular reticulation of tylostyles (fig. 51 a), 0.6 by 0.022 mm.; microscleres slender spinispirae (fig. 51 b), beset with small wart-like processes, up to 0.35 mm. (rarely 0.07 mm.) long.

Genus **Terpios** Duchassaing and Michelotti.

Clavulidae of encrusting habit, with skeleton of tylostyles arranged without order; apicles not differentiated into categories; microscleres absent.

**Terpios fugax** Duchassaing and Michelotti.

pl. viii, fig. 50.

*T. fugax* Duchassaing and Michelotti 1864, p. 102, pl. xxiv; Topsent 1900, p. 193, pl. vi., fig. 10.

**Diagnosis.**—Sponge thinly encrusting; surface even, smooth; oscules and pores not apparent; texture soft; colour, in life, blue, orange, green and yellow (first three colours due to symbiotic algae); skeleton of tylostyles, 0.25 to 0.4 by 0.004 to 0.006 mm.

Genus **Timea** Gray.

Clavulidae of encrusting habit, with skeleton of tylostyles arranged vertically on substratum, and with asters for microscleres.

**Timea stellata** (Bowerbank).

pl. viii, fig. 52.

*Hymedesmia stellata* Bowerbank 1866, p. 150; *Timea stellata* Gray 1867, p. 544; *Hymedesmia stellata* Bowerbank 1874, p. 71, pl. xxviii, figs. 5-8; Id. 1882, p. 67; Topsent 1900, p. 114, pl. iii, fig. 15.

**Diagnosis.**—Sponge thinly encrusting; surface even, hispid; oscules and pores not apparent; texture soft; colour, living and in spirit, yellow; skeleton of tylostyles arranged vertically on substratum; tylostyles (fig. 52 a), ranging from 0.17 by 0.001 mm. to 1.0 by 0.015 mm.; microscleres chiasters (fig. 52 b), 0.014 mm. diameter.

Genus **Ciona** Grant.

Clavulidae of boring habit, excavating the shells of Mollusca, chalk-rocks, coral-rock, etc., but (frequently) assuming a massive form in later stages; pores and oscules situated on specialised retractile papillae; skeleton of tylostyles, often combined with or replaced by oxea, and spinispirae or some modified form of them.
Cliona lobata Hancock.

pl. viii, fig. 53.

C. lobata Hancock 1849, p. 341, pl. xii, figs. 4, 8; Topsent 1900, p. 70, pl. ii, figs. 2, 10, pl. iii, fig. 1, pl. iv, fig. 1.

Diagnosis.—Megascleres tylostyles (fig. 53 a), ' 2 by ' 004 mm.; microscleres spinispirae (fig. 53 b), ' 01 to ' 0065 by ' 002 to ' 005 mm.

Genus Placospongia Gray.

Clavulidae with axial and cortical layers of sterrospire, and with radial bundles of tylostyles; microscleres spinispirae, microrhabds and cuasters of various sorts.

Placospongia carinata (Bowerbank).

pl. ix, fig. 57.

Geodia carinata Bowerbank 1858, pp. 308, 314, pl. xxv, fig. 19, pl. xxvi, fig. 10; Placospongia carinata Vosmaer and Vernout 1902, p. 9, pl. i, figs. 1-4, pl. ii, fig. 5, pl. iv, figs. 9-13, pl. v, figs. 1, 5, 7-9, 11.

Diagnosis.—Sponge encrusting or massively branching, branches polygonal in section and bearing longitudinal porebearing grooves; surface smooth, even; texture hard; colour, living and in spirit, yellow, brown or red; skeleton consists, in addition to tylostyles (fig. 57 a—b) and sterrospire (fig. 57 h), of spinispirae of many sorts (fig. 57 c—d), microrhabds (fig. 57 e—f) and spherasters (fig. 57 g).

Remarks.—The difference between this species and P. melebesioides, which is very similar to it and has the same distribution, is the greater number and variety of the spinispirae, as well as the difference in development of the sterrospire, a point well illustrated in Vosmer and Vernout (l.c. pl. iv).

Family HAPLOSCLERIDAE.

Sigmatoosclerophora with skeleton of oxea, rarely strongyla, of fairly constant length; skeleton a reticulation of fibres or single spicules, scalariform, triangular or a dense mass of spicules without order, or a dendritic system of fibres; microscleres, usually absent, sigmata, trichodragmata and rhaphides.

Genus Haliclona Grant.

Haploscleridae with main skeleton a regular reticulation of fibres of oxea, fibres unispirouls or multispicular; without special dermal skeleton.
Haliclona madrepora (Dendy).

pl. i, fig. 6.

Reniera madrepora Dendy 1889, p. 78, pl. iv, fig. 9; Lindgren 1897, p. 481; 1898, p. 6, pl. xvi, fig. 4.

Diagnosis.—Sponge a mass of anastomosing cylindrical branches or, more rarely, rounded lamellae; surface smooth, minutely hispid; texture soft and compressible; oscules small and scattered; colour, in spirit, pale yellow or orange; skeleton varying from unispecial to multispecial with triangular to rectangular mesh, with little spongina; spicules oxea, 16 to 18 by 0.007 to 0.008 mm.

Haliclona obtusispecialifera (Dendy).

pl. i, fig. 5.

Chalina obtusispecialifera Dendy 1905, p. 150, pl. x, fig. 9.

Diagnosis.—Sponge irregularly branched, branches long, slender, cylindrical; surface even, minutely hispid; texture soft and resilient; oscules and pores not visible; colour, in spirit, pale yellowish-brown; skeleton a reticulation of horny fibre cored by slender strongyla; spicules 12 by 0.007 mm.

Haliclona exigua (Kirkpatrick).

Petrosia exigua Kirkpatrick 1900, p. 139, pl. xii, fig. 7, pl. xii, fig. 4; Haliclona exigua Burton 1934, p. 532.

Diagnosis.—Sponge a hard, thick nodulated crust; surface thrown into folds, producing irregular ridges and lobose processes; texture hard and firm, but friable; oscules numerous, scattered, with a tendency to formation of linear series on summits of ridges; colour, in spirit, usually dark brown, rarely yellow; skeleton a fairly regular isodictyal reticulation; spicules oxea, 0.09 to 0.16 by 0.003 to 0.008 mm.

Haliclona tenuiramosa (Burton).

Chalina tenuiramosa Burton 1930, p. 666.

Diagnosis.—Sponge a mass of long, slender, cylindrical branches; surface even, minutely hispid; texture soft, compressible; vents small, distributed in an irregular linear series; colour, in life, olive-green, in spirit, light brown; skeleton a unispecial reticulation with triangular or rectangular mesh, with spongina only at nodes of reticulation; spicules oxea, 15 by 0.006 mm.

Haliclona camerata (Ridley).

Reniera camerata Ridley 1884, p. 605, pl. liii, fig. H, pl. liv, fig. n; Tonsent 1897, p. 474; Dendy 1922, p. 31; Haliclona camerata Burton 1934, p. 531. (For illustration see Ridley l.c.)
Diagnosis.—Sponge generally subcylindrical or subconical, but perforated by large irregular openings and with cavernous interior*; surface smooth, gently undulating; inner surface of cavities pitted by opening of exhalant canals; colour, in spirit, yellow, pale brown or olive-green; consistency compressible, flexible and slightly friable; skeleton ranging from uni- to multisaccular, with triangular or polygonal mesh, but with little spongia; spicules oxea, 16 to 32 mm, by 0.05 to 0.02 mm.

Hemihaliclona gen. n.

Genotype.—Amphimedon viridis Duchassaing and Michelotti 1864, p. 81.

Diagnosis.—Haploscleridae with skeleton of branching systems of fibres, cored by spicules running outwards to surface connected by numerous irregularly placed single spicules or by occasional spicule-fibres.

Hemihaliclona viridis (Duchassaing and Michelotti).

pl. i, fig. 7.

Amphimedon viridis Duchassaing and Michelotti 1864, p. 81, pl. xvi, figs. 2-3; Pachychalinova variabilis Dendy 1887, p. 504; Dactylochalinova viridis Keller 1889, p. 391, pl. xxiii, figs. 40-41; Pachychalinova variabilis Dendy 1890, p. 353, pl. lviii, fig. 3, pl. lxx, fig. 2; Chalinova polychotoma (Spec. R.N. 325), Dendy 1895, p. 243; C. viridis Id. l.c., p. 244; Reniera tabernacula Row 1911, p. 316, text-fig. 9; Ceraochalinova differentiata Dendy 1922, p. 43, pl. iii, fig. 7, pl. xii, fig. 11; Reniera tabernacula Burton 1926, p. 74; Cladochalinova variabilis Burton 1927, p. 512.

Diagnosis.—Sponge variable in form: irregularly massive, lamellar with digitate or branching processes, or branching; surface even, minutely hispid, markedly porose; texture soft, compressible; oscules usually numerous, scattered; colour, in life, green, in spirit, pale yellow to brown or olive green; skeleton of branching systems of horny fibres, cored by spicules, connected by numerous, irregularly disposed single spicules or, occasionally, by transverse connective fibres; spicules oxea, 0.06 to 0.15 by 0.003 to 0.012 mm.

Genus Adocia Gray.

Haploscleridae with isodictyal skeleton (mesh triangular or rectangular, unispicular or multisaccular) of oxea; special dermal skeleton a tangential unispicular reticulation of similar spicules.

* In reality, the sponge is composed of compact lamellae, 1-2 mm thick, much folded and anastomosing to form labyrinthine system of passages.
**Adocia pigmentifera** (Dendy).

*Reniera pigmentifera* Dendy 1905, p. 143, pl. ix, fig. 10.

**Diagnosis.**—Sponge massively flabellate in younger stages, becoming pyriform in adult; surface even, in young stages, becoming meandrine in upper parts of older specimens; oscules, about 5 mm. diameter, few and scattered, arranged in linear series on margin in flabellate forms; texture soft, compressible; colour, in life, dark green, in spirit, olive-green to brown; skeleton mainly a unispicular reticulation, very irregular in parts; spicules oxea, sometimes modified to styli or strongyla, '14 by '007 mm.

**Remarks.**—The holotype of the species is a mass of small pieces which can at best give only a slight indication of the true external form, but from the examination of other specimens in the British Museum collections, it is possible that the Krusadai Island specimen does belong to this species. It is large, 8 cms. high and 6 cms. in diameter at the widest point, irregularly pyriform with a pronounced depression at the summit, and with the surface becoming more and more marked with small meandrine ridges as the upper parts of the sponge are reached.

**Adocia semifibrosa** (Dendy).

*Reniera semifibrosa* Dendy 1916, p. 111, pl. ii, fig. 13.

**Diagnosis.**—Sponge massive, with surface thrown into irregular folds or produced into subpapillate processes; surface smooth, even; oscules scattered, large and prominent; texture soft, friable; colour, in spirit, pale yellowish-grey; main skeleton a unispicular reticulation, with a multipspicular subdermal reticulation; spicules oxea, '16 by '01 mm.

**Adocia carnosa** (Dendy).

pl. i, fig. 11

*Gelliodes carnosa* Dendy 1889, p. 83, pl. iv, fig. 7; 1905, p. 137, pl. vii, fig. 5; *G. carnosa* var. *laxa* Id. 1922, p. 29, pl. ii, fig. 1.

**Diagnosis.**—Sponge a proliferous mass of slender anastomosing tubes, fused to a greater or lesser extent to form a lamellar mass bearing numerous tubular processes each terminating in a vent; surface smooth, even; texture soft, compressible; colour, in life, grey, dried and in spirit, brownish-grey; main skeleton of multipspicular ascending fibres with fairly regular bispicular conjunctives; dermal skeleton a regular unispicular reticulation with a fair amount of spongins; spicules oxea, '12 to '14 by '006 to '008 mm., and sigmata, '017 to '02 mm. chord.
Adocia pumila (Lendenfeld).

*Siphonochalina pumila* Lendenfeld 1887, p. 806; *Adocia pumila* Burton 1934, p. 537, pl. i, figs. 1-7. (For synonymy and description see Burton l.c.)

*Diagnosis.*—Sponge massive with proliferations on surface, or composed of massive anastomosing branches, or consisting of a basal plate from which arise well-marked oscular tubes; surface entirely smooth or bearing groups of tubercles or low spines; texture firm but compressible; oscules conspicuous but scattered; colour, in spirit, pale yellow to brown; main skeleton a reticulation of spongins fibres cored by spicules, ascending fibres multispicular, connectives uni- or bispicular; subdermal portions of main skeleton without spongins and often entirely unispicular; dermal skeleton a regular, unispicular network; spicules oxea, '18 by '008 mm., and sigmata, '024 mm. chord.

Genus *Callyspongia* Duchassaing and Michelotti.

Haploscleridae with main skeleton a regular reticulation, usually of multispicular fibre or of stout spongins fibre cored by a few spicules only; spicules oxea; special dermal skeleton a large-meshed reticulation of multispicular fibres, meshes triangular or polygonal, subdivided by secondary (unispicular or multispicular) or tertiary (usually unispicular) fibres.

*Callyspongia diffusa* (Ridley).

*Cladochalina diffusa* Ridley 1884, p. 672, pl. xli, fig. D.; *Callyspongia diffusa* Burton 1934, p. 541, fig. 6. (For synonymy and description see Burton l.c.)

*Diagnosis.*—Sponge massive, often with low tubular oscules, to tubular and repent or erect and tubular, or flabellate with oscules arranged around margins or scattered over one face, or cylindrical and repent with long slender branches; surface smooth or sparingly spinose, minutely hispid; texture firm but compressible; colour, in life, purple, violet or yellowish brown, in spirit, yellowish brown, dried, yellowish-brown or yellowish-green (often in dried or spirit specimens traces of purple or violet colour remains); main skeleton a coarse network of stout multispicular fibres; dermal skeleton a network of multispicular fibres forming a triangular mesh subdivided by unispicular secondary fibres and echinated by tufts of spicules set at right angles; spicules oxea, '07 to '14 by '004 to '006 mm.

*Remarks.*—The external form of the species is markedly variable but the Gulf of Manaar specimens are almost invariably flabellate. Did not this form occur elsewhere, e.g. off the Australian coasts, and frequently alongside other forms of the same species, there might be some justification for regarding it as a distinct variety.
Callyspongia fibrosa (Ridley and Dendy).

*Dasychalina fibrosa* Ridley and Dendy 1886, p. 330; *Pachychalina fibrosa* Id. 1887, p. 21, pl. iv, figs. 3-4; *Chalina spinifera* Carter 1887, p. 66, pl. v, figs. 1-2; *Pachychalina spinilamella* Dendy 1889, p. 80; *P. fibrosa* Lindgren 1897, p. 481; Id. 1898, p. 11, pl. xix, fig. 6; *P. spinilamella* Dendy 1905, p. 149, pl. vii, fig. 4; *Cladochalina fibrosa* Burton 1927, p. 510; *C. spinilamella* Id. l.c., p. 511; *Sclerochalina spinilamella* Burton 1930, p. 669. (For illustration and description see Ridley and Dendy 1887, and Dendy 1889 and 1905.)

**Diagnosis.**—Sponge composed of massive anastomosing branches or of a series of low tubes arising from a basal mass; surface smooth or ornamented with spines; oscules, in branching forms, conspicuous and scattered; texture firm and only slightly compressible; colour, in spirit, olive-green to brown, dried, brown or drab; main skeleton a coarse reticulation, often very irregular, of multispicular fibre; dermal skeleton an irregular reticulation of multispicular fibres subdivided by more slender multispicular secondary and bispicular tertiary fibres; spicules oxea, 1·1 to 1·15 by 0·005 to 0·008 mm.

**Remarks.**—The species has been recorded by other authors, Kirkpatrick, Hentschel and Wilson, from other parts of the Indo-Pacific but these records are of doubtful value and re-examination of the original material is necessary to establish the accuracy of them. Further, *Pachychalina spinosissima* Dendy, given by Lindgren (1898) as a synonym of this species is in reality a separate species of *Callyspongia*.

Callyspongia spinosissima (Dendy).

*Pachychalina spinosissima* Dendy 1887, p. 524, pl. xlv; *P. subcylindrica* Id. 1905, p. 148, pl. x, figs. 1-2; Id. 1922, p. 41, pl. viii, fig. 1; *Cladochalina subcylindrica* Burton 1927, p. 511.

**Diagnosis.**—Sponge composed of long, subcylindrical branches; surface smooth, often bearing stout spines; texture firm but compressible; oscules conspicuous, scattered along branches; colour, in spirit, yellowish brown; main skeleton a coarse, irregular reticulation of multispicular fibres; dermal skeleton an irregular reticulation of multispicular fibres, often subdivided by uni- or bispicular secondary fibres; spicules oxea, 1·16 to 2·2 by 0·006 to 0·01 mm.

Callyspongia fistularis (Topsent).

*Sclerochalina fistularis* Topsent 1892, p. 25, pl. i, fig. 1.

**Diagnosis.**—Sponge composed of numerous low tubes arising from a basal mass; surface covered with small spines or spinose tubercles; oscules at apices of erect tubes; texture firm, only slightly compressible; colour, in spirit, pale yellow; main skeleton an irregular
network of stout multispecific fibres, with ascending and conjunctive fibres ill-defined; dermal skeleton a close-meshed reticulation of multispecific fibres, subdivided by uni- or bispecific secondary fibres, echinated by single spicules or brushes of spicules; spicules oxca, '06 to '07 by '001 mm.

Genus Petrosia Vosmaer.

Haploscleridae with skeleton a dense, irregular and confused reticulation of oxca and strongyla, usually one or both of which are differentiated into two sizes; without special dermal skeleton.

Petrosia testudinaria (Lamarck).

Pl. i, fig. 10

Akyonium testudinaria Lamarck 1815, p. 167; Reniera crateriformis Carter 1882 p. 115; R. testudinaria Ridley 1884, p. 409; R. crateriformis Carter 1887, p. 71; Petrosia testudinaria Dendy 1889, p. 77, pl. iii, figs. 1-3; Dendy 1905, p. 144, fig. 1; Hentschel 1912, p. 403; Topsent 1920, p. 7; Wilson 1925, p. 399, pl. xi, fig. 6; P. testudinaria var. fistulophora Id. l.c., p. 401, pl. xli, fig. 5, pl. xlii, figs. 1-2, pl. xlviii, figs. 8; P. testudinaria Topsent 1933, p. 40. (For description and illustration see Dendy 1889 and Wilson l.c.)

Diagnosis.—Sponge crateriform, with numerous ribbing processes, often produced into fistulae, running from base to summit on outer surface; surface smooth, porose; texture hard but friable; colour, in life, pink, in spirit and dry, brownish yellow; skeleton an irregular network of stout multispecific fibres composed of spicules loosely bound together; spicules varying from oxca to strongyla, '37 to '44 by '017 to '022 mm.

Genus Oceanapia Norman.

For synonymy see Burton 1934, p. 545.

Haploscleridae with rounded body bearing blind fistulae or oscular tubes; surface smooth; main skeleton a uni- or multispecific reticulation; dermal skeleton, usually, a tangential unispecific reticulation.

Oceanapia media (Thiele).

pl. i, fig. 9

Rhizochalina media Thiele, 1899, p. 19, pl. iv, fig. 2, pl. v, fig. 11.

Diagnosis.—Main skeleton of multispecific fibres forming an irregular network; dermal skeleton a unispecific network; spicules oxca, '3 by '016 mm.

Family DESMACIDONIDAE.

Sigmatoosclerophora characterised by the possession of chelae for microscleres, to which signata, toxa, trichodragamta or other microscleres may be added; main skeleton usually of styli or subtylostyls, smooth or spined, rarely of oxca only, often echinated by acanthostyli.
Section Mycaleae.

Desmacidonidae with skeleton of smooth styli or subtylostyli, acanthostyli or acanthooexa rarely present; microscleres anisochelae or isochelae palmate; without differentiation of spicules into those of main skeleton and auxiliary or special dermal spicules.

Genus Mycale Gray.

Mycaleae with skeleton an irregular reticulation of multispicular fibres, either isodictybal or formed of ascending fibres branching and anastomosing, of styli or subtylostyli; microscleres anisochelae to which sigmata, toxas or raphides may be added.

Mycale grandis Gray.

pl ii, fig. 13

*M. grandis* Gray 1867, p. 533; *M. armata* Thiele 1903, p. 950, fig. 16; *M. grandis* Hentachel 1912, p. 337, pl. xviii, fig. 15; Burton 1934, p. 547. (For description and illustration see Thiele l.c. and Hentachel l.c.)

Diagnosis.—Sponge encrusting or massive, sometimes with oscular tubes; surface smooth; texture soft, compressible; colour, alive or in spirit, yellow, yellowish-grey or yellowish-brown; skeleton of subtylostyli, 3 sizes of anisochelae, 2 sizes of sigmata, and raphides.

Dimensions of spicules:

subtylostyli (fig. 13 a), 0.43 to 0.6 by 0.01 to 0.02 mm.,
large anisochelae (fig. 13 b—c), 0.075 to 0.145 mm. chord,
medium-sized anisochelae (fig. 13 d), 0.015 to 0.032 mm. chord,
smaller anisochelae (fig. 13 e), 0.015 to 0.018 mm. chord,
large sigmata (fig. 13 f), 0.04 to 0.057 mm. chord,
small sigmata (fig. 13 f), 0.013 to 0.019 mm. chord,
raphides (in bundles) (fig. 13 g—h), 0.032 to 0.1 mm. long.

Mycale tenuispiculata (Dendy).

pl. ii, fig. 14


Diagnosis.—Sponge irregularly massive, with tendency to form rounded lobes or short, thick branches; surface uneven; texture soft; oscules few, small, scattered; colour, in spirit, grey to brown; spicules tylostyli, small anisochelae and sigmata.

Dimensions of spicules:

subtylostyli (fig. 14 a), 0.2 by 0.004 mm.,
anisochelae (fig. 14 b), 0.02 mm. chord,
sigmata (fig. 14 c), 0.036 mm. chord.
Mycale mytilorum Annandale.

pl. ii, fig. 15.

*M. mytilorum* Annandale 1914, p. 152, pl., fig. 1, pl. xi, figs. 2-3.

*Diagnosis.*—Sponge encrusting; surface mainly smooth; texture soft; oscules inconspicuous; colour, in life, brick-red, in spirit, yellow; skeleton of subtylostyli, anisochele and sigmata.

Dimensions of spicules:

- subtylostyli (fig. 15 a), 2 by 0.05 mm.,
- anisochele (fig. 15 b-f), up to 0.02 mm. chord,
- sigmata (fig. 15 g-l), 0.04 mm. chord.

**Mycale madraspatana** Annandale.

pl. ii, fig. 12

*M. madraspatana* Annandale 1914, p. 154, pl. x, fig. 3, pl. xi, fig. 4.

*Diagnosis.*—Sponge encrusting; surface uneven; texture soft; oscules small, inconspicuous; colour, in life, brick-red, in spirit, yellow; skeleton of subtylostyli, anisochele, sigmata and toxa.

Dimensions of spicules:

- subtylostyli (fig. 12 a), 28 by 0.05 mm.,
- anisochele (fig. 12 b-d), 0.02 and 0.048 mm. chord,
- sigmata (fig. 12 e), 0.08 mm. chord,
- toxa (fig. 12 f), 0.14 to 0.35 mm. long.

**Mycale gravelyi** sp.n.

pl. ii, fig. 16

*Holotype.*—B.M. 31.11.28.178.

*Diagnosis.*—Sponge thinly encrusting, not more than 1 mm. thick; surface even, smooth; oscules and pores not apparent; texture friable; specimen readily detachable from substratum when preserved in spirit; colour, in spirit, white; tissues charged with an abundance of refringent granules, up to 0.01 mm. diameter; subtylostyli, thickest in middle and tapering at one end to a point and to the other to end in an elongated oval head, 0.1 by 0.014 mm., anisochele, larger, in rosettes, 0.05 to 0.045 mm., smaller, 0.014 to 0.024 mm.; sigmata, 0.07 mm. chord.

*Remarks.*—The skeleton of this species presents no unusual feature and the species differs from other known species of *Mycale* in the small size of the anisochele together with the absence of toxa and trichodragmata. In most species of this genus from the Indo-Pacific
the large anisochelae are considerably larger than those of the present species, and usually there are trichodragmata and toxa in addition to the sigmata. In some European species of the genus, the anisochelae correspond in size with those of *M. graevi* sp. n. but there are invariably either toxa or trichodragmata, or both, present.

**Mycale** sp.

There are three specimens of an encrusting *Mycale* from the Krusadai Islands, which seem referable to *M. mytilorum* (Annamale), but the manner in which they differ among themselves and from the holotype is worth noting. The spicules in the holotype are sub-tylostylii, ·18 to ·26 by ·004 to ·005 mm., anisochelae, ·019 mm. chord, and sigmata, ·04 mm. chord. In the three specimens under discussion the measurements of these spicules and the frequency of occurrence vary to some extent. The megascleres are approximately the same in all three specimens and measure on an average ·32 by ·004 mm., and the same may be said of the sigmata, which measure ·045 to ·05 mm. chord. In the first specimen, on the other hand, the chelae measure ·011 mm., ·015 mm., and ·032 mm. chord, but whereas the smaller chelae are fairly abundant, the larger are more scarce and seldom found in rosettes. In the second specimen the chelae are very rare, only a few measuring ·011 mm. chord, were found. In the third specimen, the chelae are more abundant than in either of the two preceding specimens and the larger of them are commonly found in rosettes.

**Genus Biemna** Gray.

*Mycale*ae with skeleton of styli forming a halichondrioid or isodictyal reticulation, or a system of ascending fibres, which branch and anastomose; microscleres sigmata, raphides and trichodragmata, usually of more than one size each.

**Biemna peachii** var. *fistulosa* (Topsent).

pl. iii, fig. 18.

**Desmacella peachii** var. *fistulosa* Topsent 1897, p. 462, pl. xviii, fig. 11.

**Diagnosis.**—Sponge encrusting or irregularly massive, with oscular tubes in form of fistulae; surface smooth; texture soft and friable; colour, in spirit, greyish white; skeleton of styli, sigmata and microxea and trichodragmata, of 2 sizes.

Dimensions of spicules:
- styli (fig. 18 a), ·3 by ·008 mm.,
- sigmata (fig. 18 b-c), ·015 to ·06 mm. chord,
- trichodragmata (fig. 18 d-e), ·033 and ·11 mm. long,
- microxea (fig. 18 f), ·105 by ·003 mm.

**Genus Paresperella** Dendy.

Mycale with skeleton a reticulation of styli or subtylostylii; microscleres anisochelae and serrated sigmata, to which toxa may be added.
Paresperella bidentata Dendy.

_pl. ii, fig. 17._

_P. bidentata_ Dendy 1905, p. 163, pl. xi, fig. 1.

_Diagnosis._—Sponge massive; surface uneven; texture soft, friable; oscules inconspicuous; colour, in spirit, yellowish-brown; skeleton composed of tylostyle, anisochelae and serrated sigmata.

_Dimensions of spicules:_
  _tylostyle (fig. 17 a), \( \cdot3 \) by \( \cdot005 \) mm.,_
  _anisochelae (fig. 17 d-e), \( \cdot028 \) mm. chord,_
  _sigmata (fig. 17 b-c), \( \cdot05 \) mm. chord._

_Section Myxilleae._

Desmacidonidae characterized by the possession of tornota, which usually form a special dermal skeleton but may occasionally be confined to main skeleton; microscleres isochelae of various kinds, to which sigmata may be added.

_Genus Lissodendoryx_ Topsent.

Myxilleae with chelae arcuatae and without echinating spicules; main skeleton of styli or acanthostyli arranged in an isodictyal or, less commonly, a halichondroidal reticulation.

_Lissodendoryx sinensis_ Bryndstedt.

_pl. iii, fig. 19._

_L. sinensis_ Bryndstedt 1929, p. 228, fig. 5.

_Diagnosis._—Sponge branching, repent, with cylindrical branches; surface uneven, minutely hispid; texture soft, friable; oscules small, scattered; colour, in spirit, dark brownish-grey; skeleton of smooth styli, tornota, isochelae of two sizes and sigmata of two sizes.

_Dimensions of spicules:_
  _styli (fig. 19 a-b), \( \cdot16 \) to \( \cdot2 \) by \( \cdot007 \) mm.,_
  _tornota (fig. 19 c), \( \cdot16 \) to \( \cdot28 \) by \( \cdot007 \) mm.,_
  _isochelae (fig. 19 d-f), \( \cdot02 \) and \( \cdot027 \) mm. chord,_
  _sigmata (fig. 19 g-h), \( \cdot012 \) and \( \cdot035 \) mm. chord._

_Genus Tedania_ Schmidt.

Myxilleae with skeleton a halichondroidal or sub-isodictyal reticulation of styli rarely acanthostyli, and with dermal tornota; microscleres onychata.
Tedania nigrescens (Schmidt).

pl. iii fig. 22.

Reniera nigrescens Schmidt 1862 p. 74; Tedania nigrescens Burton and Rao 1932, p. 353. (For synonymy see Burton and Rao l.c.).

Diagnosis.—Sponge encrusting or massive with digitate processes or conspicuous oscular tubes; surface smooth, verrucose or minutely papillate; texture soft, friable; oscules conspicuous, scattered; colour, in life, yellow, orange or red, in spirit, yellow, olive-green, orange or red; skeleton a halichondrioid reticulation of styli with onychata scattered in meshes and with dermal tornota.

Dimensions of spicules:
styli (fig. 22 a), 12 by .008 mm.,
tornota (fig. 22 b), 2 by .004 mm.,
onychata (fig. 22 c), 15 to 2 by .001 mm.

Section Clathriae.

Desmacidonidae with auxiliary spicules slender stylostyle, usually found chiefly in dermis; microscleres typically isochelae palmatae and toxo.

Genus Clathria Schmidt.

Clathriae with megascleres stylostyle of varying sizes completely or incompletely differentiated into one or more sizes, the largest often being modified to styli, occasionally basally-spined, which can be distinguished according to position as coring, interstitial or dermal spicules; with echinating spicules small styli or acanthostyli; microscleres isochelae palmatae and toxo.

Clathria frondifera (Bowerbank).

pl. iii, fig. 21.

Halichondria frondifera Bowerbank 1875, p. 288; Amphilectus frondifer Vosmaer 1880, p. 115; Clathria frondifera Ridley 1884, p. 488, pl. xliii, fig. i, pl. liii, fig. J; C. reinwardti var. subcylindrica Id. l.c., p. 446; C. frondifera Ridley and Dendy 1887, p. 149; C. corallitincta Dendy 1889, p. 85, pl. iv, fig. 8; C. frondifera Topsent 1892, p. 21; Lindgren 1897, p. 480; Id. 1898, p. 27; Rhaphidophlus filifer var. spinifera Id. l.c., p. 29, pl. xvii, fig. 7, pl. xix, fig. 18; C. frondifera Dendy 1905, p. 170; C. frondifera et var. dichela et major Hentschel 1912, pp. 360–361; C. nuda Id. l.c., p. 364, pl. xix, fig. 28; C. corallitincta Dendy 1916, p. 128; Id. 1922, p. 65; Tenacia frondifera Burton and Rao 1932, p. 337.
Diagnosis.—Sponge massive and clathrous, or composed of anastomosing lamellae bearing digitate or spinose processes; surface smooth or irregularly tuberculate; oscules not apparent; texture firm, compressible; colour, in life, “red-coral,” in spirit, grey to yellow, dried, grey or yellow with traces of red; skeleton a reticulation of fibres cored by styli and echinately by acanthostyli, with basally-spined subacanthostyli of two sizes, larger interstitial, smaller dermal, with isochelae palmatae and toxas for microscleres.

Dimensions of spicules:

<table>
<thead>
<tr>
<th>Spicule Type</th>
<th>Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styli (fig. 21 a)</td>
<td>0.19 to 3 by 0.01 to 0.015 mm.</td>
</tr>
<tr>
<td>Interstitial subacanthostyli (fig. 21 b)</td>
<td>2 to 4 by 0.006 to 0.01 mm.</td>
</tr>
<tr>
<td>Dermal subacanthostyli</td>
<td>0.06 to 2 by 0.003 to 0.008 mm.</td>
</tr>
<tr>
<td>Acanthostyli (fig. 21 c)</td>
<td>0.013 to 0.016 mm. chord,</td>
</tr>
<tr>
<td>Chelae (fig. 21 d)</td>
<td>0.015 mm. chord,</td>
</tr>
<tr>
<td>Toxa (fig. 21 e)</td>
<td>up to 2 mm. long.</td>
</tr>
</tbody>
</table>

Remarks.—The species has been fully discussed by Burton and Rao (l.c.) but following further examination of the material now included in this species I would suggest that **Rhaphidophlus ridleyi** Lindgren **R. seriatus** Thiele **R. erectus** Thiele and **R. topsenti** Thiele, which were formerly regarded as synonyma of this species may possibly be distinct, and are treated as such here.

**Clathria procer a** (Ridley).

**Rhaphidophlus procerus** Ridley 1884, p. 451, pl. xxxix, fig. K, pl. xiii, fig. o; **Echinonema gracilis** Id. l.c., p. 617, pl. liv, fig. 1; **Rhaphidophlus spiculosus** Dendy 1889, pl. iv, fig. 4; **Clathria spiculosa** et var. *ramosa* Id. 1905, p. 171; **C. spiculosa** et var. *ravosa et macilenta* Hentschel 1912, pp. 363-364; **C. spiculosa** Dendy 1916, p. 128; **C. procer a** Dendy 1921, p. 64; **Tenacia procer a** Burton and Rao 1932, p. 349.

Diagnosis.—Sponge irregularly or dichotomously branched; surface slightly uneven; texture soft, elastic; vents small, scattered, or not apparent; colour, in life, vermillion to purple, in spirit, yellow to reddish brown; skeleton an irregular reticulation of stout spongins fibres cored by subacanthostyli, with interstitial and dermal subacanthostyli of different sizes; microscleres isochelae palmatae and toxas.

Dimensions of spicules:

<table>
<thead>
<tr>
<th>Spicule Type</th>
<th>Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subacanthostyli fibres</td>
<td>0.22 to 0.36 by 0.013 mm.</td>
</tr>
<tr>
<td>Interstitial subacanthostyli</td>
<td>0.28 by 0.008 mm.</td>
</tr>
<tr>
<td>Dermal subacanthostyli</td>
<td>0.18 to 0.2 by 0.006 mm.</td>
</tr>
<tr>
<td>Isochelae</td>
<td>0.009 to 0.016 mm. chord.</td>
</tr>
<tr>
<td>Toxa</td>
<td>0.045 to 0.056 mm. long.</td>
</tr>
</tbody>
</table>
Clathria procera var. tessellata (Dendy).

Clathria spiculosa var. tessellata Dendy 1905, p. 171, pl. viii, fig. 2.

Remarks.—This variety differs from the typical form of the species in the following particulars:

1. The external form is irregularly lamellate, the lamellae bearing digitate processes on the upper margins;

2. The surface is tessellated.

Clathria decumbens Ridley.

pl. iii, fig. 23.

C. decumbens Ridley 1884, p. 612, pl. liii, fig. K, pl. liv, fig. g; Ridley and Dendy 1887, p. 148; Wilsonella decumbens Hallmann 1912, p. 239.

Diagnosis.—Sponge massive; surface smooth, undulating; oscules small, scattered; texture firm, compressible; colour, in spirit, brown; skeleton a fairly regular reticulation of fibres cored by basally-spined styli, and echinated by acanthostyli; basally-spined styli, of same dimensions as coring spicules, as well as subtylostyle, also found interstitially, in small numbers; microscleres chelae, of two sizes;

Dimensions of spicules:

basally-spined styli (fig. 23 a), \(0.06 \text{ mm.}\),

acanthostyli (fig. 23 b), \(0.09 \text{ mm.}\),

subtylostyle (fig. 23 c), \(0.16 \text{ mm.}\),

chelae (fig. 23 d-e), \(0.021 \text{ to } 0.032 \text{ and } 0.021 \text{ mm. chord.}\)

Genus Collocithria Dendy.

Clathriaceae with skeleton of fibres cored by styli and echinated by acanthostyli; with auxiliary subtylostyle of two sizes, smaller in dermal brushes, larger interstitial to main skeleton; microscleres isochelae palmatae, toxæ and colloscleres.

Collocithria ramosa Dendy.

pl. iii, fig. 20.

C. ramosa Dendy 1922, p. 74, pl. vii, fig. 2, pl. xiv, fig. 4.

Diagnosis.—Sponge composed of cylindrical branches, repent; surface uneven, minutely hispid; oscules small, scattered; texture tough, compressible; colour, in spirit, light brown; skeleton an irregular reticulation of fibre cored by styli and echinated by acanthostyli, with sparsely scattered dermal subtylostyle; microscleres isochelae palmatae of two sizes, toxæ and colloscleres (abnormal isochelae).
Dimensions of spicules:
styli (fig. 20 a), 3 by 0.019 mm.,
acanthostyli (fig. 20 c-d), 0.07 by 0.008 mm.,
dermal subtylostyli (fig. 20 b), 0.04 by 0.008 mm.,
isochelae palmatae (fig. 20 f-h), 0.016 and 0.004 mm. chord, respectively,
toxa (fig. 20 e), up to 0.2 mm. long,
collo scleres (fig. 20 i-l), 0.012 by 0.004 mm.

Genus Microciona Bowerbank.

Clathridae with skeleton of plumose columns of large styli or acanthostyli, with small echinating acanthostyli, these spicules in encrusting forms all echinating substratum; with one size only of auxiliary subtylostyli; microscleres isochelae palmatae and toxas.

Microciona atrasanguinea Bowerbank.

pl. iv, fig. 24.

M. atrasanguinea Bowerbank 1864, p. 188, pl. xxxiii, fig. 368, pl. xxxiv, fig. 369; Id. 1866, p. 138; Parfit 1868, p. 14; Bowerbank 1874, p. 63, pl. xxiv, figs. 14-19; Amphilectus atrasanguineus Vosmaer 1889, p. 115; Microciona atrasanguinea Bowerbank 1882, p. 54; Plumohalichondria atrasanguinea Dendy 1922, p. 60, pl. xiii, fig. 1; Burton and Rao 1932, p. 344; Burton 1934, p. 37.

Diagnosis.—Sponge encrusting or massive and low-growing; surface minutely papillate or tuberculate; oscules small, scattered; texture firm, compressible; colour, in life, blood-red, in spirit, red of various shades; skeleton of plumose columns of subtylostyli echinated by acanthostyli, with dermal subtylostyli, and toxas and isochelae palmatae for microscleres.

Dimensions of spicules:
main subtylostyli (fig. 24 a, a), 0.35 to 0.5 by 0.012 to 0.014 mm.,
acanthostyli (fig. 24 a, b), 0.16 by 0.007 mm.,
dermal subtylostyli (fig. 24 a, c), 0.26 by 0.004 mm.,
toxa (fig. 24 a, d), 0.035 mm. long,
isochelae, 0.007 mm. chord.

Microciona longitoxa (Hentschel).

pl. v, fig. 29.

Hymeraphia longitoxa Hentschel 1912, p. 381, pl. xx, fig. 39.

Diagnosis.—Sponge thinly encrusting; surface even, minutely hispid; oscules and pores not seen; colour, in spirit, yellow; skeleton of long styli set at right angles to substratum, echinated by acanthostyli; dermal subtylostyli; isochelae palmatae and toxas for microscleres.
Dimensions of spicules:
- styli (fig. 29 a-b), 0.6 to 0.84 by 0.02 to 0.026 mm.,
(styli with roughened bases, intermediate between
- styli and acanthostyli (fig. 29 c), 0.24 to 0.4 by 0.013 to 0.015 mm.)
- acanthostyli (fig. 29 d), 0.64 to 0.08 by 0.006 to 0.007 mm.,
- subtylostyli (fig. 29 e), 0.43 to 0.58 by 0.004 to 0.009 mm.,
- toxa (fig. 29 g-h), 0.4 to 0.56 mm. long.
- chelae (fig. 29 f), 0.12 mm. chord.

Microciona toxifera (Hentschel).

pl. v, fig. 30.

Hymeraphia toxifera Hentschel 1912, p. 382, pl. xx, fig. 40.

Diagnosis.—Sponge thinly encrusting; surface even, minutely hispid; pores and oscules not seen; colour, in spirit, pale violet or yellow; skeleton of basally-spined tylostyli set at right angles to substratum, echinated by small acanthostyli, with dermal subtylostyli, and isochelae and two sizes of toxa for microscleres.

Dimensions of spicules:
- basally-spined styli (fig. 30 a), 0.2 to 0.46 by 0.01 mm.,
- acanthostyli (fig. 30 c), 0.1 to 0.15 by 0.005 mm.,
- subtylostyli (fig. 30 b), 0.14 to 0.38 by 0.003 to 0.005 mm.,
- isochelae (fig. 30 e), 0.021 to 0.023 mm. chord,
- toxa (fig. 30 d), 0.12 to 0.15 and 0.256 to 0.08 mm. long respectively.

Genus Echinodictyum Ridley.

Clathrieae with irregularly reticulate skeleton of fibres of oxea or styli, or both, echinated by acanthostyli; with auxiliary and dermal styli or subtylostyli; but without microscleres.

Echinodictyum clathratum Dendy.

pl. iv, fig. 25.

E. clathratum Dendy 1905, p. 175, pl. xi, fig. 4.

Diagnosis.—Sponge a clathrous mass of thin, flattened trabeculae; surface even, conulose; texture soft, tough, resilient; oscules not seen; colour, in spirit, pale greyish-yellow; main skeleton an irregular reticulation of multipcular fibres cored by oxea and echinated by acanthostyli, with long styli scattered in meshes and dermal brushes of small slender styli.
Dimensions of spicules:
- oxea, of main skeleton (fig. 25 a-b), 0.25 by 0.006 mm.,
- long styli (fig. 25 c), 1.26 by 0.012 mm.,
- dermal styli (fig. 25 d), 0.34 by 0.002 mm.,
- acanthostyli (fig. 25 e), 0.1 by 0.006 mm.

Section Raspelieae.

Desmacidonidae with skeleton ranging from a reticulation of fibre cored by long styli (or oxea or subtylostyle) and echinated by acanthostyli (rarely acanthoxea or acanthostrongylia), to an axial skeleton of long styli (or oxea or subtylostyle) with radial columns of similar spicules echinated by acanthostyli; skeleton often of plumose columns or, in encrusting forms, of styli and acanthostyli echinating substratum; echinating spicules often basally-smooth and curved in lower third; auxiliary spicules slender subtylostyle or styli, usually in brushes surrounding outermost spicules of main skeleton; microscleres usually absent, when present sigmata or thraustoxa.

Genus Aulospongus Norman.

Raspelieae with plumose columns of stout subtylostyle and basally-smooth acanthostyli, both curved in basal third; without auxiliary subtylostyle or microscleres.

Aulospongus tubulatus (Bowerbank).
pl. iii, fig. 24.

*Haliphyxea tubulatus* Bowerbank 1873, p. 29, pl. vii; *Aulospongus tubulatus* Norman 1878, p. 267; Dundy 1889, p. 89, pl. v, fig. 11; Id., 1922, p. 61.

*Diagnosis.*—Sponge flabellate, globular or subglobular; surface uneven; texture firm, friable; oscules not apparent; colour, in life, red or pinkish red, in spirit, yellow, dried, reddish-brown to yellow; skeleton of ascending plumose columns of subtylostyle and basally-smooth acanthostyli, both curved sharply in the basal third.

Dimensions of spicules:
- subtylostyle (fig. 24 a), 0.38 by 0.014 mm.,
- acanthostyli (fig. 24 b), 0.12 by 0.004 mm.

1 When the sponge is associated with a polychaete worm its shape is globular; when free of the symbiont, it is flabellate.
Genus *Raspelia* Nardo.

Raspelieae with skeleton ranging from a reticulation of fibre cored by long styli (or oxea or subtylostly) and echinated by acanthostyli (rarely acanthoxea), to an axial skeleton of long styli (or oxea or subtylostly) with radial columns of similar spicules echinated by acanthostyli; dental spicules slender styli or subtylostyli in brushes, usually surrounding bases of long styli similar to those of main skeleton; without microscleres.

*Raspelia hornelli* (Dendy).

pl. iv, fig. 27.

*Raspelia hornelli* Dendy 1905, p. 173, pl. xi, fig. 7.

**Diagnosis.**—Sponge erect, arborescent; surface coarsely granular, minutely hispid, punctate; texture tough, compressible; oscules not seen; colour, in spirit, dark brown; skeleton a reticulation of horny fibres, cored by styli, oxea or strongyla, showing a well-marked axial condensation of fibres from which ascending fibres run to surface and end in surface brushes of one or more large styli surrounded by numerous slender styli; main skeleton echinated by acanthostyli.

Dimensions of spicules:
- Large styli (fig. 27 a), 0.65 by 0.18 mm.,
- Oxea (fig. 27 d-g), 0.2 to 0.46 by 0.12 to 0.14 mm.,
- Small styli (fig. 27 b), 0.3 by 0.02 mm., strongyla, 0.2 by 0.04 mm.,
- Acanthostyli (fig. 27 c), 0.08 by 0.008 mm.,

Genus *Rhabderemia* Topsent.

Raspelieae of encrusting habit with rhabdostyli echinating substratum; microscleres sigmata, microstyli or thraustoxa.

*Rhabderemia indica* Dendy.

pl. v, fig. 28.

*R. indica* Dendy 1905, p. 180, pl. xii, fig. 10.

**Diagnosis.**—Sponge encrusting; surface smooth, uneven, granular; oscules small and scattered; texture soft, friable; colour, in spirit, dull grey; skeleton of plumose columns of rhabdostyli, loosely connected by scattered or transverse spicules; microscleres small acanthostyli and much contorted sigmata.

Dimensions of spicules:
- Rhabdostyli (fig. 28a-c), 0.24 by 0.006 mm.,
- Acanthostyli (fig. 28d), 0.044 by 0.002 mm.,
- Sigmata (fig. 28 e), 0.12 mm. chord.
Genus **Endectyon** Topsent.

Raspeleiaceae with skeleton a reticulation of stout styli echinated by acanthostrongyla; with dermal tufts of long styli at ends of ascending fibres; auxiliary substylisti in dermis; without microscleres.

**Endectyonthurstoni** (Dendy).

pl. iv, fig. 26.

*Raspailia thurstoni* Dendy 1887, p. 161, pl. xii, fig. 1; *Hemectyon thurstoni* Burton and Rao 1932, p. 347.

**Diagnosis.**—Sponge erect, stipitate, dichotomously branched; surface even, granular, porose; texture hard and tough; oscules not apparent; colour, in life, red (?), in spirit, yellow, dried, yellowish-brown; skeleton a dense reticulation of styli (fig. 26 a), varying from 0.25 to 0.35 by 0.01 to 0.014 mm., echinated by acanthostrongyla (fig. 26 b) (grapnel spicules), measuring 0.15 mm. by 0.01 mm.

Genus **Axinella** Schmidt.

Axinellidae with skeleton composed of styli and oxea of more or less equal proportions; skeleton consisting typically of a dense axial reticulation running longitudinally through centre of sponge and an extra-axial reticulation with primary fibres, composed largely of styli, running at right angles to axial skeleton, and secondary, or connective, fibres, composed mainly of oxea; without special dermal skeleton.

The typical form of the skeleton is very commonly modified in the following ways: 1) all the spicules may be styli or all oxea; 2) long styli or oxea may be found interstitially to the main skeleton; 3) the axial reticulation may be absent; 4) the extra-axial reticulation may be replaced by plumose columns.

**Axinella lyrata** (Esper).

pl. vii, fig. 41.

*Spongia lyrata* Esper 1806, pl. lxvii, figs. 1-2; *Raspagella lyrata* Ehlers 1870, p. 23; *Auletta aurantica* Dendy 1889, p. 92, pl. v, fig. 13; *A. lyrata* Id. 1905, p. 194.

**Diagnosis.**—Sponge erect, stipitate, flabellate, as though formed by fusion of numerous vertical tubes; oscules in series along upper margins of sponge; surface minutely conulose and hispid; texture tough, compressible and resilient; colour, in spirit, yellowish-grey; skeleton a sub-isodictyal reticulation of fibre cored by styli (fig. 41 a) and oxea (fig. 41 b), measuring 0.4 by 0.005 mm.
Axinella donnani (Bowerbank).

pl. vi, fig. 32.

Isodictya donnani Bowerbank 1873, p. 28, pl. vi, figs. 2-6; Axinella donnani Dendy 1889, p. 158, pl. xi, fig. 1; Phakellia donnani Dendy 1916, p. 119; Id. 1922, p. 116.

Diagnosis.—Sponge infundibular, flabello-digitate or flabellate (often prolificous); surface even, minutely hispid, with longitudinal grooves near upper margins and, often, stellate grooves in lower portions of body; texture firm, compressible; colour, alive, orange, in spirit, reddish-brown to yellow; skeleton either isodictyal or composed of ascending plumose columns; spicules oxea or styli, or mixture of both, often differentiated into categories of different lengths; spicules ranging from \( \sim 2 \) to \( \sim 5 \) mm. long.

Axinella flabelliformis (Keller).

pl. vi, fig. 38.

Acanthella flabelliformis Keller 1889, p. 394, pl. xxiv, fig. 48; Dendy 1905, p. 193.

Diagnosis.—Sponge flabellate, stipitate; surface beset with longitudinal ridges showing a tendency to break up into conuli, with deep grooves between ridges bearing numerous small scattered oscules; texture tough, compressible, resilient; colour, in life, blue-black, in spirit, deep violet or greyish-brown; skeleton a sub-isodictyal reticulation of spongine fibres filled with oxea, sometimes plumosely arranged; oxea measuring \( \sim 3 \) by \( \sim 0.06 \) mm.

Axinella carteri (Dendy).

pl. vi, fig. 37.

Acanthella carteri Dendy 1889, p. 93, pl. iv, fig. 6; A. aurantiaca Keller 1889, p. 396, pl. xxiv, fig. 47; A. carteri Dendy 1905, p. 193, pl. viii, fig. 6; A. aurantiaca Topsent 1906, p. 562; Row 1911, p. 356; A. carteri Dendy 1922, p. 119, pl. v, fig. 5.

Diagnosis.—Sponge prolificously sub-lamellar or branching; surface covered with short stout spines or ridges; pores and oscules not apparent; texture tough, resilient; colour, in life, orange-red, in spirit, yellow; skeleton an irregular network of styli, mainly \( \sim 4 \) by \( \sim 0.21 \) mm., with a few slender styli, \( \sim 2 \) by \( \sim 0.11 \) mm., and, rarely, oxea or strongyla as modifications of smaller styli.

Axinella ceylonensis Dendy.

pl. vi, fig. 35.

Phakellia ceylonensis Dendy 1905, p. 192, pl. viii, fig. 3, pl. xiii, fig. 5.

Diagnosis.—Sponge prolificously lamellar, stipitate; surface finely conulose and minutely hispid; pores and oscules not apparent; texture tough and resilient; colour, in spirit, greyish brown; skeleton of plumose columns of styli and oxea running vertically to surface; spicules, of two sizes, \( \sim 2 \) by \( \sim 0.08 \) and \( \sim 0.45 \) by \( \sim 0.05 \) mm.
Axinella bubarinoides Dendy.

pl. vi, fig. 33.

A. bubarinoides Dendy 1922, p. 114, pl. xvii, fig. 1.

Diagnosis.—Sponge small, cushion-shaped or irregularly massive; surface even, slightly hispid, marked by convergent grooves containing vents; texture firm, hardly compressible; colour, in spirit, light brownish-yellow; skeleton composed of plumose ascending columns of small styli, \(1.48\) by \(0.34\) mm. and strongly bent in the basal third, with long styli, \(1.3\) by \(0.25\) mm., lying interstitially to columns.

Axinella conulosa Dendy.

pl. vi, fig. 34.

Phakella conulosa Dendy 1922, p. 116, pl. vi, fig. 4, pl. xvii, fig. 2.

Diagnosis.—Sponge proliferously lamellar, stipitate; surface conulose, conuli sometimes uniting to form longitudinal ridges; pores and oscula not distinguishable; texture tough, flexible, resilient; colour, in spirit, a light brown; skeleton of loosely plumose columns of styli running vertically to surface, without secondary connecting fibres; epicles styli, of two sizes, \(0.69\) by \(0.03\) mm. and \(1.5\) by \(0.02\) mm.

Genus Acanthella Schmidt.

Axinellidae with skeleton of styli and verniform strongyla (or oxea) typically differentiated into two parts, an axial skeleton of branching, multispicular fibres and an extra-axial skeleton of styli, with bases implanted in axial skeleton and apices directed towards, often projecting beyond, surface; skeleton often composed of a system of branching fibres in which strongyla and styli are indiscriminately mixed, with no distinction between axial and extra-axial skeletons; in encrusting forms, strongyla form a basal layer with styli rising erect from it; without special dermal skeleton.

Acanthella cavernosa Dendy.

pl. vi, fig. 36.

A. cavernosa Dendy 1922, p. 120, pl. vii, fig. 7, pl. xvii, fig. 3.

Diagnosis.—Sponge massive, sub-stipitate; surface coarsely aculeate, with glabrous parchment-like dermal membrane pierced here and there by large oscula leading into cavernous interior of sponge; texture compressible, resilient; colour, in spirit, yellowish grey, with pinkish tinge; skeleton of branching tree-like fibres composed of styli (fig. 36 b), up to \(8.8\) mm. by \(0.11\) mm. and sinuous strongyla (fig. 36 a), \(1.3\) by \(0.011\) mm.
Acanthella elongata (Dendy).

pl. vii, fig. 42.

Auletta elongata Dendy 1905, p. 195, pl. xiii, fig. 7; A. elongata var. fruticosa Id. 1916, p. 119, pl. ii, fig. 17; A. elongata Id. 1922, p. 121.

Diagnosis.—Sponge erect, stipitate, tubular; surface even, minutely hispid; oscules at ends of tubes; texture compressible, resilient; colour, in spirit, yellowish-grey; skeleton composed of stout, longitudinal fibres, with plumose columns running to surface; spicules styli and oxea (fig. 42 d-f), 0.8 by 0.022 mm., and strongylia (fig. 42 a-c), 1.2 by 0.022 mm.

Genus Halichondria Fleming.

Axinellidae with main skeleton a confused reticulation of oxea of variable size; special dermal skeleton a confused, tangential reticulation of similar spicules.

Halichondria glabrata Keller.

pl. vi, fig. 43.

H. glabrata Keller 1891, p. 311, pl. xvi, fig. 9; Burton 1926, p. 75.

Diagnosis.—Sponge thinly encrusting, occasionally bearing well-marked ridges (i.e., folds); surface smooth, even; oscules few, scattered, marked by sub-dermal grooves radiating from vent; texture soft, friable; colour, in spirit, light grey; skeleton of oxea, 0.4 to 0.54 by 0.008 mm.

Genus Prostylissa Topsent.

Axinellidae with main skeleton a reticulation of oxea, and a dermal tangential skeleton of similar spicules with which small styli are associated.

Prostylissa foetida (Dendy).

pl. vii, fig. 45.

Hymeniacidon foetida Dendy 1889, p. 87, pl. iv, fig. 5; Amorphinopsis foetida Topsent 1897, p. 445; Ciocalypta foetida Lindgren 1897, p. 483; Id. 1898, p. 31; Axinella halichondrioides Dendy 1905, p. 190, pl. xii, fig. 7; Leucophloeus foetidus Id. l.c., p. 197; Prostylissa siamensis Topsent 1925, p. 208, figs. 1-2.

Diagnosis.—Sponge massive, slightly lobose; surface smooth, reticulate; oscules on summits of lobes; texture soft, compressible; colour, alive, grey, in spirit, white to blackish grey; skeleton of large oxea (fig. 45 a), 0.8 by 0.02 mm., forming a loose, irregular reticulation internally and a tangential dermal reticulation, latter ornamented with small styli (fig. 45 b), 1.2 by 0.007 mm.
**Prostylissa oculata** (Kieschnick).

_**Suberites oculatus** Kieschnick, 1896, p. 334; _Ciocalypta oculata_ var. _maxima_ Hentschel 1912, p. 428, pl. xxi, fig. 61.

**Diagnosis.**—Sponge encrusting or massive, with digitate processes ending blindly or with oscules at summits; surface smooth; texture soft, compressible; colour, in spirit, whitish-grey; skeleton of oxea (fig. 39 a), often rounded at one end (i.e. pseudooxea), 8 mm. long and small styli (fig. 39 b), 3 mm. long.

**Prostylissa heterostyla** (Hentschel).

_pl. vii, fig. 40._

_Ciocalypta heterostyla_ Hentschel, 1912, p. 424, pl. xiv, fig. 3, pl. xxi, fig. 58.

**Diagnosis.**—Sponge encrusting or massive; surface smooth; oscules and pores not apparent; texture soft, compressible; colour, in spirit, white; skeleton of styli of two sizes, 5 by 0.012 mm. and 3 by 0.005 mm.

**Genus Trachyopsis** Dendy.

Axinellidac with skeleton an irregular reticulation of oxea of variable size, with (often) a tendency for those spicules near surface to be arranged more or less at right angles to it; without dermal skeleton.

**Trachyopsis cavernosa** (Topsent).

_Halicordria cavernosa_ Topsent, 1897, p. 477, pl. xix, fig. 16.

**Diagnosis.**—Sponge encrusting or massive; surface thrown into folds, minutely hispid; pores and oscules not apparent; texture firm but compressible; colour, in spirit, yellow or brown; skeleton a loose, irregular reticulation of oxea, 1.0 by 0.017 mm.

**Trachyopsis solida var. rugosa** (Ridley and Dendy).

_Halicordria solida_ var. _rugosa_ Ridley and Dendy, 1887, p. 4.

**Diagnosis.**—Sponge massive, sessile; surface roughened by minute prominences; pores and oscules not apparent; texture firm, slightly compressible; colour, in spirit, yellow or dark brown; skeleton a dense, irregular reticulation of oxea, 1.0 by 0.038 mm.

**Trachyopsis aphysinoides** (Dendy).

_Halicordria aphysinoides_ Dendy, 1922, p. 39, pl. iii, figs. 3-5, pl. xii, fig. 9.

**Diagnosis.**—Sponge massive or massively branching; surface often faintly nodulated and ridged; vents few and large, or numerous, small and scattered; texture firm, slightly compressible; colour, in spirit, dark brown externally, lighter brown internally; skeleton a lax reticulation of single spicules, with a tendency to form loose fibres running to surface; spicules oxea, up to 1.0 by 0.03 mm.
Genus Liosina Thiele.
Axinellidae with skeleton of long oxea, mainly modified to strongyla (or pseudoaxea), scattered in a loose reticulation with only a slight tendency to formation of fibres.

**Liosina paradoxa** Thiele.
pl. viii, fig. 46.

*L. paradoxa* Thiele, 1899, p. 17, pl. ii, fig. 5, pl. iv, fig. 4, pl. v, fig. 9.

**Diagnosis.**—Sponge massive; surface uneven, raised into a series of rounded prominences; oscules and pores not apparent; texture soft, friable; colour, in spirit, greyish-brown; skeleton of oxea or strongyla, 6 to 9 by 0.02 mm.

Genus Myrmekioderma Ehlers.
Axinellidae with a confused reticulation of oxea and acanthoxea.

**Myrmekioderma granulatum** (Esper).
pl. vii, fig. 42.

*Aleyonium granulatum* Esper, 1830, p. 71, pl. xxiv; *Myrmekioderma granulatum* Ehlers, 1879, p. 28; *Acanthoxifer ceylonensis* Dendy, 1905, p. 157, pl. ix, fig. 5.

**Diagnosis.**—Sponge massive or encrusting; surface minutely hispid or granular, uneven, nodular or tubercular; nodules or tubercles usually low, rounded or polygonal, and separated by grooves which may be broad or shallow, or narrow with prominent margins; texture compact, flesh with much incorporated foreign debris; pores and oscules not apparent; colour, in spirit, light brown; spicules, oxea sometimes styli (fig. 42 b), 17 by 0.012 mm., acanthoxea (fig. 42 c), 4 by 0.008 mm., and trichodragmata (fig. 42 d), 0.016 by 0.004 mm.

Order KERATOSA.
Porifera with skeleton of horny fibres only, often reinforced by the inclusion of sand or foreign spicules.

Suborder DENDROCERATIDA.
Keratosa with skeleton a network of fibres.

Genus *Spongia* Linnaeus.
Keratosa with skeleton a close-meshed reticulation of ascending fibres, containing foreign bodies, connected by a polygonal-meshed network of more slender fibres without foreign bodies.

**Spongia officinalis** var. *ceylonensis* Dendy.
*Euspongia officinalis* var. *ceylonensis* Dendy, 1905, p. 211, pl. xiv, fig. 3, pl. xvi, fig. 5.
Diagnosis.—Sponge massive, ranging from sub-globular to sub-pyriiform, with flattened summit bearing several conspicuous oscules; surface minutely conulose; texture firm, compressible, elastic; colour, living, deep purple becoming yellow on lower parts (colour little changed on preservation); skeleton composed of ascending fibres, filled with broken sponge-spicules, 4 mm. diameter, connected by a polygonal-meshed network of secondary fibres, free of foreign matter; diameter of meshes variable, 17 mm. across on an average, fibres 0.02 mm. diameter.

Genus Hircinia Nardo.

Keratosa with skeleton differentiated into ascending, usually fasciated, systems of fibres often filled with foreign inclusions, connected by an irregular secondary network of more slender fibres; interstices of skeleton filled to a varying extent with "filaments."

Hircinia fusca Carter.

_H. fusca_ Carter, 1880, p. 36; Dendy, 1905, p. 219, pl. xiv, fig. 1.

Diagnosis.—Sponge massive, digitate or lobately branched; surface conulose; vents small; texture tough, compressible, resilient; colour, in spirit, brown; ascending fibres of skeleton composed of foreign inclusions held together by slender spongion threads, secondary network of foreign inclusions in linear series cemented together by spongion threads; thin layer of foreign bodies in ectosome.

Hircinia ramosa Keller.

_H. ramosa_ Keller, 1889, p. 345, pl. xx, fig. 5; _H. schulzii_ Dendy, 1905, p. 221, pl. xvi, fig. 3; _H. ramosa_ Row, 1911, p. 372; Burton, 1934, p. 579, pl. i, fig. 11, text-fig. 16.

Diagnosis.—Sponge irregularly branched, branches cylindrical, slender, attached at many points to calcareous debris; surface conulose, marked by subdermal canals; oscules single or in sieves in membrane covering subdermal canals; texture stiff, compressible, resilient; colour, in spirit, yellow; skeleton of ascending non-fasciated fibres, widely placed, connected at irregular intervals by a round-meshed lattice work of secondary connecting fibres; main fibres, usually containing broken sponge-spicules, 12 mm. in diameter, secondary fibres, variable in diameter, up to 1 mm.

Hircinia aruensis Hentschel.

_H. aruensis_ Hentschel, 1912, p. 445, pl. xvi, fig. 6; Burton, 1933, p. 242; 1934, p. 580.

Diagnosis.—Sponge encrusting or massive; surface conulose; oscules small, scattered; texture tough, compressible, resilient; colour, in spirit, yellow or purple-brown; skeleton with ascending fibres non-fasciated or only sub-fasciated, secondary connecting fibres
comparatively few and of same size as ascending fibres; whole skeleton filled with foreign inclusions (sand or sponge-spicules); fibres 0.075 to 0.13 mm. thick, meshes of skeleton 1.5 mm. across.

Genus Dysidea Johnston.

Keratosa with skeleton composed of stout ascending fibres connected by a secondary reticulation of irregular mesh formed of more slender fibres, whole skeleton obscured to a greater or lesser extent by the inclusion of foreign bodies; without special dermal skeleton or ectosomal layer of foreign bodies.

Dysidea fragilis (Montagu).

*Spongia fragilis* Montagu 1818, p. 114, pl. xvi, figs. 1-2; *Dysidea fragilis* Burton 1934, p. 583, pl. ii, figs. 2-11, text-figs. 18-33.

*Diagnosis.*—Sponge encrusting, massive, lobose or sub-flabellate; surface conulose; oscules small, scattered, rarely in linear series; texture firm, compressible, elastic; colour, in spirit, white, grey, yellow or brown; skeleton in its elementary form of stout ascending fibres connected by a secondary network of polygonal mesh, by inclusion of foreign bodies skeleton may be entirely obscured.

Genus Luffariospongia gen. n.

*Genotype.*—Hircinia clathrata Carter 1881, p. 366.

*Diagnosis.*—Keratosa with skeleton composed of an irregular network of polygonal mesh, with no distinction into ascending or connective fibres, but with fibres of variable thickness; foreign inclusions usually absent, at most only sparingly present; without special dermal or ectosomal layer of foreign inclusions.

Luffariospongia clathrata (Carter).

*Hircinia clathrata* Carter 1881, p. 366; Dendy 1887, p. 163; Id. 1889, p. 96; *Hippopsongia clathrata* Dendy 1905 p. 215, pl. xiv, fig. 2.

*Diagnosis.*—Sponge massive or massively branching; surface even, minutely conulose; body consisting of tubular processes with walls punctured by large, irregular openings covered in life with thin tympani of ectosome; oscules confined to ectosomal tympani; texture firm, compressible, elastic; colour, in life, purple or reddish-brown, in spirit, brown; skeleton fibre varying from 0.04 to 0.07 mm. diameter and meshes from 0.04 to 0.4 mm. diameter.

Genus Aplysinopsis Lendenfeld.

Keratosa with skeleton a rectangular reticulation of medullated fibres; ascending fibres with foreign inclusions, connecting fibres free of inclusions; without special dermal skeleton.
Aplysinopsis reticulata Hentschel.

* A. reticulata. Hentschel 1912, p. 437, pl. xv, fig. 1, pl. xvi, fig. 9.

* Diagnosis.—Sponge massive, lobo-digitate ; surface conulose and marked with ridges connecting apices of conuli ; oscules large, usually at summits of lobes ; texture firm, compressible, resilient ; colour, in spirit, yellow, grey or black ; ascending fibres, \( \cdot 15 \) to \( \cdot 22 \) mm. thick, with an axial core of broken sponge-spicules, connecting fibres irregularly-placed, \( \cdot 025 \) to \( \cdot 13 \) mm. thick ; meshes of skeleton \( \cdot 2 \) to \( \cdot 5 \) mm. across ; thin ectosomal layer of foreign inclusions.

Genus Spongionella Bowerbank.

Keratosa with main skeleton regularly reticulate, with large meshes, composed of fibres showing a distinct lamellation ; without special dermal skeleton or foreign inclusions in fibres.

Spongionella nigra Dendy.

* S. nigra Dendy 1889, p. 94 ; Megalopastas nigra Idd. 1905, p. 205, pl. xiv, fig. 7, pl. xv, figs. 5-8.

* Diagnosis.—Sponge composed of vertical lamellae springing from a basal plate ; surface even, granulated ; oscules in groups, abundantly scattered on one surface of each lamella ; texture tough, very compressible and resilient ; colour, alive and in spirit, black ; ascending fibres \( \cdot 05 \) mm. diameter, connecting fibres \( \cdot 025 \) mm. diameter ; meshes of skeleton \( \cdot 07 \) to \( \cdot 15 \) mm. across, often subdivided by irregular tertiary fibres.

Spongionella pulvillus (Dendy).

* Megalopastas pulvillus Dendy 1905, p. 206, pl. xv, fig. 3.

* Diagnosis.—Sponge cushion-shaped, flattened dorso-ventrally ; surface even, granulated ; oscules small, compound, scattered ; texture firm, compressible, resilient ; colour, in spirit, yellowish-grey ; ascending fibres \( \cdot 1 \) mm. diameter, connecting fibres \( \cdot 04 \) mm. diameter ; connecting fibres irregularly-disposed with regard to ascending fibres, sometimes regularly transverse, often set at a varying angle.

Spongionella tubulosa sp. n.

(\( \text{pl. ix, fig. 58} \)).

* Holotype.—B.M. 31. 11. 28. 13.

* Diagnosis.—Sponge composed of a mass of tubes arising from a common base, each tube up to \( 10 \) mm. high and \( 5 \) mm. in diameter ; surface minutely tuberculate ; texture soft, compressible ; colour, in spirit, yellow ; skeleton a regular isodictyal network of pale-coloured spongin fibres, ascending fibres \( \cdot 03 \) mm. diameter, conjunctive fibres \( \cdot 015 \) mm. in diameter ; meshes of skeleton up to \( \cdot 16 \) mm. across.
Genus **Duriella** Row.

Keratosa with skeleton composed of an irregular network of fibres filled with foreign inclusions, showing no differentiation into ascending or connecting fibres; at certain points, notably in surface conuli, trellis-like plexuses of fibre are developed; dermal tangential skeleton of fibres filled with foreign bodies.

**Duriella nigra** Row.

*D. nigra* Row 1911, p. 370, pl. xli, fig. 29.

**Diagnosis.**—Sponge massive, with erect digitate processes; surface minutely conulose, conuli connected by a series of radiating ridges; oscules numerous, irregularly-scattered; texture tough, compressible, resilient; colour, in spirit, black; skeleton a loose, irregular network of fibres, ranging from 0.3 to 3 mm. diameter, usually forming a plexus of fibres at each junction and in the surface conuli; meshes 2 to 3 mm. across; dermal reticulation composed of fibres radiating from apices of conuli.

**Suborder DENDROCERATINA**

Keratosa with dendritic skeleton of pithed fibres, to which horny spicules may be added; usually entirely without foreign inclusions or special dermal skeleton.

**Genus Dendrilla** Lendenfeld

Dendroceratina with dendritic skeleton but without horny spicules.

**Dendrilla membranosa** (Pallas).

*Spongia membranosa* Pallas, 1766, p. 398; *Dendrilla membranosa* Burton, 1934, p. 595.

**Diagnosis.**—Sponge massive or, more typically lobo-digitate; surface smooth, with well-developed spinose conuli set well apart; oscules small, scattered; texture soft, compressible, resilient; colour, alive and in spirit, yellow to red or purple; skeleton a tree-like system of stout fibres.

**Genus Hexadella** Topsent

Dendroceratina without skeleton.

**Remarks.**—The absence of a skeleton makes for doubt as to the correct position for this genus in any scheme of classification, but the anatomical characters and texture of its representatives are so like those of the members of the genus *Dendrilla* as to leave little doubt that the various species of *Hexadella* are reduced Dendroceratina.

**Hexadella purpurea** sp.n.

*Psammopemma purpureum* Kirkpatrick, 1900, p. 358; nec *Aplysina purpurea* Carter.

**Diagnosis.**—Sponge thinly encrusting, agglutinating calcareous and other debris; surface smooth, even; oscules not apparent; texture tough; colour, alive and in spirit, purple.
List of works referred to.


1830 ESPER, E. J. C. Die Pflanzentiere. III. Nürnberg, 4°, pls. viii–xxv.


1759 Linnaeus, C. Systema naturae, II, Ed. 10.


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- clathratum (Eichnodactylus) 
- Cliona 
- Collochrysa 
- conchida (Axinella, Phahe- lia) 
- corallithenoida (Cithoria) 
- corticata (Chondrella, Chon- drillastra) 
- corynium (Tethys) 
- cratiferiformis (Reimeira) 
- crinoidea (Eiconemia) 
- crucuta (Lagaxobeteires, Sub- erites) 

D
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- ducumbes (Cithoria, Wilde- nalla) 
- Dendrella 
- Desmacella 
- dichela (Chithoria fron- diffens var.) 
- differentiata (Eiconemia) 

E
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- Eiconemia 
- Echinodactylus 
- Echinoidactylus 
- elongata (Acanthella, Auletes) 
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- eretus (Rhiphophlebus) 
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- exigua (Halichiona, Petrosia) 

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- frondifera (Cithoria, Hal- chondria, Tenacia) 
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G
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APPENDIX.

LIST OF LOCALITIES AND RECORDS OF COLOUR IN LIFE.

Two collections of sponges have been dealt with in the above descriptions, one from the Madras Museum and one from the Madras Fisheries Department. As the latter included a number of specimens not collected in the Gulf of Manaar it is important that all localities should be recorded. When colour notes recorded from the living sponge are recorded on the labels they have been noted in the list.

Species dealt with by Mr. Burton in the report but not represented in the Museum collection have been marked with an asterisk (*). A few species in the Kru sadai collection have not been recorded in the report. These are marked with a single dagger (†).

<table>
<thead>
<tr>
<th>Name</th>
<th>Locality and colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leuconovela coriacea †</td>
<td>Krusadai Island</td>
</tr>
<tr>
<td>Stelletta purpurea Ridley</td>
<td>Pamban Bridge and Shingle Island</td>
</tr>
<tr>
<td>Ecitonema bacillifera (Carter)</td>
<td>Kilakarai, Krusadai Island, Pamban Bridge (bright yellow) and Shingle Island (lemon yellow).</td>
</tr>
<tr>
<td>Geodia areolata Carter</td>
<td>Off Pondicherry (dull white and brown) and off Madras (brick red).</td>
</tr>
<tr>
<td>G. pictetii (Topsent)</td>
<td>Krusadai Island</td>
</tr>
<tr>
<td>Chondrella australiensis Carter</td>
<td>Shingle Island (whitish shading to dull brownish or dull purplish).</td>
</tr>
<tr>
<td>Chondrosia reniformis Nardo</td>
<td>Shingle Island and Pamban Bridge (grey shading to whitish).</td>
</tr>
<tr>
<td>Lophocranthon rhabdophorius Hentschel</td>
<td>Pulli Reef, and Krusadai Island (dull pink).</td>
</tr>
<tr>
<td>Chrosetella australiensis (Carter)</td>
<td>Krusadai Island (yellowish) and Shingle Island (ochraceous becoming greenish at surface).</td>
</tr>
<tr>
<td>Tethya repens Schmidt</td>
<td>Krusadai Island</td>
</tr>
<tr>
<td>T. diploderma Schmidt</td>
<td>Shingle Island (ochraceous).</td>
</tr>
<tr>
<td>T. robusta (Bowerbank)</td>
<td>Pamban Bridge (thick surface layer white, rest ochraceous) and Kilakarai.</td>
</tr>
<tr>
<td>T. japonica Sollas</td>
<td>Shingle Island</td>
</tr>
<tr>
<td>Aaptos aaptos (Schmidt) *</td>
<td></td>
</tr>
<tr>
<td>Pseudoruberites andrewes Kirkpatrick</td>
<td>Krusadai Island (dull yellow) and Shingle Island.</td>
</tr>
<tr>
<td>Laxosuberites cruciatu (Dendy)</td>
<td>Pulli Reef and S. Lagoon, Krusadai Island.</td>
</tr>
<tr>
<td>L. lacustris Annandale *</td>
<td></td>
</tr>
<tr>
<td>Spirastrella inconstans (Dendy) *</td>
<td></td>
</tr>
<tr>
<td>S. purpura (Lamarck) †</td>
<td>Off Negapatham (mud colour), between Pamban and Kutikal (brown), Krusadai Island (orange), Shingle Island (dull apricot, greenish brown, whitish), Rameswaram and Pamban Bridge.</td>
</tr>
</tbody>
</table>

Terpios fugaz Duchassing and Michelotti. Shingle Island and Pamban Bridge (black).
Name.                      APPENDIX

Timea stelletta (Bowerbank) ... ... Pulli Reef, Krusadai Island (red).
Cliona lobata Hancock ... ... Pamban Bridge (bright red in life) and Pamban.
Placospongia carinala (Bowerbank) ... ... Pamban Bridge (dull yellow).
Haliclona madrepora (Dendy) ... ... Shingle Island (black).
H. obtusispiculifera (Dendy) * ... ... Rameswaram, Krusadai Island, Pulli Reef (red surface, white body), S. Lagoon, Krusadai Island.
H. exigua (Kirkpatrick) ... ... Rameswaram and Shingle Island.
H. tenuiramosa (Burton) ... ... Pulli Reef, Krusadai Island.
H. camerata (Ridley) ... ... S. Lagoon, Krusadai Island and Shingle Island (pale blue).
Hemihaliclona viridis (Duchassing and Michelotti).
Adocia pigmentifera (Dendy) * ... ... Shingle Island.
A. semijubrosa (Dendy) ... ... Tuticorin Pearl Bank (dirty yellow with bright brownish tint).
A. carnosa (Dendy) ... ... Shingle Island (dull grey, apparently full of mud).
Callyspongia diffusa (Ridley) ... ... Between Pamban and Kutikal.
C. fibrosa (Ridley and Dendy) ... ... Between Pamban and Kutikal.
C. spinosissima (Dendy) ... ... Krusadai Island, Shingle Island (pale greyish), between Pamban and Kutikal (pale blue grey).
C. fistularia (Topsent) ... ... Pulli Reef, Krusadai Island and between Pamban and Kutikal (pale violet).
Petrosia testudinaria (Lamarck) ... ... Off Negapatam (very light violet).
Oceanapia media (Thiele) ... ... Pulli Reef and S. Lagoon, Krusadai Island.
Mycale grandis Gray ... ... Pamban Bridge, Shingle Island (dull ochre) S. Lagoon, Krusadai Island.
M. tenuispiculata (Dendy) ... ... Shingle Island.
M. mytilorum Annandale * ... ... Pulli Reef and Krusadai Island.
Mycale madraspatanum Annandale ... ... Pulli Reef and Krusadai Island.
M. graseyi n.sp. * ... ... Pamban Bridge.
Biema peachii var. fistulosa (Topsent) ... ... Shingle Island.
Parasperella bidentata Dendy ... ... S. Lagoon, Krusadai Island.
Linoedendoryx sinensis Bronsted ... ... Krusadai Island.
Tetania nigrescens (Schmidt) * ... ... Between Pamban and Kutikal (red), Kutikal and Krusadai Island.
T. digitata Schmidt † ... ... Off Negapatam (salmon pink), between Pamban and Kutikal and Krusadai Island.
Clathria frondifera (Bowerbank) ... ... Shingle Island; between Pamban and Kutikal.
C. procera (Ridley) ... ... Shingle Island; between Pamban and Kutikal.
C. p. var. tessellata (Dendy) * ... ...
<table>
<thead>
<tr>
<th>Name</th>
<th>Locality and colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. decumbens Ridley</td>
<td>Pulli Reef and Krusadai Island.</td>
</tr>
<tr>
<td>Colloclathria ramosa Dendy *</td>
<td></td>
</tr>
<tr>
<td>Microciona australiousea Bowerbank</td>
<td>S. Lagoon, Krusadai Island (dull orange) and Pamban Bridge.</td>
</tr>
<tr>
<td>M. longitosa (Hentschel) *</td>
<td></td>
</tr>
<tr>
<td>M. toxifera (Hentschel) *</td>
<td></td>
</tr>
<tr>
<td>Echinodictyum clathratum Dendy</td>
<td>Pamban Bridge.</td>
</tr>
<tr>
<td>Aulospungus tubulatus (Bowerbank)</td>
<td>Off Negapatam (brick red), Tuticorn (orange red) and Rameswaram.</td>
</tr>
<tr>
<td>Raspelia hornelli (Dendy) *</td>
<td></td>
</tr>
<tr>
<td>Rhuberemia indica Dendy</td>
<td>Off Negapatam (light yellow).</td>
</tr>
<tr>
<td>Endoctyon thurtoni (Dendy)</td>
<td>Rameswaram.</td>
</tr>
<tr>
<td>Axinella lyrata (Esper)</td>
<td>Off Negapatam (dirty brown).</td>
</tr>
<tr>
<td>A. donnani (Bowerbank)</td>
<td>Off Madras (brown).</td>
</tr>
<tr>
<td>A. flabelliformis (Keller) *</td>
<td></td>
</tr>
<tr>
<td>A. carteri (Dendy)</td>
<td>Tuticorn Pearl Bank (orange).</td>
</tr>
<tr>
<td>A. ceylonensis Dendy *</td>
<td></td>
</tr>
<tr>
<td>A. bibrainoides Dendy</td>
<td>Off Negapatam (dirty white).</td>
</tr>
<tr>
<td>A. conulosa Dendy *</td>
<td></td>
</tr>
<tr>
<td>Acanthella caverossa Dendy</td>
<td>Off Madras (light yellow).</td>
</tr>
<tr>
<td>A. elongata (Dendy)</td>
<td>Off Madras (dirty white).</td>
</tr>
<tr>
<td>Halichondria glabrata Keller</td>
<td>Shingle Island; Sandy Pt., Krusadai Island.</td>
</tr>
<tr>
<td>Prostilissa fociata (Dendy)</td>
<td>Pamban Bridge.</td>
</tr>
<tr>
<td>P. oculata (Kieschnick) *</td>
<td></td>
</tr>
<tr>
<td>P. heterostyla (Hentschel)</td>
<td>Shingle Island.</td>
</tr>
<tr>
<td>Trachyopsis caverossa (Topsent) *</td>
<td></td>
</tr>
<tr>
<td>T. solida var. rugosa (Ridley and Dendy) *</td>
<td></td>
</tr>
<tr>
<td>T. aplysinoides (Dendy) *</td>
<td></td>
</tr>
<tr>
<td>Linosia paradoxa Thiele</td>
<td>Pulli Reef, Krusadai Island and Shingle Island.</td>
</tr>
<tr>
<td>Myrmekioderma granulatum (Esper)</td>
<td>Tuticorn Pearl Bank (bright yellow).</td>
</tr>
<tr>
<td>Spongia clathrata (Carter)</td>
<td>Rameswaram.</td>
</tr>
<tr>
<td>Spongia officinalis var. ceylonensis Dendy</td>
<td>Pamban Bridge (brownish, dirty whitish), Pulli Reef, Krusadai Island (black) and Rameswaram.</td>
</tr>
<tr>
<td>Hircinia fusca Carter *</td>
<td>Pamban Bridge and Rameswaram (dull bluish brown shading to whitish).</td>
</tr>
<tr>
<td>H. ramosa Keller</td>
<td></td>
</tr>
<tr>
<td>H. aruensis Hentschel *</td>
<td></td>
</tr>
<tr>
<td>Dyidsea fragilis (Montagu)</td>
<td>S. Lagoon, Krusadai Island.</td>
</tr>
<tr>
<td>Luffariosponga clathrata (Carter)</td>
<td>Tuticorn Pearl Bank (light green with yellow shades) and Krusadai Island.</td>
</tr>
<tr>
<td>Aplysinopsis reticulata Hentschel *</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Locality and colour</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td><em>Spongodonta nigra</em> Dendy *</td>
<td></td>
</tr>
<tr>
<td><em>S. pulvella</em> (Dendy)</td>
<td>Off Madras (reddish)</td>
</tr>
<tr>
<td><em>S. tubulosa</em> n.sp. *</td>
<td></td>
</tr>
<tr>
<td><em>Duriella nigra</em> Row</td>
<td>Kutikal (red)</td>
</tr>
<tr>
<td><em>Dendrilla membranosa</em> (Pallas)</td>
<td>Off Madras (black)</td>
</tr>
<tr>
<td><em>Hexadella purpurea</em> n.sp.</td>
<td>Krusadai Island (yellowish shading to greenish) and</td>
</tr>
<tr>
<td></td>
<td>Shingle Island</td>
</tr>
<tr>
<td><em>Phloecodictyon</em> sp.*</td>
<td>Pamban Bridge (white), and Pulli Reef, Krusadai Island</td>
</tr>
<tr>
<td><em>Sideroderma navicelligerum</em> (Carter) †</td>
<td>S. Lagoon Krusadai, Island</td>
</tr>
</tbody>
</table>
PLATE I.

Figure 1. Stelletta purpurea Ridley. a. Oxcoete, $\times 30$; b. orthotriæne, $\times 30$; c. anatriæne, $\times 30$; d. tylaster, $\times 500$.

2. Ecionemia carteri Dendy. a. Protriaene, $\times 45$; b. anatriæne, $\times 45$; c. orthotriæne, $\times 45$; d. tylaster, $\times 500$; e. microrhabd, $\times 500$.

3. Geodia areolata Carter. a. Orthotriæne, $\times 40$; b. anatriæne, $\times 40$; c. protriaene, $\times 40$; d. sterraster, $\times 300$; e. tylaster, $\times 500$; f. oxyaster, $\times 500$.

4. Chondrilla australiensis Carter. a. Spheraster, $\times 300$; b. oxyaster, $\times 300$.

5. Haliclona obtusispicuifera (Dendy). Strongyle, $\times 400$.

6. Haliclona madrepora (Dendy). Oxcoete, $\times 300$.

7. Hemihaliclona viridis (Duchassaing and Michelotti). Oxcoete, $\times 400$.

8. Adocia pigmentifera (Dendy). Oxcoete, $\times 400$.

9. Oceanapia media (Thiele). Oxcoete, $\times 120$.

10. Petrosia testudinaria (Lamarck). Oxcoete and strongyle, $\times 150$.

11. Adocia carnosa (Dendy). Oxcoete and sigma, $\times 400$. 
PLATE II.

Figure 12. *Mycale madraspatana* Annandale. *a*. Subtylostyle, × 300; *b*. large anisochele, × 600; *c*-d. small anisochele, × 600; *e*. sigma, × 300; *f*. toxon, × 100.

"13. *Mycale grandis* Gray. *a*. Subtylostyle, × 100; *b-c*. large anisochele, × 300; *d*. medium-sized anisochele, × 300; *e*. small anisochele, × 300; *f*. large and small sigmata, × 300; *g-h*. raphides, × 150.


"15. *Mycale mytilorum* Annandale. *a*. Subtylostyle, × 350; *b*. anisocheleae much enlarged, × 1,500; *c-f*. anisocheleae, × 600; *g-i*. sigmata, × 300.


PLATE III.

Figure 18. Biemna peachii var. fistulosa (Topsent). a. Style, × 300; b-c. sigmata, × 300; d-e. trichodragmata, × 150; f. microxeote, × 150.

19. Lissodendoryx sinensis Brondsted. a-b. Styli, × 250; c. tornote (the upper end is incorrectly drawn, it should be the same as the lower end), × 250; d-f. isochelae, × 300; g-h. sigmata, × 300.

20. Collocathria ramosa Dendy. a. Style × 300; b. subtylostyle, × 300; c-d. acanthostyli, × 600; e. toxis, × 1,000; f-h. isochelae, × 1,000; i-l. colloscleres, × 1,000.


22. Tedania nigrescens (Schmidt). a. Style, × 300; b. tornote, × 300; c. onychata, × 300.

23. Clathria decumbens Ridley. a. Style, × 300; b. acanthostyle, × 300; c. subtylostyle, × 300; d-e. isochelae, × 200.

Figure 24a. *Microciona atrasanguinea* Bowerbank.  
*a*. Subtylostyle, × 150;  
*b*. acanthostyli, × 150;  
*c*. subtylostyli, × 100;  
*d*. toxon, × 600.

*a-b*. Oxeote;  
*c*. long styli;  
*d*. dermal styli;  
*e*. acanthostyli;  
all × 230.

*a*. Styli;  
*b*. acanthostrongyla;  
all × 300.

,, 27. *Raspelia hornelli* (Dendy).  
*a*. Large styli;  
*b*. dermal styli;  
*c*. acanthostyli;  
*d-g*. oxea;  
all × 230.
Plate V.

Figure 28. Rhabderemia indica Dendy. a-c. Rhabdostyli, × 200; d. acanthostyli, × 500; e. sigmata, × 500.

29. Microciona longitoxa (Hentschel). a-c. Styli; d. acanthostyle; e. subtylostyle; f. chelæ; g-h. toxæ; all × 200.

30. Microciona toxifera (Hentschel). a. Basally-spined style; b. subtylostyle; c. acanthostyle; d. toxæ; e. chelæ; all × 200.

31. Lophacanthus rhabdophorus Hentschel. a-b. Desmas; c. lophotriaene; d-e. rhabdostyli; all × 200.
PLATE VI.

Figure 32. *Axinella donnani* (Bowerbank). Style, × 200.

33. *Axinella buharinoides* Dendy.  a. Long style; b. short styli; all × 120.

34. *Axinella conulosa* (Dendy). a-d. Styli, × 100.

35. *Axinella ceylonensis* (Dendy). a-b. Styli; c-e. oxca; all × 230.

36. *Acanthella cavernosa* Dendy. a. Sinuous stróngyle; b. style; all × 160.

37. *Axinella carteri* (Dendy). a-c. Styli; d. oxocone; all × 120.

PLATE VII.

Figure 39. Prostylissa oculata (Kieschnick). a. Pseudoxeote; b. small style; all $\times$ 150.

40. Prostylissa heterostyla (Hentschel). a. Style; b. small style; all $\times$ 150.

41. Axinella lyrata (Esper). a. Style; b. oxeote; all $\times$ 200.

42. Acanthella elongata (Dendy). a-c. Strongyla; d-e. styli; f. oxeote; all $\times$ 80.


44. Myrmekioderma granulatum (Esper). a. Style; b. oxeote; c. acanthoxeote; d. trichodragmata; all $\times$ 230.

45. Prostylissa foetida (Dendy) a. Oxeote; b. small style; all $\times$ 120.
Figure 46. *Liosina paradoxa* Thiele. *a.* Pseudoxeote; *b.* strongyle; all × 150.

47. *Laxosuberites cruciatus* (Dendy). *a-b.* Tylostyle, × 530; *c.* bases of tylostyli enlarged, × 1,000.


51. *Spirastrella inconstans* (Dendy). *a.* Tylostyle, × 180; *b.* spinispira, × 300.

52. *Timea siellata* (Bowerbank). *a.* Tylostyle, × 100; *b.* chiasters, × 600.

53. *Cliona lobata* Hancock. *a.* Tylostyle; *b-c.* spinispiræ, all × 400.
PLATE IX.

Figure 54. *Tethya repens* Schmidt. *a.* Strongylocote, × 60; *b-c.* spherasters, × 100; *d-e.* strongylasters, × 200.

55. *Tethya robusta* (Bowerbank). *a.* Strongylocote, × 60; *b.* spheraster, × 100; *c-d.* strongylasters, × 400.

56. *Tethya diploderma* Schmidt. *a.* Strongylocote, × 60; *b.* spheraster, × 100; *c.* oxyaster, × 400; *d.* tyaster, × 400.

57. *Placospengia carinata* (Bowerbank). *a-b.* Tylostyle, × 100; *c-d.* spinispira, × 500; *e-f.* spiny microrhabds, × 500; *g.* spheraster, × 500; *h.* sterospire, × 400.

58. *Spongionella tubulosa* sp. n. Section of skeleton at right angles to surface, × 100.