SPONGES

BY

MAURICE BURTON, D.Sc.

DEFINITION OF THE INDIAN OCEAN AREA

For the purposes of this report the Indian Ocean is arbitrarily delimited as follows. The Tropic of Capricorn is accepted as the southern boundary. To the east, the boundary starts at the junction of this Tropic with the coast of Africa, thence runs north to include the African coast, Red Sea (excluding the Suez Canal), Persian Gulf and the southern seaboard of Asia to the southern tip of the Malay Peninsula. Sumatra is also included and from the tip of Malaya southwards the western boundary follows the line of latitude 105° west to its junction with the Tropic of Capricorn.

Such an area does not represent a true zoogeographical area, and its use must be qualified by the knowledge that some species, typical of the Indian Ocean proper, may be found further south or east, along the coast of South Africa, in the Southern Ocean and east into the East Indian Archipelago. In addition, species proper to these adjoining areas will in some cases overlap with the Indian Ocean Area as here defined.

LIST OF SPECIES RECORDED FROM THE INDIAN OCEAN AREA, INCLUDING THOSE NEW WITH THIS REPORT

Order HEXACTINELLIDA.

(The list of species in this order is arranged according to the scheme given in Ijima, 1927, pp. 364–377.)

Sub-order AMPHIDISCOPHORA.

Family PHERONEMATIDÆ.

Genus *Pheronema* Leidy.

P. raphanus Schulze.
P. carpenteri (Thomson).
P. giganteum Schulze.

Genus *Sempercella* Gray.

S. cucumis Schulze.

Genus *Platylistrum* Schulze.

P. platessa Schulze.

Family MONORHAPHIDÆ.

Genus *Monorhaphis* Schulze.

M. chuni Schulze.
M. dives Schulze.

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Family Hyalonematidæ.

Genus *Hyalonema* Gray.

H. proximum Schulze.
H. aculeatum Schulze.
H. heideri Schulze.
H. lamella Schulze.
H. indicum Schulze.
H. indicum laccadivense Schulze.
H. indicum andamense Schulze.
H. heymousi Schulze.
**H. affine* Brandt.
H. pirum Schulze.
H. tulipa Schulze.
H. nicobaricum Schulze.
H. nicobaricum nicobaricum Schulze.
H. nicobaricum somalicum Schulze.
H. molle Schulze.
H. coniforme Schulze.
H. simile Schulze.
H. valdiviæ Schulze.
H. rapa Schulze.
H. globiferum Schulze.
H. martabanense Schulze.
H. alcocki Schulze.
H. investigatoris Schulze.
H. urna Schulze.
H. solutum Schulze.
H. validum Schulze.
H. masoni Schulze.
H. weltneri Schulze.

Genus *Compsocalyx* Schulze.

C. gibberosa Schulze.

Genus *Lophophysema* Schulze.

L. inflatum Schulze.

Sub-order Hexasterophora.

Tribe Hexactinosa.

Sub-tribe Clavularia.

*This is called *H. apertum* by Ijima (1927) who, throughout a long discourse on the species does not mention *H. affine* Brandt, nor do Brandt's works figure in Ijima's list of literature referred to.

Family Farreidæ.

Genus *Farrea* Bowerbank.

F. occa occa Bowerbank.
F. occa erecta Ijima.
F. spirifera Ijima.

Genus *Sarostegia* Topsent.

S. oculata Topsent.

Sub-tribe Scopularia.

Family Euretidæ.

Genus *Pleurochorium* Schrammen.

P. annandalei (Kirkpatrick).

Genus *Myliusia* Gray.

M. verrucosa Ijima.

Family Aulocalycidæ Ijima.

Genus *Aulocalyx* Schulze.

A. serialis Dendy.

Genus *Rhabdodictyum* Schmidt.

R. delicatum Schmidt.

Family Aphrocallistidæ Gray.

Genus *Aphrocallistes* Gray.

A. beatrix Gray.
(*A. bocagei* Wright and *A. ramosus* Schulze are treated as synonyms of *A. beatrix* in this present report.)

Tribe Lychniscosa.

Family Aulocystidæ.

Genus *Aulocystis* Schulze.

A. zitteli zitteli Marshall and Meyer.
A. grayi grayi (Bowerbank).
A. grayi polæ (Ijima).

Tribe Lyssacinosa.

Family Leucopsacasidæ.

Genus *Placoplegma* Schulze.

P. solutum Schulze.

Genus *Chaunangium* Schulze.

C. crater Schulze.

Family Euplectellidæ.

Genus *Euplectella* Owen.

E. aspergillum Owen.
E. regalis Schulze.
E. simplex Schulze.
?*E. aspera* Schulze.
?*E. cucumer* Owen.
?*E. suberea* Thomson.

Genus *Holascus* Schulze.

H. fibulatus Schulze.
H. robustus Schulze.
H. tener Schulze.

Genus *Regadrella Schmidt.*

R. decora Schulze.
R. phœnix Schmidt.

Genus *Dictyaulus Schulze.*

D. elegans Schulze.

Genus *Saccocalyx* Schulze.

S. pedunculata Schulze.

Family Caulophacidæ.

Genus *Sympagella* Schmidt.

S. johnstoni (Schulze).

Family Rossellidæ.

Genus *Lophocalyx* Schulze.

L. spinosa Schulze.

Genus *Bathydorus* Schulze.

B. lævis Schulze.

Order CALCAREA

(The list of species in this order is arranged according to the scheme given by Dendy and Row, 1913.)

Family Homocœlidæ.

Genus *Leucosolenia* Bowerbank.

L. canariensis (Michlucho-Maclay).
L. coriacea (Montagu).
L. darwinii Haeckel.
L. gardineri Dendy.
L. irregularis Jenkin.
L. tenuipilosa Dendy.

Genus *Dendya* Bidder.

D. prolifera Dendy.

Family Leucascidæ.

Genus *Leucetta* Haeckel.

L. chagosensis Dendy.
L. primigenia Haeckel.
L. pyriformis Dendy.

Genus *Pericharax* Poléjaeff.

P. heteroraphis (Poléjaeff).

Family Leucaltidæ.

Genus *Leucaltis* Haeckel.

L. clathria Haeckel.

Family Minchinellidæ.

Genus *Plectroninia* Hinde.

P. deansii Kirkpatrick.

Family Murrayonidæ.

Genus *Murrayona* Kirkpatrick.

M. phanolepis Kirkpatrick.

Family Sycettidæ Dendy.

Genus *Sycetta* Haeckel.

S. sagittifera Haeckel.

Genus *Sycon* Risso.

S. proboscideum (Haeckel).
S. raphanus Schmidt.
S. tabulatum (Schuffner).
S. munitum Jenkin.

Family Heteropidæ.

Genus *Grantessa* Lendenfeld.

G. glabra Row.
G. hastifera (Row).
G. simplex Jenkin.
G. stauridia (Haeckel).
G. sycilloides (Schuffner).

Genus *Heteropia* Carter.

H. glomerosa (Bowerbank).

Genus *Grantilla* Row.

G. quadriradiata Row.

Family GRANTIIDÆ.

Genus *Grantia* Fleming.

G. indica Dendy.

Genus *Leuconia* Grant.

L. anguinea (Ridley).
L. bathybia (Haeckel).
L. claviformis (Schuffner).
L. donnani (Dendy).
L. echinata (Schuffner).
L. falcigera (Schuffner).
L. infesta Row.
L. innominata Row.
L. pulvinar (Haeckel).
L. wasinensis (Jenkin).

Genus *Aphroceras* Gray.

A. alcicornis Gray.

Genus *Paraleucilla* Dendy.

P. cucumis (Haeckel).

Family AMPHORISCIDÆ.

Genus *Leucilla* Haeckel.

L. proteus Dendy.

Family LELAPIIDÆ.

Genus *Kebira* Row.

K. utecides Row.

Order TETRAXONIDA.

Sub-order HOMOSCLEROPHORA.

Family PLAKINIDÆ.

Genus *Acanthoplakina* **gen. n.**

A. spinosa (Kirkpatrick).

Genus *Astroplakina* Dendy and Burton.

A. stelligera Dendy and Burton.

Genus *Dercitopsis* Dendy.

D. ceylonica Dendy.
D. clathrata (Kirkpatrick).

Genus *Plakortis* Schulze.

P. simplex Schulze.

Genus *Thrombus* Sollas.

T. ornatus Schulze.

Sub-order STREPTASTROSCLEROPHORA.

Family PACHASTRELLIDÆ.

Genus *Yodomia* Lebwohl.

Y. perfecta Dendy.

Genus *Pachastrella* Schmidt.

P. monilifera Schmidt.

Genus *Pœcillastra* Sollas.

P. eccentrica Dendy and Burton.
P. schulzei (Sollas).

Genus *Sphinctrella* Schmidt.

S. annulata (Carter).
S. gracilis (Sollas).
S. theneides **sp. n.**

Family THENEIDÆ.

Genus *Thenea* Gray.

T. muricata (Bowerbank).
T. grayi Sollas.
T. wyvillii Sollas.
T. centrotyla Lendenfeld.

Sub-order ASTROSCLEROPHORA.

Family STELLETTIDÆ.

Genus *Stelletta* Schmidt.

S. purpurea Ridley.
S. herdmani Dendy.
S. mauritiana (Dendy).

Genus *Ecionemia* Bowerbank.

E. acervus Bowerbank.

Genus *Penares* Gray.

P. intermedia (Dendy).

Sub-order LITHISTIDA.

(Since the sub-order is here regarded as a polyphyletic and artificial group, see Burton, 1929, pp. 1–12, no attempt is made to apportion the species to families.)

Genus *Discodermia* Bocage.

D. natalensis Kirkpatrick.
D. emarginata Dendy.

Genus *Theonella* Gray.

T. lacerata Lendenfeld.
T. discifera Lendenfeld.
T. pulchrifolia Dendy.

Genus *Corallistes* Schmidt.

C. bowerbanki (Johnson).

Genus *Taprobane* Dendy.

T. herdmani Dendy.

Genus *Microscleroderma* Kirkpatrick.

M. hirsutum (Kirkpatrick).

Sub-order SIGMATOSCLEROPHORA.

Family HAPLOSCLERIDÆ.

Genus *Haliclona* Grant.

H. camerata (Ridley).
H. cribriformis (Ridley).
H. flagellifer (Ridley and Dendy).
H. cf. *ochracea* (Keller).
H. contignata (Thiele).
H. irregularis (Kirkpatrick).
H. expansa (Thiele).
H. obtusispiculifera (Dendy).
H. decidua (Topsent).
H. tabernacula (Row).
H. seychellensis (Dendy).
H. tuberosa (Dendy).
H. cerebrum (Burton).
H. carteri **sp. n.**

Genus *Adocia* Gray.

A. sagittarius (Sollas).
A. fibulatus (Schmidt), var. *microsigma* (Dendy).
A. pigmentifera (Dendy).
A. digitata (Baer).
A. cf. *semifibrosa* (Dendy).
A. tufoides (Dendy).

Genus *Petrosia* Vosmaer.

P. testudinaria (Lamarck).
P. mauritiana (Carter).
P. nigricans Lindgren.

Genus *Oceanapia* Gray.

O. putridosum (Lamarck).
O. fistulosa (Bowerbank).
O. canalis (Ridley).
O. elastica (Keller).
O. media (Thiele).
O. zoologica (Dendy).
O. incrustata (Dendy).
O. cf. *cagayense* (Wilson).

Genus *Callyspongia* Duchassaing and Michelotti.

C. diffusa (Ridley).
C. subarmigera (Ridley).
C. confœderata (Ridley).
C. fibrosa (Ridley and Dendy).
C. spinosissima (Dendy).
C. clathrata (Dendy).
C. barodensis **sp. n.**
C. rowi **sp. n.**

Genus *Gelliodes* Ridley.

G. fibulatus Ridley.

Family DESMACIDONIDÆ.

Sub-family MYCALINÆ.

Genus *Biemna* Gray.

B. fortis (Topsent).
B. trirhaphis (Topsent).
B. ciocalytoides **sp. n.**

Genus *Desmacella* Schmidt.

D. annexa Schmidt.

Genus *Mycale* Gray.

M. sulevoidea (Sollas).
M. murrayi (Ridley and Dendy).
M. sulcata (Hentschel).
M. massa (Schmidt), var *oceanica* Topsen
M. topsenti **sp. n.**

Genus *Hamacantha* Gray.

H. mindanaensis Wilson.
H. simplex **sp. n.**

Genus *Guitarra* Carter.

G. fimbriata Carter.

Sub-family MYXILLINÆ.

Genus *Myxilla* Schmidt.

M. simplex (Baer).
M. dendyi **sp. n.**

Genus *Lissodendoryx* Topsent.

L. ciocalyptoides **sp. n.**
L. damirioides **sp. n.**
L. tubicola **sp. n.**

Genus *Ectyodoryx* Lundbeck.

E. rhaphidiophora **sp. n.**
E. coralliophila **sp. n.**

Genus *Hymedesmia* Bowerbank.

H. murrayi **sp. n.**

Genus *Phorbas* Duchassaing and Michelotti.

P. styliferus **sp. n.**

Genus *Desmapsamma* Burton.

D. anchorata (Carter).

Genus *Iotrochota* Ridley.

I. baculifera Ridley.

Genus *Acanthancora* Topsent.

A. stylifera **sp. n.**

Genus *Damirina* **gen. n.**

D. verticillata **sp. n.**

Genus *Tedania* Gray.

T. nigrescens (Schmidt).

Genus *Strongylacidon* Lendenfeld.

S. inaequalis (Hentschel).

Genus *Lithoplocamia* Dendy.

L. lithistoides Dendy.

Genus *Agelas* Duchassaing and Michelotti.

A. mauritianus (Carter).

Sub-family CLATHRIINÆ.

Genus *Clathria* Schmidt.

C. frondifera (Bowerbank).
C. aculeata Ridley.
C. procera (Ridley).
C. maeandrina Ridley.
C. mixta Hentschel.
C. spicata Hallmann.
C. transiens Hallmann.
C. whiteleggii Dendy.
C. spongiosa **sp. n.**

Genus *Ophlitaspongia* Bowerbank.

O. minor **sp. n.**

Genus *Microciona* Bowerbank.

M. affinis Carter.
M. longitoxa (Hentschel).
M. rhopalophora (Hentschel).
M. densa **sp. n.**
M. longistyla **sp. n.**
M. anonyma **sp. n.**

Genus *Echinodictyum* Ridley.

E. nervosum Ridley.
E. jousseaumei Topsent.

Genus *Antho* Gray.

A. tawiensis (Wilson).

Genus *Echinoplocamia* **gen. n.**

E. arbuscula **sp. n.**

Genus *Acarnus* Gray.

A. topsenti Dendy.

Genus *Plocamilla* Topsent.

P. manaarensis (Carter).

Sub-family RASPELIINÆ.

Genus *Aulospongus* Norman.

A. tubulatus (Bowerbank).

Genus *Rhabderemia* Topsent.

R. indica Dendy.

Genus *Endectyon* Topsent.

E. thurstoni (Dendy).

Genus *Hemectyonilla* **gen. n.**

H. involutum (Kirkpatrick).

Genus *Higginsia* Higgin.

H. petrosioides Dendy.
H. robusta **sp. n.**

Genus *Raspailopsis* **gen. n.**

R. cervicornis **sp. n.**

Family Axinellidæ.

Genus *Amorphinopsis* Carter.

A. megalorhaphis (Carter).

Genus *Axinella* Schmidt.

A. carteri (Dendy).
A. lamellata (Dendy).
A. agariciformis (Dendy).
A. durissima (Dendy).
A. conulosa (Dendy).
A. bidderi **sp. n.**
A. ventilabrum **sp. n.**
A. flabello-reticulata **sp. n.**
A. dragmaxioides **sp. n.**
A. massalis **sp. n.**

Genus *Phakellia* Bowerbank.

P. radiata (Dendy).

Genus *Hymeniacidon* Bowerbank.

H. virgultosa (Carter).
H. variospiculata Dendy.

Genus *Ciocalypta* Bowerbank.

C. penicillus Bowerbank.

Genus *Collocalypta* Dendy.

C. digitata Dendy.

Genus *Sigmaxinella* Dendy.

S. megastyla **sp. n.**

Genus *Stylissa* Hallmann.

S. massa (Carter).
S. coccinea (Keller).

Genus *Ptilocaulis* Carter.

P. spiculifera (Lamarck).

Genus *Raspaigella* Schmidt.

R. salomonensis (Dendy).
R. dendyi **sp. n.**
R. ? suluensis (Wilson).

Genus *Pseudaxinyssa* Burton.

P. tenuispiculata Burton.

Order Keratosa.

Genus *Darwinella* Müller.

D. simplex Topsent.

Genus *Aplysina* Nardo.

A. euplectella (Hentschel).
A. mollis Row.
A. primitiva **sp. n.**

Genus *Aplysinopsis* Lendenfeld.

A. reticulata Hentschel.

Genus *Druinella* Lendenfeld.

D. ramosa Thiele.

Genus *Megalopastas* Dendy.

M. retiaria Dendy.

Genus *Spongia* Linnaeus.

S. officinalis Linnaeus.

Genus *Spongionella* Bowerbank.

S. pulvilla (Dendy).
S. nigra Dendy.
S. frondosa (Hentschel).

Genus *Psammaplysilla* Keller.

P. arabica Keller.

Genus *Cacospongia* Schmidt.

C. herdmani (Dendy).
C. symbiotica **sp. n.**

Genus *Dysidea* Johnston.

D. fragilis (Montagu).
D. cinerea Keller.

Genus *Euryspongia* Row.

E. lactea Row.

Genus *Hircinia* Nardo.

H. arenosa Lendenfeld.
H. aruensis Hentschel.

Genus *Carteriospongia* Hyatt.

C. cordifolia Keller.

List of Species Obtained by the John Murray Expedition, in Systematic Order, with Numbers of Stations and Depths.

Name.	Station.	Depth in m.
Pharonema gigantcum	122	745
Semperella cucumis	145	494
Monorhaphis dives	119	1204
Monorhaphis sp.	118	1789
Hyalonema affine	176	695
Farrea spirifera	157	229
Farrea occa subsp. *erecta*	162	1829
Sarostegia oculata	42, 54, 152, 153, 162	1415, 1046, 878, 256, 1829
Pleurochorium annandalei	152	878
Mylitsia verrucosa	109	640
Aphrocallistes beatrix	54, 108	1046, 781
Placoplegma solutum	54	1046
Euplectella simplex	145	494
Holascus fibulatus	145	494
Leucosolenia gardineri	43	95
Leucetta pyriformis	148	27
Grantessa zanzibaris	10	55
Grantessa sycilloides	24	73–220
Grantessa glabra	43	95
Sycon munitum	24	73–220
Leuconia wasinensis	45	38
Dercitopsis ceylonica	111	Probably between 73–165
Dercitopsis minor	24, 45	73–220, 38
Yodomia perfecta	157	229
Pachastrella monilifera	112, 152, 153, 157	113, 878, 256, 229
Pœcillastra schulzii	123, 157	256–366, 229
Sphinctrella gracilis	89, 123, 177	193, 256–366, 366
Sphinctrella theneides	152	878
Thenea centrotyla	145	494
Thenea grayi	108	781
Thenea muricata	122	745
Thenea wyvillii	177	366
Stelletta purpurea	53	13·5
Stelletta herdmani	45, 111, 112	38, unknown, 113
Stelletta mauritiana	45	38
Ecionemia acervus	45, 111, 112	38, unknown, 113
Penares intermedia	111	depth unknown
Geodia perarmata	27, 45, 112	37, 38, 113
Geodia globostellifera	43	95
Geodia areolata	24, 27, 45, 53, 145	73–220, 37, 38, 13·5
Geodia sphaeroides	89, 152	193, 878
Pachymatisma bifida	157	229

Name.	Station.	Depth in m.
Erylus ledenfeldi	111	Depth unknown
Chondrilla australiensis	45	38
Chondrosia reniformis	53	13·5
Tetilla cranium	45, 53	38, 13·5
Tetilla oxeata	43	95
Chrotella cavernosa	27, 43	37, 95
Chrotella eurystoma	24, 45	73–220, 38
Paratetilla bacca	45	38
Fangophilina submersa	106	212
Acanthotetilla hemispharica	45	38
Suberites domuncula	175	1618
Suberites ramulosus	43, 54, 157	95, 1046, 229
Suberites kelleri	24	73–220
Pseudosuberites hyalinus	194	220
Laxosuberites longispiculus	157	229
Tentorium semisuberites	108	781
Tentorina sigmatophora	157	229
Polymastia tubulifera	53	13·5
Polymastia murrayi	157, 177, 185	229, 366, 2001
Polymastia clavata	24	73–220
Radiella sarsii	108, 145 E	781–494
Spirastrella cuspidifera	45, 53, 111	38, 13·5, unknown
Spirastrella spinispirulifer	111	73–165
Diplastrella gardineri	111, 117	73–165, 366
Timea capitatostellifera	111	73–165
Timea tethyoides	112	113
Timea spherastraea	111	Depth ?
Trachycladus tethyoides	24	73–220
Trachycladus cervicornis	24	73–220
Placospongia carinata	45	38
Hemiasterella typus	27	37
Hemiasterella complicata	24	73–220
Tethya repens	45, 53, 112, 152	38, 13·5, 113, 878
Discodermia natalensis	111	73–165
Discodermia emarginata	123	256–366
Theonella lacerata	43	95
Theonella discifera	45, 111	38, 73–165
Theonella pulchrifolia	157	229
Corallistes bowerbanki	123	256–366
Taprobane herdmani	27, 45	37, 38
Microscleroderma hirsutum	45	38
Haliclona camerata	10	55
Haliclona cribriformis	53, 111	13·5, 73–165
Haliclona flagellifer	M.B. I (d), 157	26, 229
Haliclona cf. *ochracea*	9	245
Haliclona contignata	10, 24, 111	55, 73–220 (? 73–165)
Haliclona irregularis	24, 111, 157	73–220, 73–165, 229
Haliclona expansa	157	229
Haliclona obtusispiculifera	D	23
Haliclona decidua	110	73–165
Haliclona tabernacula	45	38
Haliclona seychellensis	45, 112	38, 113
Haliclona tuberosa	45	38
Haliclona cerebrum	111	73–165
Haliclona carteri	27, 45	37, 38
Adocia sagittarius	139	57

Name.	Station.	Depth in m.
Adocia fibulatus var. *microsigma*	141	44
Adocia pigmentifera	10	55
Adocia digitata	111	73–165
Adocia cf. *semifibrosa*	27	37
Adocia tufoides	157	229
Petrosia testudinaria	10, 111	55, 73–165
Petrosia mauritiana	111	73–165
Petrosia nigricans	9, 10, 111, 157	245, 55, (? 73–165) 229
Oceanapia putridosum	144	31
Oceanapia fistulosa	45	38
Oceanapia canalis	45	38
Oceanapia elastica	139	57
Oceanapia media	111	73–165
Oceanapia zoologica	111, 112	Unknown, 113
Oceanapia incrustata	11	207
Oceanapia cf. *cagayense*	112	113
Callyspongia diffusa	24, 111	73–220, unknown
Callyspongia subarmigera	M.B. I (d), 45, 111, M.B. (b).	26, 38, 73–165, 29
Callyspongia confædcrata	45, 53	38, 13·5
Callyspongia fibrosa	27, 45, 53	37, 38, 13·5
Callyspongia spinosissima	24, 45, 50, 53	73–220, 38, 1939, 13·5
Callyspongia clathrata	A	65
Callyspongia barodensis	45	38
Callyspongia rowi	45	38
Gelliodes fibulatus	27	37
Biemna fortis	24, 27	73–220, 37
Biemna trirhaphis	10	55
Biemna ciocalyptoides	27	37
Desmacella annexa	122	732
Mycale sulevoidea	M.B. I (d)	26
Mycale murrayi	24	73–220
Mycale sulcata	24, 53, 112	73–220, 13·5, 113
Mycale massa var. *oceanica*	54	1046
Mycale topsenti	54	1046
Hamacantha mindanaensis	152, 157	878, 229
Hamacantha simplex	157	229
Guitarra fimbriata	11, 177	207, 366
Myxilla simplex	24	73–220
Myxilla dendyi	27, 45	37, 38
Lissodendoryx ciocalyptoides	177	366
Lissodendoryx damirioides	54	1046
Lissodendoryx tubicola	54	1046
Ectyodoryx rhaphidiophora	24	73–220
Ectyodoryx coralliophila	54, 157	1046, 229
Hymedesmia murrayi	111	73–165
Phorbas styliferus	24	73–220
Desmapsamma anchorata	111	73–165
Iotrochota baculifera	10, M.B. I (d)	55, 26
Acanthancora stylifera	45	38
Damirina verticillata	112	113
Tedania nigrescens	9, 10, 27	245, 55, 37
Strongylacidon inæqualis	M.B. I (b)	26
Lithoplocamia lithistoides	9, 45	245, 38
Agelas mauritianus	27	37
Clathria frondifera	M.B. I (d)	26
Clathria aculeata	10, M.B. I (d), 45	55, 29, 38

Name.	Station.	Depth in m.
Clathria procera	M.B. I (d), M.B. I (b)	26, 26
Clathria maeandrina	M.B. I (d)	26
Clathria mixta	53	13·5
Clathria spicata	27	37
Clathria transiens	M.B. I (b)	29
Clathria whiteleggii	24, 27, M.B. II (c)	73–200, 37, 29
Clathria spongiosa	9, 27	245, 38
Ophlitaspongia minor	89	193
Microciona affinis	45, 112	28, 113
Microciona longitoxa	24	73–220
Microciona rhopalophora	157	229
Microciona densa	45	38
Microciona longistyla	45	38
Microciona anonyma	111	73–165
Echinodictyum nervosum	53	13·5
Echinodictyum jousseaumei	9	245
Antho taviensis	43, 89	95, 193
Echinoplocamia arbuscula	177	366
Plocamilla manaarensis	89	193
Acarnus topsenti	45	38
Aulospongus tubulatus	27, 53	37, 13·5
Rhabderemia indica	27, 209	37, 366
Endectyon thurstoni	45	38
Hemectyonilla involutum	27, 24, 45, 185	37, 73–220, 38, 2001
Higginsia petrosioides	45	38
Higginsia robusta	27, 35, 45	37, 441, 38
Raspailopsis cervicornis	27, 45, 53, 111	37, 38, 13·5, 73–165
Amorphinopsis megalorhaphis	43, 45, 53, 111	95, 38, 13·5, 73–165
Axinella carteri	53	13·5
Axinella lamellata	45	38
Axinella agariciformis	45	38
Axinella durissima	M.B. I (G), 27, 45, 112	26, 37, 38, 113
Axinella convulosa	112	113
Axinella bidderi	35, 45, 54	441, 38, 1046
Axinella ventilabrum	112	113
Axinella flabello-reticulata	112	113
Axinella dragmaxioides	45	38
Axinella massalis	112	113
Phakellia radiata	9, 27, 45, 89, 111, 112	245, 37, 38, 193, (? 73–165), 113
Hymeniacidon virgultosa	27, 45	37, 38
Hymeniacidon variospiculata	45	38
Ciocalypta penicillus	161	46
Collocalypta digitata	112	113
Sigmaxinella megastyla	24	73–220
Stylissa massa	53	13·5
Stylissa coccinea	53	13·5
Ptilocaulis spiculifera	151	101
Raspaigella salomonensis	112	113
Raspaigella ? suluensis	112	113
Raspaigella dendyi	45, 112	38, 113
Pseudaxinyssa tenuispiculata	45	38
Darwinella simplex	45	38
Aplysina cuplectella	24	73–220
Aplysina mollis	45	38
Aplysina primitiva	111	73–165

Name.	Station.	Depth in m.
Aplysinopsis reticulata	111	Depth unknown
Druinella ramosa	45	38
Megalopastas retiaria	53	13·5
Spongia officinalis	43	95
Spongionella pulvilla	45	38
Spongionella nigra	27, 45	37, 38
Spongionella frondosa	45	38
Psammaplysilla arabica	M.B. I (d)	26
Cacospongia herdmani	45, 53	38, 13·5
Cacospongia symbiotica	45	38
Dysidea fragilis	24, 45, 109	73–220, 38, 640
Dysidea cinerea	112	113
Eurypongia lactea	45	38
Hircinia arenosa	45, 53	38, 13·5
Hircinia aruensis	53	13·5
Carteriospongia cordifolia	45	38

Analysis of Species Obtained by the John Murray Expedition, Showing Depths and Species Obtained.

Station.	Depth in m.	Name.
53	13·5	*Stelletta purpurea.*
		Geodia areolata.
		Chondrosia reniformis.
		Tetilla cranium.
		Spirastrella cuspidifera.
		Tethya repens.
		Haliclona cribriformis.
		Callyspongia confoederata.
		Callyspongia fibrosa.
		Callyspongia spinosissima.
		Mycale sulcata.
		Clathria mixta.
		Echinodictyum nervosum.
		Aulospongus tubulatus.
		Raspailopsis cervicornis.
		Amorphinopsis megalorhaphis.
		Axinella carteri.
		Stylissa massa.
		Stylissa coccinea.
		Megalopastas retiaria.
		Cacospongia herdmani.
		Hircinia arenosa.
		Hircinia aruensis.
M.B. I (d)	23	*Callyspongia subarmigera.*
		Haliclona obtusispiculifera.
M.B. I (d)	26	*Haliclona flagellifer.*
		Mycale sulevoidea.
		Iotrochota baculifera.
		Clathria aculeata.
		Clathria procera.
		Clathria maeandrina.
		Psammaplysilla arabica.

Station.	Depth in m.	Name.
M.B. I (b)	29	*Callyspongia subarmigera.*
		Clathria transiens.
		Clathria procera.
		Strongylacidon inaequalis.
M.B. I (c)	26	*Axinella durissima.*
148	27	*Leucetta pyriformis.*
M.B. II (c)	29	*Clathria whiteleggii.*
144	31	*Oceanapia putridosum.*
27	37	*Geodia perarmata.*
		Geodia areolata.
		Chrotella cavernosa.
		Hemiasterella typus.
		Taprobane herdmani.
		Haliclona carteri.
		Callyspongia fibrosa.
		Gelliodes fibulatus.
		Biemna fortis.
		Biemna ciocalyptoides.
		Myxilla dendyi.
		Tedania migrescens.
		Agelas mauritianus.
		Clathria spicata.
		Clathria whiteleggii.
		Clathria spongiosa.
		Aulospongus tubulatus.
		Rhabderemia indica.
		Hemectyonilla involutum.
		Higginsia robusta.
		Raspailopsis cervicornis.
		Axinella durissima.
		Phakellia radiata.
		Hymeniacidon virgultosa.
		Spongionella nigra.
45	38	*Leuconia wasinensis.*
		Dercitopsis minor.
		Stelletta mauritiana.
		Ecionemia acervus.
		Geodia perarmata.
		Geodia areolata.
		Chondrilla australiensis.
		Tetilla cranium.
		Paratetilla bacca.
		Acanthotetilla hemispharica.
		Spirastrella cuspidifera.
		Placospongia carinata.
		Tethya repens.
		Theonella discifera.
		Taprobane herdmani.
		Microscleroderma hirsutum.
		Haliclona tabernacula.
		Haliclona seychellensis.
		Haliclona tuberosa.
		Haliclona carteri.
		Oceanapia fistulosa.
		Oceanapia canalis.
		Callyspongia subarmigera.

Station.	Depth in m.	Name.
		Callyspongia confœderata.
		Callyspongia fibrosa.
		Callyspongia spinosissima.
		Callyspongia barodensis.
		Callyspongia rowi.
		Acanthancora stylifera.
		Lithoplocamia lithistoides.
		Clathria aculeata.
		Microciona affinis.
		Microciona densa.
		Microciona longistyla.
		Acarnus topsenti.
		Endectyon thurstoni.
		Hemectyonilla involutum.
		Higginsia petrosioides.
		Higginsia robusta.
		Raspailopsis cervicornis.
		Amorphinopsis megalorhaphis.
		Axinella lamellata.
		Axinella agariciformis.
		Axinella durissima.
		Axinella bidderi.
		Axinella dragmaxioides.
		Phakellia radiata.
		Hymeniacidon virgultosa.
		Hymeniacidon variospiculata.
		Raspaigella dendyi.
		Pseudaxinyssa tenuispiculata.
		Darwinella simplex.
		Aplysina mollis.
		Druinella ramosa.
		Spongionella pulvilla.
		Spongionella nigra.
		Spongionella frondosa.
		Cacospongia herdmani.
		Cacospongia symbiotica.
		Dysidea cinerea.
		Hircinia arenosa.
		Carteriospongia cordifolia.
141	44	*Adocia fibulatus* var. *microsigma.*
161	46	*Ciocalypta penicillus.*
10	55	*Grantessa zanzibaris.*
		Haliclona camerata.
		Haliclona contignata.
		Adocia pigmentifera.
		Petrosia nigricans.
		Biemna trirhaphis.
		Iotrochota baculifera.
		Tedania nigrescens.
		Clathria aculeata.
139	57	*Oceanapia elastica.*
		Adocia sagittarius.
A	65–68	*Callyspongia clathrata.*
43	95	*Leucosolenia gardineri.*
		Grantessa glabra.
		Geodia globostellifera.

Station.	Depth in m.	Name.
		Tetilla oxeata.
		Chrotella cavernosa.
		Suberites ramulosus.
		Theonella lacerata.
		Antho tawiensis.
		Amorphinopsis megalorhaphis.
		Spongia officinalis.
151	101	*Ptilocaulis spiculifera.*
112	113	*Stelletta herdmani.*
		Ecionemia acervus.
		Geodia perarmata.
		Timea tethyoides.
		Damirina verticillata.
		Microciona affinis.
		Axinella durissima.
		Axinella conulosa.
		Axinella ventilabrum.
		Axinella flabello-reticulata.
		Axinella massalis.
		Phakellia radiata.
		Collocalypta digitata.
		Raspaigella salomonensis.
		Raspaigella ? suluensis.
		Raspaigella dendyi.
111	.(Uncertain, probably 73–165).	*Dercitopsis ceylonica*
	73–165	*Spirastrella spinispirulifer.*
		Diplastrella gardineri.
		Timea capitatostellifera.
		Discodermia natalensis.
		Theonella discifera.
		Haliclona cribriformis.
		Haliclona contignata.
		Haliclona irregularis.
		Haliclona cerebrum.
		Adocia digitata.
		Petrosia testudinaria.
		Petrosia mauritiana.
		Petrosia nigricans.
		Oceanapia media.
		Callyspongia subarmigera.
		Hymedesmia murrayi.
		Desmapsamma anchorata.
		Microciona anonyma.
		Raspailopsis cervicornis.
		Amorphinopsis megalorhaphis.
		Phakellia radiata.
		Aplysina primitiva.
	(Uncertain)	*Stelletta herdmani.*
		Ecionemia acervus.
		Penares intermedia.
		Erylus lendenfeldi.
		Spirastrella cuspidifera.
		Oceanapia zoologica.
		Callyspongia diffusa.
		Aplysinopsis reticulata.
89	193	*Sphinctrella gracilis.*

Station.	Depth in m.	Name.
		Geodia sphaeroides.
		Ophlitaspongia minor.
		Antho taviensis.
		Plocamilla manaarensis.
		Phakellia radiata.
11	207	*Oceanapia incrustata.*
		Guitarra fimbriata.
106	212	*Fangophilina submersa.*
24	73–220	*Grantessa sycilloides.*
		Sycon munitum.
		Dercitopsis minor.
		Geodia areolata.
		Chrotella eurystoma.
		Suberites kelleri.
		Polymastia clavata.
		Trachycladus tethyoides.
		Trachycladus cervicornis.
		Hemiasterella complicata.
		Haliclona contignata.
		Haliclona irregularis.
		Callyspongia diffusa.
		Callyspongia spinosissima.
		Biemna fortis.
		Mycale murrayi.
		Mycale sulcata.
		Myxilla simplex.
		Ectyodoryx rhaphidiophora.
		Phorbas styliferus.
		Clathria whiteleggii.
		Microciona longiloxa.
		Hemectyonilla involutum.
		Sigmaxinella megastyla.
		Aplysina cuplectella.
		Dysidea fragilis.
157	229	*Farrea spirifera.*
		Yodomia perfecta.
		Pachastrella monilifera.
		Pœcillastra schulzii.
		Pachymatisma bifida.
		Suberites ramulosus.
		Laxosuberites longispiculus.
		Tentorina sigmatophora.
		Polymastia murrayi.
		Theonella pulchrifolia.
		Haliclona flagellifer.
		Haliclona irregularis.
		Haliclona expansa.
		Petrosia nigricans.
		Hamacantha mindanaensis.
		Hamacantha simplex.
		Ectyodoryx coralliophila.
		Microciona rhopalophora.
9	245	*Haliclona* cf. *ochracea.*
		Petrosia nigricans.
		Tedania nigrescens.
		Lithoplocamia lithistoides.

Station.	Depth in m.	Name.
		Clathria spongiosa.
		Echinodictyum jousseaumei.
		Phakellia radiata.
123	256–366	*Pœcillastra schulzii.*
		Sphinctrella gracilis.
		Discodermia emarginata.
		Corallistes bowerbanki.
177	274–366	*Sphinctrella gracilis.*
		Thenea wyvillii.
		Polymastia murrayi.
		Guitarra fimbriata.
		Lissodendoryx ciocalyptoides.
		Echinoplocamia arbuscula.
35	441	*Higginsia robusta.*
		Axinella bidderi.
145 E	494	*Radiella sarsii.*
145	494	*Semperella cucumis.*
		Euplectella simplex.
		Holascus fibulatus.
		Thenea centrotyla.
109	640	*Myliusia verrucosa.*
		Dysidea fragilis.
176	695	*Hyalonema affine.*
122	732	*Pheronema giganteum.*
		Thenea muricata.
108	781	*Aphrocallistes beatrix.*
		Radiella sarsii.
		Tentorium semisuberites.
		Thenea grayi.
152	609–915	*Sarostegia oculata.*
		Pleurochorium arnandalei.
		Pachastrella monilifera.
		Sphinctrella thyneides.
		Geodia sphaeroides.
		Hamacantha mindanaensis.
54	1046	*Sarostegia oculata.*
		Aphrocallistes beatrix.
		Placoplegma solutum.
		Suberites ramulosus.
		Mycale massa var. *oceanica.*
		Mycale topsenti.
		Lissodendoryx damirioides.
		Lissodendoryx tubicola.
		Ectyodoryx coralliophila.
		Axinella bidderi.
119	1207–1463	*Monorhaphis dives.*
42	1415	*Sarostegia oculata.*
175	1618	*Suberites domuncula.*
118	1789	*Monorhaphis* sp.
162	1829	*Farrea occa* subsp. *erecta.*
		Sarostegia oculata.
50	1939	*Callyspongia spinosissima.*
185	2001	*Hemectyonilla involutum.*

Order HEXACTINELLIDA.

Sub-order AMPHIDISCOPHORA.

Family PHERONEMATIDÆ.

Genus *Pheronema* Leidy.

Pheronema giganteum Schulze.

Pheronema giganteum Schulze, 1886 : 66 ; Schulze, 1887 : 250, pls. xlv, xlvi ; Schulze, 1893 : 996 ; Schulze, 1893 : 563 ; Ijima, 1927 ; 10, pl. v, figs. 1–7 ; Okada, 1932 : 6.

OCCURRENCE.—Stn. 122, January 22, 1934, Zanzibar Area (5° 21′ 24″ S., 39° 23′ 00″ E. to 5° 22′ 36″ S., 39° 22′ 18″ E.), 745 m., bottom grey-green mud.

DISTRIBUTION.—Kei Island; Timor; Japan; 204–276 m., blue mud.

Genus *Semperella* Gray.

Semperella cucumis Schulze.

Semperella cucumis Schulze, 1895 : 45, pl. ix, figs. 1–16 ; Schulze, 1902 : 41, pl. viii, figs. 1–16 ; Schulze, 1904 : 103, pls. xx–xxii, pl. xxiv, fig. 1.

OCCURRENCE.—Stn. 145, March 31, 1934, Maldive Area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m., bottom green mud and sand.

DISTRIBUTION.—Andamans; Nicobars ; 296–730 m.

Family MONORHAPHIDÆ.

Genus *Monorhaphis* Schulze.

Monorhaphis dives Schulze.

Monorhaphis dives Schulze, 1904 : 121, pl. xliii, figs. 1–20.

OCCURRENCE.—Stn. 119, January 19, 1934. Zanzibar Area (6° 29′ 24″ S., 39° 49′ 54″ E. to 6° 32′ 00″ S., 39° 53′ 30″ E.), 1204 m.

REMARKS.—The specimen consists of a badly-preserved fragment, but the spiculation puts its identity beyond doubt.

DISTRIBUTION.—Coast of Somaliland ; 1644 m.

Monorhaphis sp.

OCCURRENCE.—Stn. 118, Zanzibar Area (4° 05′ 54″ N., 41° 10′ 12″ E. to 4° 17′ 00″ N., 41° 11′ 48″ E.), 1789 m., bottom globigerina ooze.

REMARKS.—Three spicules were obtained with the following dimensions : 63, 133 and 138 cm. long and 1·5, 3 and 4 mm. diameter at the centre respectively. No body spicules were found.

Family HYALONEMATIDÆ.

Genus *Hyalonema* Gray.

Hyalonema affine Brandt.

Hyalonema affine Brandt, 1857 ; 606 ; Brandt, 1859 : fol. ; Schultze, 1860 : 9 ; Marshall, 1875 : 224 : *H.* (*Stylocalyx*) *apertus* Schulze, 1887 : 59 ; *H. apertum* Schulze, 1887 : 214, pls. xxxvii, xxxviii : Schulze, 1893 : 554 ; Schulze, 1895 : 39, pl. viii, figs. 1–6 ; *H. machrenthali* Schulze, 1895 : 41, pl. viii, figs. 7–11 ; *H. affine reticulatum* Schulze, 1899 : 112 ; *H. affine japonicum* Schulze, 1899 : 112 ; *H. affine* Schulze, 1902 : 27, pl. vii, figs. 1–11 ; *H. apertum* Schulze, 1904 : 91 ; pls. xxvii, xxviii ; *H. apertum machrentali* Ijima, 1927 : 72, pl. ii, fig. 15, pl. iv, figs. 1–8, text-figs. 7–15 ; *H. apertum* Okada, 1932 : 19 ; *H. apertum solidum* Okada, 1932 : 21, pl. i, figs. 1–2.

OCCURRENCE.—Stn. 176, May 2, 1934, Gulf of Aden (12° 04′ 06″ N., 50° 38′ 36″ E.), 695 m., bottom green mud and sand.

REMARKS.—Two poorly preserved specimens represent this species. In both the body is badly damaged, but in one of them the stalk bears an *Actinia* (like that figured by Schulze, 1902, pl. vii, fig. 1a) and below this a *Palythoa*. The body in both specimens is 30 mm. high and the stalk 140 mm. long.

DISTRIBUTION.—Japan ; East Indies ; Indian Ocean (W. of Sumatra, Nicobars, Andamans) ; 204–1886 m., bottom green mud, Pteropod ooze.

Sub-order HEXASTEROPHORA.

Tribe HEXACTINOSA.

Sub-tribe CLAVULARIA.

Family FARREIDÆ.

Genus *Farrea* Bowerbank.

Farrea spirifera Ijima.

Farrea spirifera Ijima, 1927 : 156, pl. xiii, figs. 10–15.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DISTRIBUTION.—Kei Is. ; 595–984 m.

Farrea occa Bowerbank, subsp. *erecta* Ijima.

Farrea occa erecta Ijima, 1927 : 132, pl. x, figs. 1–12, ?13–16.

OCCURRENCE.—Stn. 162, April 10, 1934, Maldive Area (8° 08′ 30″ N., 72° 58′ 00″ E.) 1829 m., bottom grey mud.

DISTRIBUTION.—Between Celebes and the Philippines (several localities) ; 278–1633 m

Genus *Sarostegia* Topsent.

Sarostegia oculata Topsent.

Sarostegia oculata Topsent, 1904 : 4, figs. 1–3 ; Topsent, 1904 : 377 ; *Ramella tubulosa* Schulze, 1904 : 38, pl. xiv, figs. 7–9 ; *Sarostegia oculata* Dendy, 1916 : 219, pl. xlii, figs. 19–31, pl. xliii, figs. 32–36 ; Gravier, 1918 : 20 ; Topsent, 1928 : 87, pl. i, figs. 11–12, pl. iv, fig. 5.

Occurrence.—Stn. 42, October 27, 1933, South Arabian Coast (17° 26′ 00″ N., 55° 49′ 00″ E.), 1415 m., bottom rock and mud ; Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud ; Stn. 152, April 4, 1934, Maldive Area (4° 49′ 00″ N., 72° 46′ 30″ E. to 4° 48′ 00″ N., 72° 40′ 00″ E.), 878 m., bottom green sand ; Stn. 153, April 4, 1934, Maldive Area (4° 45′ 36″ N., 72° 52′ 12″ E. to 4° 42′ 36″ N., 72° 50′ 24″ E.), 256 m. ; Stn. 162, April 10, 1934, Maldive Area (8° 08′ 30″ N., 72° 58′ 00″ E.), 1829 m., bottom grey mud.

Distribution.—Cape Verde Islands, 598–1694 m. (Topsent, Schulze) ; off Sumatra, 677 m. (Schulze) ; Seychelles, 823 m. (Dendy) ; Maldives, 256–1829 m. (Murray Expedition).

Sub-tribe Scopularia.

Family Euretidæ.

Genus *Pleurochorium* Schrammen.

Pleurochorium annandalei (Kirkpatrick).

Eurete annandalei Kirkpatrick, 1908 : 21, pl. i, figs. 1–13 ; *Pleurochorium annandalei* Ijima, 1927 : 196 ; *P. amandelei* (err.), Ijima, 1927 : 368.

Occurrence.—Stn. 152, April 4, 1934, Maldive Area (4° 49′ 00″ N., 72° 46′ 30″ E. to 4° 48′ 00″ N., 72° 40′ 00″ E.), 878 m., bottom green sand.

Distribution.—Off Ceylon (925 and 1207 m.).

Genus *Myliusia* Gray.

Myliusia verrucosa Ijima.

Myliusia verrucosa Ijima, 1927 : 217, pl. xxiv, figs. 17–19.

Occurrence.—Stn. 109, January 13, 1934, Zanzibar Area (5° 10′ 36″ S., 39° 33′ 48″ E.), 640 m., light grey mud.

Distribution.—Sulu Archipelago ; 564 m.

Family Aphrocallistidæ.

Genus *Aphrocallistes* Gray.

Aphrocallistes beatrix Gray.

Aphrocallistes beatrix Gray, 1858 : 224 ; Gray, 1858 : 115, pl. xi ; Gray 1867 : 507 ; Thomson, 1868 : 119 ; *Iphiteon beatrix* Bowerbank, 1869 : 325 ; *Aphrocallistes bocagei* Wright, 1870 : 77, pl. i ; Kent, 1870 : 248 ; Schmidt, 1870 : 17, pl. ii, figs. 1, 11, 12 ; Carter, 1873 : 358 ; *A. beatrix* Carter, 1873 : 359 ; *A. bocagei* Marshall, 1875 : 150, pl. xiv, figs. 42–45 ; Marshall, 1876 : 124 ; Schmidt, 1880 : 48, pl. vii, fig. 5 ; *A. beatrix* Priest, 1884 : 12, pl. ii, figs. 14–15 ; *A. bocagei* Schulze, 1886 : 74 ; *A. beatrix* Schulze, 1886 : 75 ; *A. ramosus* Schulze, 1886 : 75 ; *A. beatrix* Schulze, 1887 : 311, pl. lxxxiv, figs. 9–10 ; *A. bocagei* Schulze, 1887 : 313, pl. lxxxii, pl. lxxxiv, figs. 1–8 ; *A. ramosus* Schulze, 1887 : 319, pl. lxxxvi ; *A. bocagei* Kirkpatrick, 1889 : 446 ; Topsent, 1892 : 32 ; *A. ramosus* Topsent, 1892 : 32, pl. v, fig. 12, pl. vii, fig. 10 ; *A. beatrix* Schulze, 1896 : 68, pl. vii, figs. 1–13 ; *A. ramosus* Schulze, 1896 : 76, pl. vii, fig. 14 ; *A. bocagei* Schulze, 1896 : 78, pl. viii, figs. 1–11 ; Schulze, 1899 : 85 ; *A. vastus* Schulze, 1896 : 86, pl. xviii, fig. 3 ; *A. beatrix* Schulze 1900 : 38 ; *A. bocagei* Schulze, 1900 : 39 ; *A. beatrix* Schulze, 1902 : 87, pl. xv, figs. 1–13 ; *A. bocagei* Schulze, 1902 : 93, pl. xvi ; *A. ramosus* Schulze, 1902 : 97, pl. xv, fig. 14 ; *A. beatrix* Schulze, 1904 : 48, pls. xi–xiii, pl. xiv, figs. 1–6 ; *A. bocagei* Topsent, 1904 : 48 ; *A. beatrix* Stephens, 1915 : 430 ; *A. beatrix orientalis* Ijima, 1916 : 173 ; *A. beatrix* Arneson, 1920 : 10 ; Dendy and Burton, 1926 : 226 ; Ijima, 1927 : 286, pl. xxiv, figs. 20–30, pl. xxv, text-fig. 35 ; Burton, 1928 : 15 ; Topsent, 1928 : 95 ; Burton and Rao, 1932 : 302 ; *A. beatrix orientalis* Okada, 1932 : 51, pl. iv, fig. 1.

Occurrence.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud ; Stn. 108, January 13, 1934, Zanzibar Area (5° 18′ 06″ N., 39° 24′ 12″ E. to 5° 14′ 30″ N., 39° 25′ 36″ E.), 781 m., bottom grey mud.

Remarks.—Examples of this species occur commonly in deep-sea dredgings, probably more frequently than any other Hexactinellid. The geographical range is within the limits of approximately 5° S. and 50° N., except in the Atlantic where (Burton, 1928) it has been recorded for the Greenland-Iceland area.

Distribution.—Atlantic (Greenland, Iceland, SW. Ireland, Azores, Bermuda, West Indies, Morocco, Canaries, Cape Verde Islands, St. Helena, St. Paul, Ascension Is.) ; Indian Ocean (off Bombay, Bay of Bengal, Nicobars, Andamans, Mergui) ; Dutch East Indies ; Pacific (Philippines, Japan) ; 164–1966 m.

Tribe Lyssacinosa.

Family Leucopsacasidæ.

Genus *Placoplegma* Schulze.

Placoplegma solutum Schulze.

Placoplegma solutum Schulze, 1896 : 63, pl. vi, figs. 11–17 ; Schulze, 1897 : 544 ; Schulze, 1902 : 80, pl. xiv, figs. 11–17 ; Ijima, 1898 : 43 ; Schulze, 1904 : 28, pl. vii.

Occurrence.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

Distribution.—Dar-es-Salaam ; Bay of Bengal (12° N., 90° E.) ; 2925–3008 m.

Family Euplectellidæ.

Genus *Euplectella* Owen.

Euplectella simplex Schulze.

Euplectella simplex Schulze, 1896 : 15, pl. ii, figs. 1–13 ; Schulze, 1902 : 51, pl. x, figs. 1–13 ; Schulze, 1904 : 21, pl. iv, figs. 4–5.

Occurrence.—? Stn. 145, March 31, 1934, Maldive Area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m., bottom green mud and sand.

Distribution.—Zanzibar ; Andamans ; W. of Sumatra ; 402–1668 m., bottom blue mud.

Genus *Holascus* Schulze.

Holascus fibulatus Schulze.

Holascus fibulatus Schulze, 1886 : 40 ; Schulze, 1887 : 87, pl. xv, figs. 1–5, pl. xvi ; Schulze, 1896 : 10 ; Schulze, 1904 : 8.

Occurrence.—Stn. 145, March 31, 1934, Maldive Area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m.

Distribution.—Dar-es-Salaam ; between Kerguelen and South Africa ; South of Australia ; 2516–2959 m., bottom Globigerina ooze, Diatom ooze, red clay.

Order CALCAREA.

Family Homocœlidæ.

Genus *Leucosolenia* Bowerbank.

Leucosolenia gardineri Dendy.

Leucosolenia gardineri Dendy, 1913 : 2, pl. i, figs. 1–2, pl. iii, figs. 1–3 ; Dendy and Row, 1913 : 725 ; *L. gardineri*, var. *vergensis* Kumar, 1924 : 21.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Distribution.—Indian Ocean ; 18–25 m.

Family Leucascidæ.

Genus *Leucetta* Haeckel.

Leucetta pyriformis Dendy.

Leucetta pyriformis Dendy, 1913 : 11, pl. i, fig. 7, pl. iv, fig. 3 ; Dendy and Row, 1913 : 734.

Occurrence.—Stn. 148, April 3, 1934, Maldive Area (4° 53′ 12″ N., 72° 54′ 30″ E. to 4° 51′ 24″ N., 72° 53′ 06″ E.), 27 m., bottom soft cream mud.

Distribution.—Cargados Carajos ; 82 m.

Family Heteropiidæ.

Genus *Grantessa* Lendenfeld.

Grantessa zanzibaris Jenkin.

Grantessa zanzibaris Jenkin, 1908 : 449, figs. 98–102 ; *G. zanzibarensis* Dendy and Row, 1913 : 753.

Occurrence.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.

Distribution.—Zanzibar ; 11–15 m.

Grantessa glabra Row.

Grantessa glabra Row, 1911 : 203, pl. xix, fig. 6 ; Dendy and Row, 1913 : 752.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Distribution.—Red Sea.

Grantessa sycilloides (Schuffner).

Sycortis sycilloides Schuffner, 1877 : 420, pl. xxv, fig. 10 ; *Grantessa sycilloides* Dendy and Row, 1913 : 753.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shells.

Remarks.—It is probable that *Grantessa glabra* Row, from the Red Sea, is synonymous with *G. sycilloides*.

Distribution.—Mauritius.

Family Sycettidæ.

Genus *Sycon* Risso.

Sycon munitum Jenkin.

Sycon munitum Jenkin, 1908 : 443, fig. 91 ; Dendy and Row, 1913 : 747.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

Distribution.—Zanzibar ; 13 m.

Genus *Leuconia* Grant.

Leuconia wasinensis (Jenkin).

Leucilla wasinensis Jenkin, 1908 : 454, fig. 104 ; *Leucandra wasinensis* Dendy, 1913 : 24, pl. ii, fig. 5 ; Dendy and Row, 1913 : 772.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—East Africa (Wasin) ; Saya da Malha ; 11–100 m.

Order TETRAXONIDA.

Sub-order Homosclerophora.

Family Plakinidæ.

Genus *Dercitopsis* Dendy.

Dercitopsis ceylonica Dendy.

Dercitopsis ceylonica Dendy, 1905 : 66, pl. ii, fig. 1.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain (probably between 73 and 165 m.).

Distribution.—Ceylon, 182 m.

Dercitopsis minor Dendy.

Dercitopsis minor Dendy, 1916 : 229, pl. xliv, fig. 1, pl. xlv, fig. 1 ; Dendy and Frederick, 1924 : 489.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shell ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Cargados Carajos, Amirante, Egmont Reef); 55–80 m.; Western Australia (Abrolhos Island).

Sub-order STREPTASTROSCLEROPHORA.

Family PACHASTRELLIDÆ.

Genus *Yodomia* Lebwohl.

Yodomia perfecta Dendy.

Yodomia perfecta Dendy, 1916 : 232, pl. xliv, fig. 2, pl. xlv, fig. 3.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Saya de Malha); 273 m.

Genus *Pachastrella* Schmidt.

Pachastrella monilifera Schmidt.

Pachastrella monilifera Schmidt, 1868 : 15, pl. iii, fig. 7; *P. abyssi* Schmidt, 1870 : 64, pl. vi, fig. 4; Carter, 1876 : 407; Schmidt, 1880 : 68; Sollas, 1888 : 104, pl. x, fig. 5, pl. xi, figs. 1–31; *P. monilifera* Sollas, 1888 : 110; Topsent, 1892 : 41; Topsent, 1894 : 380, pl. xv, fig. 4; *P. ovisternata* Lendenfeld, 1894 : 439, pl. i, figs. 1–3; *P. monilifera* Topsent, 1901 : 343; 1902 : 346; *P. caliculata* Kirkpatrick, 1902 : 227, pl. ii, fig. 4, pl. iii, fig. 4; *P. isorrhopa* Kirkpatrick, 1902 : 228, pl. ii, fig. 5, pl. iii, fig. 5; *P. monilifera* Lendenfeld, 1903 : 75; *P. ovisternata* Lendenfeld, 1903 : 75; *P. monilifera* Topsent, 1904 : 92, pl. ii, fig. 2; *P. chuni* Lendenfeld, 1906 : 238, pl. xxxviii, figs. 2–45; *P. caliculata* Lendenfeld, 1906 : 243, pl. xxxix, figs. 1–13; *P. monilifera* Topsent, 1913 : 609; Ferrer, 1914 : 7; *P. ovisternata* Ferrer, 1914 : 7; *P. monilifera* Stephens, 1915 : 13; Babić, 1921 : 92; Babić, 1922 : 285, fig. U; Burton, 1926 : 9; Topsent, 1928 : 132.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock; Stn. 152, April 4, 1934, Maldive Area (4° 49′ 24″ N., 72° 46′ 30″ E. to 4° 48′ 42″ S., 72° 40′ 30″ E.), 878 m., bottom green sand; Stn. 153, April 4, 1934, Maldive Area (4° 45′ 36″ N., 72° 52′ 12″ E. to 4° 42′ 36″ N., 72° 50′ 24″ E.), 256 m.; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

REMARKS.—Except that the larger megascleres, in the specimens from Stn. 157, have the ends of the cladi more commonly bifid than usual, these specimens are fairly representative. Through them, the recorded distribution of the species is carried into the Indian Ocean for the first time, apart from the specimens found off South Africa.

DISTRIBUTION.—Atlantic Ocean (SW. Ireland, Spain, Portugal, Morocco, Azores, Madeira, Canaries, West Africa, South Africa, Tristan da Cunha, Gough Is.); Mediterranean; Natal; 61–2165 m.; bottom rock, sand, mud, gravel or broken shells.

Genus *Pœcillastra* Sollas.

Pœcillastra schulzii (Sollas).

Normania schulzii Sollas, 1886 : 185; *N. laminaris* Sollas, 1886 : 186; *N. tenuilaminaris* Sollas, 1886 : 186; *Pœcillastra schulzei* Sollas, 1888 : 79, pl. ix, figs. 1–29; *P. laminaris* Sollas, 1888 : 84; *P. tenuilaminaris* Sollas, 1888 : 85, pl. v, figs. 17–18; *Pachastrella schulzii*, Lendenfeld, 1903 : 77; *P. laminaris* Lendenfeld, 1903 : 78; *P. tenuilaminaris* Lebwohl, 1914 : 72, pl. vii, figs. 16–25, pl. ix, fig. 21; Dendy, 1916 : 230, pl. xlv, fig. 2; *Pœcillastra tenuilaminaris* Dendy and Burton, 1926 : 238.

OCCURRENCE.—Stn. 123, January 22, 1934, Zanzibar Area (5° 19′ 00″ S., 39° 32′ 30″ E. to 5° 19′ 12″ S., 39° 33′ 30″ E.), 256–366 m., bottom green mud, sand and rock; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Amirante, Andamans, Mergui Archipelago); Heard Island; Amboina; Pacific Ocean (Japan and east of the Philippines); 73–1829 m.

Genus *Sphinctrella* Schmidt.

Sphinctrella gracilis Sollas.

Sphinctrella gracilis Sollas, 1888 : 89, pl. xiii, figs. 1–2; Topsent, 1902 : 12; *Pachastrella gracilis* Lendenfeld, 1903 : 74; *Sphinctrella gracilis* Topsent, 1904 : 88, pl. iv, fig. 2; Topsent 1928 : 131.

OCCURRENCE.—Stn. 89, December 7, 1933, Northern area of Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shells and rock; Stn. 123, January 22, 1934, Zanzibar Area (5° 19′ 00″ S., 39° 32′ 30″ E. to 5° 19′ 12″ S., 39° 33′ 30″ E.), 256–366 m., bottom green mud, sand and rock; Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

REMARKS.—There are three typical specimens, 10, 20 and 60 mm. across respectively. The smallest resembles closely the specimen figured by Topsent (1904), and the largest is closely similar in external form to *Thenea fenestrata* Sollas, with a flattened, discoidal form and a series of equatorial pore-recesses.

DISTRIBUTION.—Azores, Madeira, Cape Verde Is.; 182–1229 m.

Sphinctrella theneides sp. n.

(Text-fig. 1.)

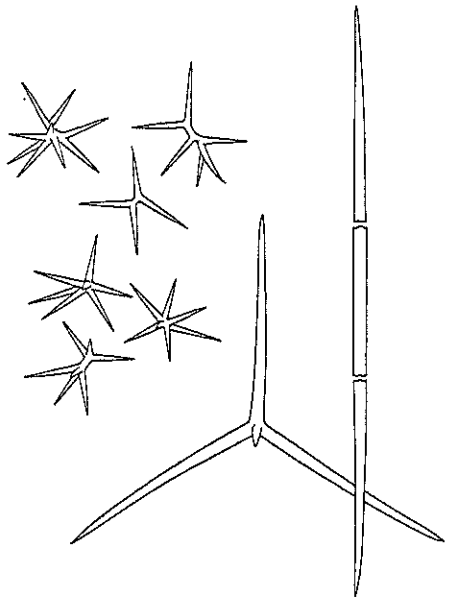
HOLOTYPE.—B.M. 1936.3.4.313.

OCCURRENCE.—Stn. 152, April 4, 1934, Maldive Area (4° 49′ 24″ N., 72° 46′ 30″ E. to 4° 48′ 42″ N., 72° 40′ 30″ E.), 878 m., bottom green sand.

DIAGNOSIS.—Sponge subspherical; surface hispid; oscules and pores in equatorial recesses at opposite sides of body, each protected by a fringe of long spicules; texture firm; colour, in spirit, pale yellowish-brown; skeleton of radially-arranged oxea, with a subectosomal layer of short-shafted orthotriænes, more rarely dichotriænes; microscleres streptasters of two sizes.

Spicules:

oxea, 6·0–8·0 by 0·04–0·056 mm.,
orthotriænes, cladi 0·48–0·8 by 0·032–0·05 mm., shaft of same length or slightly longer,
dichotriænes, rare, of similar dimensions,
streptasters 0·022–0·05 mm. across, larger with 4–5 rays.



TEXT-FIG. 1.—*Sphinctrella theneides* sp. n. Oxeote, ×50 and orthotriæne ×50, with group of streptasters, ×500.

Family THENEIDÆ.

Genus *Thenea* Gray.

Thenea Gray, 1867 : 541 ; *Tisiphonia* Thomson, 1869 : 712 ; *Dorvillia* Kent, 1870 : 293 ; *Wyvillethomsonia* Wright, 1870 : 80 ; *Dorvilia* Poctâ, 1883 : 382 ; *Clavellomorpha* Hansen, 1885 : 19 ; *Thisiphonia* Ledenfeld, 1887 : 563 ; *Theuca* Lundbeck, 1907 : 559.

GENOTYPE.—*Tethea muricata* Bowerbank, 1864 : 25, figs. 35, 304, 305.

DIAGNOSIS.—Theneidæ with radially-arranged oxea and long-shafted triænes ; microscleres metasters ; with special pore-areas.

REMARKS.—In dealing with the species belonging to the genus *Thenea*, it becomes quickly apparent that the differences between them are comparatively slight. Previous writers have tended to base their diagnoses on differences in (*a*) shape and size of the microscleres, (*b*) shape and size of the megascleres, and (*c*) external form, in this order of importance.

Of the first, the shape and size of the microscleres, it is only too obvious, when a comparative survey is made, that the microscleres of the various species of *Thenea* are much more closely alike than those of, say, the genus *Stelletta*. There are differences in size, but comparatively little difference in shape. Even the presence or absence of spines on the rays is a matter of doubtful importance, as we know by analogy with other genera

of Tetraxonida and with the Hexactinellida. As to size, we find that this varies sufficiently to make it almost worthless in the definition of species. It has been shown, again and again, by various writers, that the microscleres of all Tetraxonida not only vary in size, but that whole categories of spicules may be absent from some parts of an individual sponge, or may be completely lacking in a given individual.

The same remarks may be made of the megascleres which, unlike those of *Stelletta* and other such genera, are remarkably uniform, consisting of oxea, dichotriænes, anatriænes and protiænes.

The external form, however, does offer a possible basis for distinction, as its characters appear to be comparatively stable. It seems possible, therefore, that using, primarily, the external characters, supplemented by details of spiculation, we shall arrive at the most satisfactory basis for classification of this genus.

Before passing to consideration of the species of *Thenea*, it may be useful to consider the range of variation in both size and shape of the spicules. Lendenfeld (1906, p. 222) records that in the two specimens of his *Thenea microclada*, one had streptasters (die grossen Metaster) 0·15–0·29 mm. across, and the other, 0·27–0·4 mm. across. This is a significant record, and one which I followed up by examining the accumulated material of *T. muricata* in the British Museum collection. Using only specimens from the coast of Norway, the type-locality of the species, I found that, in specimens otherwise readily identifiable as *T. muricata* (Bowerbank), the size and shape of the larger streptasters varied considerably. The first six observations were as follows :

Specimen.	Small streptasters. (mm.)	Large streptasters. (mm.)
The holotype	0·021–0·031 across	Absent.
B.M. 10.1.1.1127	0·021–0·028 ,,	R 0·05–0·08 across.
B.M. 10.1.1.1119	0·02–0·035 ,,	C 0·07–0·48 ,,
B.M. 94.11.16.120	0·03–0·035 ,,	R 0·06–0·14 ,,
B.M. 10.1.1.746.iii	0·007–0·02 ,,	C 0·05–0·1 ,,
B.M. 10.1.1.834	Absent	Absent.

(R = rare ; C = Common.)

Not only do the dimensions vary but the characters of the spicules do also. Thus, in some large streptasters, with rays of equal length, the thickness varies perceptibly. In some instances, the rays of the larger streptasters are strongly microspined instead of smooth.

Turning to the rest of the skeleton, and to the morphology, we find that, in addition to variation in size, the following may be found :

(1) The dichotriænes may be replaced by a varying but usually small quantity of plagiotriænes ; but in one specimen the large triænes were exclusively plagiotriænes.

(2) The anatriænes and less commonly the protriænes, may be differentiated into two categories.

(3) The sponge, while usually attached to the substratum by a root-tuft and ropes of long spicules, may, in rare instances, be attached direct to a stone. This may lead to a deformity in shape of the sponge.

(4) The oscules may be single, numerous but small, or converted into irregular crypts similar to the equatorial poriferous crypts. The increase in number of the oscules is usually, t not always, correlated with increase in size, and especially with a dorso-ventral flatten-

ing of the sponge. The formation of osculiferous crypts, in some cases, at all events, appears to be due to malformation of the sponge body (see 3 above), or to the presence of smothering algæ, or organic débris.

(5) The hispidation of the surface may be very much developed (cf. Lendenfeld, 1906, pl. xxi, fig 6, *T. mesotriæna*) or the specimens may appear practically non-hispid, almost smooth, without any equatorial fringe. But of a hundred or more specimens examined, the great majority showed little obvious hispidation apart from the fringe around the oscules and the equatorial crypts.

(6) The body of the sponge tends to flatten and the oscules to multiply in number with the size of the specimen.

Using the external form as the basis for specific identification the position can be expressed as in Text-fig. 2 and in the key on page 187. Both represent however, an ideal situation. In practice there are difficulties which can be but sparingly dealt with in print. For example, the smallest specimens (presumably juvenile) of all species are very similar no matter from which part of the world they come. The body is rounded, usually surmounting a proportionately long stalk, with a pair of crypts at opposite sides of the body. Presumably these crypts are poral and oscular respectively. A typical example is seen in Lendenfeld (1906, pl. xxiii, fig. 39) and in the same work (pl. xxii, figs. 11, 12) young specimens can be seen still attached to the parent. With further growth, so it would seem, changes in shape take place producing the characters exemplified in Text-fig. 2.

The next difficulty lies in the fact that the shapes given in Text-fig. 2 are only rarely attained in this definite form. Either by some slight variation, more often by some distortion as a result of preservation, the ideal characters tend to be masked. Thus, in a jar of some 20 *Thenea grayi* in the British Museum collection only two or three approach the typical form shown in Text-fig. 2. For the rest, some are so damaged that specific morphological characters are indefinable, in others the equatorial crypts extend in places into the upper surface producing an appearance deceptively like that of some specimens of *T. muricata*, where the oscules may be in oscular crypts (as in *T. valdiviæ* Lendenfeld, 1906, pl. xviii, fig. 11). If then, instead of a group of 20 specimens, the collector had in this case brought back one only, identification might have been rendered difficult if not impossible. Or the subsequent determination might have been misleading.

There is a third difficulty. The spiculation, as regards both megascleres and microscleres, is comparatively uniform throughout the genus. So long as the known specimens numbered a few scores it was possible to note and use the small variations in spicular characters. Now, when the British Museum collections alone run into hundreds, the variation and gradations to be found in the total range of recorded specimens are such that we may say for all practical purposes that the spiculation is uniform throughout the genus. Identification must therefore depend upon external characters correlated, where these characters are distorted, with geographical distribution.

The five species, if such they be, listed on p. 187, have a well ordered distribution, which is consistent with what is known of the distribution of sponges generally. Thus, *T. centrotyla* is recorded from the eastern and southern Indian Ocean; *T. grayi*, from the Indian Ocean, Philippines, and Australia. *T. wyvillii*, from the Philippines; *T. fenestrata*, from the Galapagos area, Florida and West Africa and *T. muricata* from the North Atlantic, Arctic Ocean and Japan. There is, therefore, nothing in their distribution to suggest that this grouping is unreasonable.

The typical characters of the 5 species are illustrated in the following key:

KEY TO THE SPECIES OF THENEA.

1	Oscules equatorial, set in a cribriform pit at opposite side of body from pore-bearing crypt	2
	Oscules apical	3
2	Skeleton includes microxea	*centrotyla*
	Skeleton without microxea	*grayi*
3	Oscules small, or situated in an irregular apical cribriform crypt	4
	Oscules in a large shallow depression	*wyvillii*
4	Body dorso-ventrally flattened, with an equatorial series of small pore-bearing crypts	*fenestrata*
	Body usually subspherical, rarely dorso-ventrally flattened, and pore-bearing crypts more or less continuous	*muricata*

Thenea centrotyla Lendenfeld.

Thenea centrotyla Lodenfeld, 1906 : 184, pl. xx, figs. 26–31 ; *T. corallophila* Dendy and Burton, 1926 : 232, fig. 3 ; *T. andamanensis* Dandy and Burton, 1926 : 235, fig. 4.

OCCURRENCE.—Stn. 145, March 31, 1934, Maldive Area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m., bottom green mud and sand.

DIAGNOSIS.—Sponge subspherical, with upper surface flattened; oscular and poral recesses situated equatorially and at opposite ends of the body; surface hispid; texture firm; colour, in spirit, light greyish-brown to brown; skeleton of radially-arranged oxea, dichotriænes, anatriænes, of which there may be more than one category, large protriænes and small promesotriænes; microscleres streptasters, triacts and microxea.

Spicules:

oxea, 6·8–7·6 by 0·068–0·08 mm.,
oxea, 4·5 by 0·017 mm.,
dichotriænes, cladome 2·4–2·8 mm. across, rhabdome 4·2–5·8 by 0·07 mm. across.
anatriænes, large, cladi 0·1–0·3 mm. chord, rhabdome 6·8 by 0·013–0·03 mm.,
anatriænes, small, cladi 0·017–0·03 mm. chord, rhabdome 6·8 by 0·009–0·01 mm.,
protriænes, cladi 0·6–0·8 mm. long, rhabdome 3·6–6·2 by 0·085–0·1 mm.,
promesotriænes, cladi 0·17–0·28 mm. long, rhabdome 8·0–8·5 by 0·034–0·04 mm.,
streptasters, 0·024–0·1 mm. long, passing with no clear distinction into tetracts, triacts and diacts with rays 0·07–0·3 by 0·007–0·016 mm.,
microxea, usually centrotylote, 0·16–0·45 by 0·005–0·016 mm.

DISTRIBUTION.—SW. of Ceylon; Andamans; New Amsterdam Is. (southern Indian Ocean); 738–2414 m.

REMARKS.—*Thenea corallophila* and *T. andamanensis* differ, according to Dendy and Burton, in the presence of a root-tuft and minute short-shafted surface anatriænes in *T. andamanensis*, and the much greater abundance of the larger triacts and dichotracts and the smaller size of the microxea in that species. In view of our present knowledge of the range of variation in species of *Thenea*, neither of these seems to present adequate grounds for specific distinction. Further, re-examination of the types has shown that spicules v, t, s, w, of Text-fig. 4 (*T. corallophila*) are also present in *T. andamanensis*, although rare. Moreover, there seems to have been an error in the measurement of the microxea of *T. corallophila*, which are rarely more than 0·25 mm. long.

[Although *T. fenestrata* has not been recorded for the Indian Ocean, its inclusion here makes complete the revision of the genus *Thenea*.]

Thenea fenestrata (Schmidt).

Tisiphonia fenestrata Schmidt, 1880 : 71, pl. x, fig. 2 ; *Thenea fenestrata* Sollas, 1886 : 185 ; *T. wrightii* Sollas, 1886 : 185 ; Sollas, 1888 : 63, pl. viii, figs. 11–20 ; *T. fenestrata* Sollas, 1888 : 71, pl. viii, figs. 1–8 ; *Ancorina* (*Thenea*) *fenestrata* Lendenfeld, 1903 : 55 ; *A.* (*T.*) *wrightii* Lendenfeld, 1903 : 58 ; *Thenea fenestrata* Wilson, 1904 : 88, pl. xiii, figs. 2–4, 6–7, 9 ; *T. echinata* Wilson, 1904 : 91, pl. xii, figs. 1–9 ; *T. lamelliformis* Wilson, 1904 : 95, pl. xii, figs. 10–13, pl. xiii, fig. 1 ; *T. pyriformis* Wilson, 1904 : 98, pl. xiii, figs. 5, 8, 10, 11.

Diagnosis.—Sponge irregularly discoidal, with equatorial pore-recesses and with one or more small oscules on upper surface ; surface even, hispid ; texture firm ; colour, in spirit yellowish- to whitish-grey or brown ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes occasionally with tylota ; microscleres streptasters, sometimes of two distinct sizes.

Spicules :

oxea, sometimes differentiated into two sizes 0·5–0·9 by 0·012–0·07 mm.,
dichotriænes, cladome 1·6–2·7 mm. across, rhabdome 3·1–6·0 by 0·03–0·1 mm.,
antriænes, cladi 0·1–0·2 mm. chord, rhabdome 0·4–0·7 mm. long by 0·01–0·03 mm. thick,
anatriænes, of root-tuft, cladi 0·085–0·25 mm. chord, rhabdome (very long ?) by 0·02 mm. thick,
protriænes (sometimes absent, or replaced by tylota), cladi 0·5–0·8 mm. long, rhabdome 4·0–6·0 by 0·05–0·1 mm.,
streptasters, of two sizes, with larger streptasters sometimes scarce or even absent, 0·028–0·047 and 0·07–0·35 mm. across (largest microscleres being triacts, tetracts or pentacts).

Distribution.—Galapagos Islands ; Pacific coasts of Mexico and South America ; West Indies ; Brazil ; West Africa ; 900–4115 m. ; bottom mud, ooze or sand.

Remarks.—According to the findings of Schmidt, Sollas and Wilson, the range of *T. fenestrata* includes the tropical Atlantic, from Africa to America, and also the tropical eastern Pacific. *T. wrightii*, also from the tropical eastern Pacific, differs from *T. fenestrata* in comparatively minor details, the most obvious of which is the presence of tylota (? modified protriænes) instead of protriænes. *T. echinata*, also from the eastern tropical Pacific differs from *T. fenestrata* in unimportant differences in the spiculation and in minor differences in the oscular and equatorial fringes, and the same is true for *T. lamelliformis* from the same region.

Thenea grayi Sollas.

Thenea grayi Sollas, 1886 : 183 ; Sollas, 1888 : 65, pl. vi, figs. 21–22 ; *T. malindiæ* Lendenfeld, 1906 : 179, pl. xx, figs. 22–24 ; *T. microspina* Lendenfeld, 1906 : 180, pl. xx, fig. 21 ; *T. nicobarensis* Lendenfeld, 1906 : 181, pl. xx, figs. 18–20 ; *T. rotunda* Lendenfeld, 1906 : 189, pl. xx, fig. 25 ; *T. multiformis* Lendenfeld, 1906 : 217, pl. xxiii, figs. 1–21 ; *T. tyla* Lendenfeld, 1906 : 219, pl. xx, figs. 36–38 ; *T. megaspina* Lendenfeld, 1906 : 223, pl. xxi, figs. 16–22, pl. xxii, figs. 1–5 ; *T. grayi* Wilson, 1925 : 278, pl. xlv, figs. 1–2 ; *T. grayi*, var. *sulcata* Wilson, 1925 : 280.

Occurrence.—Stn. 108, January 13, 1934, Zanzibar Area (5° 18′ 06″ S., 39° 24′ 12″ E. to 5° 14′ 30″ S., 39° 25′ 36″ E.), 781 m., bottom grey mud.

Diagnosis.—Sponge subspherical or ovate to irregularly subspherical, with poral and oscular recesses situated more or less equatorially and at opposite sides of body ; surface hispid ; texture firm ; colour, in spirit, greyish-white to light brown ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes ; microscleres streptasters of three sizes.

Spicules :

oxea, 3·0–11·0 by 0·02–0·07 mm.,
dichotriænes, cladome 1·3–3·2 mm. across, rhabdome 2·2–5·8 by 0·03–0·1 mm.,
anatriænes, cladi 0·025–0·23 mm. chord, rhabdome 11·0 by 0·006–0·025 mm.,
anatriænes, of root tuft, cladi 0·035–0·09 mm. chord, rhabdome 4·0–10·3 by 0·004–0·018 mm.,
protriænes, cladi 0·2–1·0 mm. long, rhabdome 4·0–8·0 by 0·08–0·1 mm.,
streptasters, 0·015–0·036 mm. across, divided by size into three groups.

Distribution.—East Africa, southern Indian Ocean, Nicobars ; eastern Australia (off Sydney) ; Philippines ; 400–3548 m. ; bottom green mud.

Remarks.—The specimens included under this heading can be segregated into two groups, that named *T. grayi* by Sollas and Wilson, from eastern Australia and the Philippines, and those described by Lendenfeld (1906) from the southern half of the Indian Ocean (from East Africa to the Nicobars) under seven different names. Yet all have a similar external form, with poral and oscular recesses equatorial and at opposite ends of the body, and all have the streptasters divided into groups of three sizes. There are, of course, differences in the size of the spicules, but the general occurrence of these two well-marked features leaves little doubt that all represent a single species.

Thenea muricata (Bowerbank).

Tethea muricata Bowerbank, 1858 : 308, pl. xxv, fig. 18 ; Bowerbank, 1862 : 782, pl. xxxi, figs. 14, 15 ; Bowerbank 1864 : 25, figs. 35, 304, 305 ; Gray, 1867 : 541 ; Bowerbank, 1868 : 131 ; *Wyvillethomsonia wallichii* Wright, 1870 : 80, pl. ii ; *Dorvillia* agariciformis Kent, 1870 : 293, pl. 66 ; *Tisiphonia agariciformis* Schmidt, 1870 : 68 ; *Dorvillia agariciformis* Kent, 1871 : 37 ; ? *Hyalonema parvum* Sars, 1872 : 73 ; *Tethya agariciformis* Kent, 1872 : 211 ; *Tethea muricata* Bowerbank, 1872 : 115, pl. v, figs. 1–6 ; *Tisiphonia agariciformis* Thomson, 1873 : 74, fig. 7 ; Whiteaves, 1874 : 211 ; *Dorvillia echinata* Verrill, 1874 : 501 ; *Tethea muricata* Carter, 1878 : 174 ; *Wyvillethomsonia wallichii* Norman, 1879 : 13 ; *Stelletta profunditatis* Schmidt, 1880 : 70 ; *Tisiphonia agariciformis* Schmidt, 1880 : 71 ; Keller, 1880 : 271 ; *Thenea muricata* Vosmaer, 1882 : 5, pl. i, figs. 1–8, pl. ii, figs. 1–21, pl. iv, figs. 114–115 ; *Thenea wallichii* Sollas, 1882 : 427, pl. xvii ; *Tisiphonia agariciformis* Schulze, 1882 : 708 ; *Thenea muricata* Carter, 1883 : 362 ; *Thenea wallichii* Carter, 1883 : 362 ; *Thenea muricata* Vosmaer, 1885 : 4 ; Hansen, 1885 : 18, pl. v, figs. 6–9, pl. vii, fig. 19 ; *Clavellomorpha minima* Hansen, 1885 : 19, pl. v, fig. 2 ; *Thenea wallichii* Marenzeller, 1886 : 17 ; *T. schmidtii* Sollas, 1886 : 183 ; *T. delicata* Sollas, 1886 : 185 ; *T. muricata* Levinsen, 1886 : 343, pl. xxix, fig. 1 ; *T. delicata* Sollas, 1888 : 60, pl. vi, figs. 10–20, pl. viii, figs. 9–10 ; *T. schmidtii* Sollas, 1888 : 67, pl. vii, figs. 1–2, pl. viii, figs. 21–22 ; *T. muricata* Sollas, 1888 : 95, pl. vii, fig. 3 ; *T. intermedia* Sollas, 1888 : 97, pl. vii, fig. 4 ; *T. muricata* Topsent, 1892 : 37 ; *T. schmidtii* Topsent, 1892 : 37 ; *T. muricata* Topsent, 1894 : 375, pl. xv, figs. 1–5 ; Lambe, 1896 : 202, pl. iii, fig. 4 ; *T. grayi* Thiele, 1898 : 23, pl. v, figs. 2–3 ; *T. grayi*, var. *lateralis* Thiele, 1898 : 23, pl. v, fig. 4 ; *T. compressa* Thiele, 1898 : 24, pl. v, figs. 5–6 ; *T. compacta* Thiele, 1898 : 24, pl. v, fig. 7 ; *T. calyx* Thiele, 1898 : 24, pl. v, figs. 9–10 ; *T. nucula* Thiele 1898 : 25, pl. v, fig. 8 ; *T. hemisphærica* Thiele, 1898 : 25, pl. v, fig. 12 ; *T. muricata* Lambe, 1900 : 26 ; Lambe, 1900 : 164 ; *Ancorina* (*Thenea*) *grayi* Lendenfeld, 1903 : 56 ; *A.* (*T.*) *grayi grayi* Lendenfeld, 1903 : 56 ; *A.* (*T.*) *grayi lateralis* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *grayi compressa* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *grayi thielei* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *grayi calyx* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *grayi nucula* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *hemisphærica* Lendenfeld, 1903 : 57 ; *A.* (*T.*) *grayi irregularis*

Lendenfeld, 1903 : 57 ; *A. (T.) delicata* Lendenfeld, 1903 : 55 ; *A. (T.) schmidtii* Lendenfeld, 1903 : 58 ; *Thenea schmidti* Topsent, 1904 : 85 ; *T. valdiviæ* Lendenfeld, 1906 ; 190, pl. xvii, figs. 6–49, pl. xviii, figs. 1–19, pl. xix, figs. 1–20, pl. xx, figs. 1–13 ; *T. bojeadori* Lendenfeld, 1906 : 209, pl. xx, figs. 32–33 ; *T. pendula* Lendenfeld, 1906 : 210, pl. xxii, figs. 6–19 ; *T. levis* Lendenfeld, 1906 : 215, pl. xx, figs. 34–35 ; *T. microclada* Lendenfeld, 1906 : 221, pl. xxiii, figs. 37–44 ; *T. megastrella* Ledenfeld, 1906 : 225, pl. xxiii, figs. 22–36 ; *T. muricata* Arndt, 1912 : 112 ; Topsent, 1913 : 12 ; *T. grayi*, var. *grayi* Lebwohl, 1914 : 27, pl. iv, figs. 1–47 ; *Ancorina (Thenea) muricata* Babić, 1914 : 152, figs. 1–3 ; *Thenea muricata* Stephens, 1915 : 11 ; *T. (muricata) schmidtii* Babić, 1915 : 276 ; Babić, 1916 : 389 ; *T. muricata* Stephens, 1917 : 3 ; Arnesen, 1920 : 13 ; *T. (muricata) schmidti* Babić, 1921 : 92 ; Babić, 1922 : 282 ; *T. muricata* Ferrer, 1922 : 248 ; *T. schmidtii* Ferrer, 1922 : 248 ; Rezvoi, 1924 : 241 ; Rezvoi, 1928 : 75 ; Topsent, 1928 : 129 ; Hentschel, 1929 : 918 ; Burton, 1930 : 488 ; Burton, 1934 : 6.

Occurrence.—Stn. 122, January 22, 1934, Zanzibar Area (5° 21′ 24″ S., 39° 23′ 00″ E. to 5° 22′ 36″ S., 39° 22′ 18″ E.), 745 m., bottom grey-green mud.

Diagnosis.—Sponge spherical or subspherical, with conspicuous, equatorial pore-sieves, and usually with rooting processes ; surface strongly hispid ; oscules apical ; texture firm, fragile ; colour, in spirit, white to whitish- or yellowish-grey ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes ; microscleres streptasters of varying sizes.

Spicules :

oxea 1·25–18·0 by 0·01–0·09 mm.,
dichotriænes, cladome 1·1–3·5 mm. across, rhabdome 1·5–12·0 by 0·037–0·15 mm.,
anatriænes, cladi 0·02–0·9 mm. chord, rhabdome 1·0–21·5 by 0·007–0·045 mm.,
protriænes, cladi 0·2–2·0 mm. long, rhabdome 8·0–21·5 by 0·02–0·95 mm.,
streptasters, 0·008–0·55 mm. long.

Remarks.—There are twelve specimens, 25 to 60 mm. across, agreeing closely with those figured by Lendenfeld (1906) under *T. valdiviæ*. While identifying these the opportunity was taken to make a survey of all known specimens of *Thenea*, particularly of those in the British Museum collection. As a result, it is possible to make the following tentative comments on the species included here, for the first time, as synonyms of *T. muricata*.

Thenea bojeadori Lendenfeld is obviously a young specimen, and the dimensions of its spicules come well within the limits of those recorded for authentic specimens of *T. muricata*. The same may be said of *T. microclada* Lendenfeld. Others of the so-called species included as synonyms of *T. muricata*, for example, *T. delicata* Sollas, *T. levis* Lendenfeld, *T. megastrella* Lendenfeld, *T. microspina* Lendenfeld, *T. pendula* Lendenfeld and *T. schmidtii* Sollas, have all such strong general resemblance to *T. muricata* that it is not possible to recognize them apart, especially when we consider the range of variation in external form and spicules that can be found in typical examples of that species. The differences between *T. valdiviæ* Lendenfeld and *T. muricata* are said by Lendenfeld (1906, p. 207–208) to be the simple oscules in *T. muricata*, as against the oscular recesses in *valdiviæ*, together with the larger dimensions of the dichotriænes in *valdiviæ*. The variations already recorded for the oscular openings in *T. muricata* effectively dispose of the first point. As to the second, it need only be said that I have compared preparations of the holotype of *T. muricata* with preparations labelled by Lendenfeld "*Thenea valdiviæ* : Valdivia," and that it is not possible to see any real differences between them, except for the absence of large streptasters in some specimens of *T. muricata*.

There is some difficulty about *T. pyriformis*, which although having a strong resemblance to *T. muricata* in spiculation, differs markedly in external form. Some light is shed on this by five specimens from Naples, in the British Museum collection, all of which are somewhat distorted in form, and one of which is singularly like *T. pyriformis* in appearance. This suggests two possibilities, either that *T. pyriformis* is a teratological form of *T. muricata*, or that *T. pyriformis* is a separate species found, so far, only in the Mediterranean and off the Pacific coast of Mexico. By the nature of things the second alternative is much the more unlikely. *T. hemisphærica* (pl. v, fig. 11) appears to be slightly coated with debris, which may account for its atypical appearance ; and *T. irregularis* (pl. v, fig. 12) abundantly coated with foreign matter, is almost identical with a deformed specimen from Norway, in the British Museum collection.

In conclusion it suffices to say that in the series in the British Museum, of *Thenea muricata* from the North Atlantic, may be found an exactly similar set of specimens to those described by Thiele from Japan under half a dozen different specific names.

Thenea wyvillii Sollas.

Thenea wyvilli Sollas, 1886 : 184 ; Sollas, 1888 : 74, pl. vi, figs. 1–9 ; *Ancorina (Thenea) wyvillii* Lendenfeld, 1903 : 56.

Occurrence.—Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

Diagnosis.—Sponge composed of a lower, rounded portion roofed above by a cupola-like upper part ; surface even, minutely hispid ; oscules large, apical ; texture firm ; colour, in spirit, whitish ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes ; microscleres streptasters.

Spicules :

oxea, 7·9 by 0·07–0·084 mm.,
dichotriænes, cladome 1·4 mm. across, rhabdome 4·28 by 0·1 mm.,
anatriænes, cladi 0·095 mm. chord, rhabdome 0·88 by 0·008 mm.,
anatriænes, radical, cladi 0·1 mm. chord, rhabdome 18·2 by 0·025 mm.,
protriænes, cladi 0·5 mm. long, rhabdome 6·8 by 0·072 mm.,
streptasters, of three sizes, 0·02–0·025, 0·035 and 0·07–0·11 mm. across, largest with 2–7 rays.

Distribution.—Philippines ; Gulf of Aden ; West Africa ; 174–1300 m., bottom mud and rock.

Remarks.—The fringes to both the equatorial and the oscular recesses are developed to a varying degree in the four specimens of the Murray Collection. In the two smallest, there is none. In those ranging from 25 to 40 mm. across the fringes are most strongly developed. In one, 65 mm. across, they are feebly developed (? disappearing) ; and in the four largest they are again absent. Except in the smallest specimen, in which it is relatively simple, the oscular recess is never less than a quarter and usually one-third or more of the total diameter of the sponge.

A specimen obtained by the "Rosaura" from West Africa while typical in all other respects, appears to have been unattached and without basal tuft. A few incipient and small tufts of long spicules at the base may be the vestiges of rooting ropes.

Sub-order ASTROSCLEROPHORA.

Family STELLETTIDÆ.

Genus *Stelletta* Schmidt.

Stelletta purpurea Ridley.

Stelletta purpurea Ridley, 1884 : 473, pl. xl, fig. E, pl. xliii, fig. j ; Burton, 1929 : 415.

(For synonymy see Burton, 1926 : 44.)

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shell and Lithothamnion.

DISTRIBUTION.—Suez Canal ; Red Sea ; Indian Ocean ; Indo-Pacific ; Australia ; New Zealand ; Antarctic ; littoral to 275 m.

Stelletta herdmani Dendy.

(Text-fig. 2.)

Stelletta herdmani Dendy, 1905 : 77, pl. ii, fig. 6.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 12″ N., 39° 13′ 18″ E.), 113 m., bottom coral rock.

REMARKS.—The specimen from Stn. 45 is fairly typical, but the other two can be assigned to this species only with hesitation. The specimen from Stn. 111 is small and irregularly massive. The skeleton is a halichondroid reticulation of oxea, with occasional trizenes lying just under the surface, or protruding slightly beyond it. The trizenes are like those of *S. herdmani*, but with occasional diænes. The microscleres include ectosomal strongylasters, 0·012–0·017 mm. diameter and anthasters 0·02 mm. diameter. In possessing anthasters the specimen differs from *S. herdmani* but makes a near approach to *S. centrotyla* Lendenfeld.

The specimen from Stn. 112 is massive but flattened, and agrees in appearance and texture with *S. grubii* as figured by Topsent (1894, pl. xiii, fig. 7), and with specimens from Port Erin in the British Museum collection. The skeleton agrees with that of the holotype of *S. herdmani* except that the cladi of the trizenes are longer and the shafts shorter. Also, while most of the cladi are normal (see Text-fig. 2A, B), many have recurved ends (Text-fig. 2C, D, E), or are reduced to two or one (Text-fig. 2F, G), or have the ends of the cladi bifid.

DISTRIBUTION.—Ceylon and west coast of India, down to 183 m.

Stelletta mauritiana (Dendy).

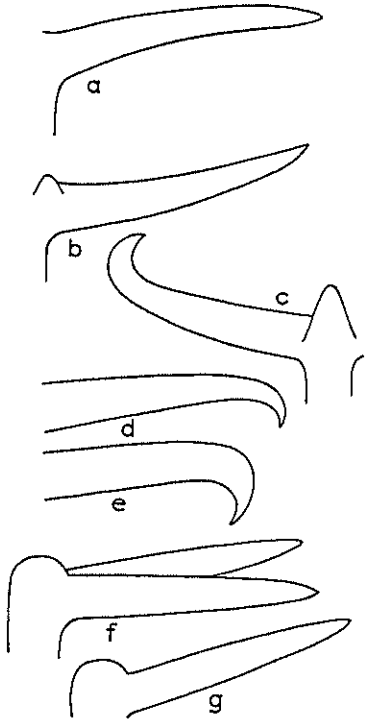
Dragmastra lactea, var. *mauritiana* Dendy, 1916 : 238, pl. xlvi, fig. 7.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

REMARKS.—Here are two specimens assigned to *Stelletta mauritiana* (Dendy) with some hesitation. The first is clavate, 50 mm. high and 9 mm. across at its broadest point.

The second is cushion-shaped, 10 mm. across. In both the surface is even but harsh to the touch, the colour is pale yellow to light brown. Both are without oscules. The texture is firm.

The spicules are similar in both specimens : oxea, 1·4 by 0·047 mm. (against 0·75 by 0·02 mm. in the holotype) ; dichotrizenes with cladome 0·16–0·43 mm. across, and shaft



TEXT-FIG. 2.—*Stelletta herdmani* Dendy. Cladi of orthotrizenes to show abnormalities. ×300. Most of the cladi in the specimen from Stn. 112 are as in *a* and *b*, but many have the shape shown in *c* or *d* and *e*. The more abnormal forms shown in *f* and *g* are not uncommon and there is a tendency in some for the cladi to bifurcate near the distal end.

0·48 by 0·02–0·048 mm. Occasionally orthotrizenes, of similar size to the dichotrizenes, may be seen. The microscleres are oxyasters and oxyspherasters, up to 0·016 mm. diameter, but, whereas in the holotype the majority are oxyspherasters of about 0·008 mm. diameter, with a few oxyasters up to 0·016 mm., in these two specimens the majority are oxyasters of 0·012–0·016 mm. diameter. Other features in which differences from the holotype can be seen are, that in these two specimens no trichodragmata were found, but cortical oxea,

0·25 by 0·002–0·003 mm., are present projecting in an almost continuous palisade at the surface. Cortical oxea may be present in the holotype, but the surface of that specimen is obscured by a *Latrunculia*.

DISTRIBUTION.—Mauritius.

Genus *Ecionemia* Bowerbank.

Ecionemia acervus Bowerbank.

Ecionemia acervus Bowerbank, 1862 : 1101, pl. lxxiii, fig. 1 ; Bowerbank, 1864 : 173, pl. xxviii, fig. 355 ; Bowerbank, 1873 : 322, pl. xxx, figs. 1–6 ; *Stelletta acervus* Ridley, 1884 : 627 ; *S. bacillifera* Carter, 1887 : 78, pl. vi, figs. 9–14 ; *Ecionema acervus* Sollas, 1888 : 196 ; *E. nigrum* Sollas, 1888 : 198 ; *E. rotundum* Sollas, 1888 : 198 ; *Thalassomora nigra* Lendenfeld, 1888 : 40 ; *Ecionema rotundum* Topsent, 1893 : 175 ; *Stelletta lobata* Kieschnick, 1896 ; 527 ; ? *S. truncata* Kieschnick, 1896 : 528 ; *Ancorina simplex* Lendenfeld, 1897 : 96, pl. ix, figs. 12–34 ; *Ecionema baculifera* Lindgren, 1897 : 485 ; *Stelletta lobata* Kieschnick, 1898 : 27 ; *S. truncata* Kieschnick, 1898 : 32 ; *Ecionema baculifera* Lindgren, 1898 : 335, pl. xvii, fig. 17, pl. xix, fig. 27 ; *E. bacillifera* Lindgren, 1899 : 88 ; *Ecionemia agglutinans* Thiele, 1899 : 7, pl. iv, fig. 1, pl. v, fig. 2 ; *Stellctta truncata* Kieschnick, 1900 : 553 ; *Ecionemia bacilliferum* Kirkpatrick, 1900 : 131 ; *E. cribrosa* Thiele, 1900 : 31, pl. ii, fig. 7 ; *E. cinerea* Thiele, 1900 : 32, pl. ii, fig. 8 ; *E. nigrescens* Thiele, 1900 : 34, pl. ii, fig. 9 ; *Ancorina amboinensis* Lendenfeld, 1903 : 63 ; *A. lobata* Lendenfeld, 1903 : 63 ; *A. nigra* Lendenfeld, 1903 : 64 ; *A. acervus*, Lendenfeld, 1903 : 64 ; *A. rotunda* Lendenfeld, 1903 : 65 ; *A. agglutinans* Lendenfeld, 1903 : 65 ; *A. cinerea* Lendenfeld, 1903 : 65 ; *A. bacillifera* Lendenfeld, 1903 : 66 ; *A. simplex* Dragnewitsch, 1905 : 3 ; Dragnewitsch, 1906 : 441 ; *Ecionemia carteri* Dendy, 1905 : 79, pl. i, fig. 5, pl. iii, fig. 1 ; *Ancorina bacillifera* Baer, 1906 : 7, pl. i, fig. 3, pl. iii, figs. 11–19 ; *Ecionemia cinerea* Bösnaug, 1913 : 236, pl. xviii, figs. 23–44, pl. xix, figs. 1–53 ; *E. carteri* Dendy, 1916 : 242 ; *Ancorina brevidens* Dendy and Frederick, 1924 : 493, pl. xxvi, fig. 9 ; *Ecionemia cribrosa* Wilson, 1925 : 297.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 m. ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Zanzibar, Seychelles, Amirante, Ceylon, Christmas Island, Mergui Archipelago) ; Indo-Pacific (Java, Celebes, Amboina, Ternate, Philippines, Fiji) ; Australia (Great Barrier Reef, SW. Australia) ; West Africa (*teste* Sollas, 1888, but this locality should be accepted doubtfully) ; littoral to 23 m.

Genus *Penares* Gray.

Penares intermedia (Dendy).

Plakinastrella intermedia Dendy, 1905 : 67, pl. i, fig. 4, pl. ii, fig. 2 ; *P. schulzei* Dendy, 1905 : 69, pl. ii, fig. 3.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ N., 39° 14′ 12″ E.), depth uncertain, 73–165 m.

REMARKS.—Dendy's original figures suggest clearly that both the species described under *Plakinastrella* belong to *Penares*, and that there is little to distinguish them. Re-examination of the types amply confirms both points.

DISTRIBUTION.—Ceylon ; 183 m.

Family GEODIIDÆ.

Genus *Geodia* Lamarck.

Geodia perarmata Bowerbank.

Geodia perarmatus Bowerbank, 1873 : 8, pl. ii, figs. 1–11 ; *G. perarmata* Carter, 1880 : 131, pl. vi, figs. 32–35 ; Sollas, 1888 : 245 ; *Sidonops perarmata* Lendenfeld, 1903 : 101 ; *Geodia perarmata* Dendy, 1905 : 83 ; Burton, 1926 : 15.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 112, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DISTRIBUTION.—Ceylon ; False Bay, South Africa ; 33–183 m.

Geodia globostellifera Carter.

Geodia globostellifera Carter, 1880 : 134, pl. vi, fig. 38 ; *Cydonium globostelliferum* Sollas, 1888 : 261 ; *Geodia globostellifera* Lendenfeld, 1903 : 111 ; *nec G. globostellifera* Ridley, 1884.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

DISTRIBUTION.—Gulf of Manaar.

Geodia areolata Carter.

Geodia areolata Carter, 1880 : 133, pl. vi, figs. 36–37 ; Sollas, 1888 : 246 ; *Sidonops areolata* Lendenfeld, 1903 : 103 ; *Geodia areolata* Dendy, 1905 : 87.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shells ; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion ; Stn 145, March 31, 1934, Maldive area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m., bottom green mud and sand.

REMARKS.—The specimens are fairly typical in all respects except that the choanosomal oxyasters have a maximum diameter of 0·045 mm.

DISTRIBUTION.—Gulf of Manaar, up to 183 m.

Geodia sphæroides (Kieschnick).

Cydonium sphaeroides Kieschnick, 1896 : 529 ; *Geodia arripiens* Lindgren, 1897 : 486 ; 1898 : 346, pl. xviii, figs. 10, 18, pl. xx, fig. 5 ; *Geodia sphæroides* Thiele, 1900 : 41, pl. ii, fig. 14 ; Lendenfeld, 1903 : 110 ; Hentschel, 1912 : 314.

OCCURRENCE.—Stn. 89, December 7, 1933, Northern Area of Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shells and rock ; Stn. 152, Maldive Area (4° 49′ 24″ S., 72° 46′ 30″ E. to 4° 48′ 42″ S., 72° 40′ 30″ E.), 878 m., bottom green sand.

DISTRIBUTION.—Cochin-China ; Aru Is. ; Ternate ; 18–45 m.

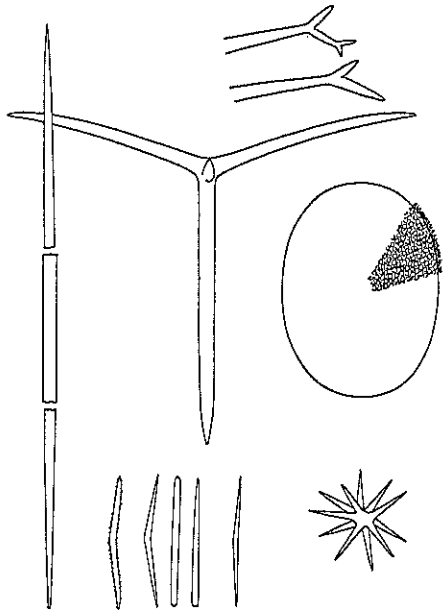
Genus *Pachymatisma* Bowerbank.

Pachymatisma bifida sp. n.

(Text-fig. 3.)

HOLOTYPE.—B.M. 1936.3.4.339.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.



TEXT-FIG. 3.—*Pachymatisma bifida* sp. n. Oxeote, ×50, triæne, showing variation in ends of rays, ×50, sterraster, ×250, oxyaster, ×500, and microxea and microstrongyla, ×250.

DIAGNOSIS.—Sponge massive, rounded; surface uneven, mainly non-hispid; oscules simple, 1–2 mm. diameter, distributed evenly over upper surface; texture hard; colour, in spirit, pale yellow; main skeleton of radially arranged oxea and dichotriænes (rarely orthotriænes); microscleres sterrasters, ectosomal microxea to microstrongyla and choanosomal oxyasters.

Spicules:

(1) oxea, 0·9 by 0·05 mm.,
(2) triænes, with cladi irregular, bifid (rarely trifid or unbranched), cladome 0·8–1·0 mm. across, rhabdome 0·9–1·1 by 0·048–0·06 mm.,
(3) sterrasters 0·12–0·16 mm. across,
(4) microxea to microstrongyla, usually centrotylote, 0·07–0·1 by 0·004–0·005 mm.,
(5) choanosomal oxyasters, 0·04–0·06 mm. diameter.

Genus *Erylus* Gray.

Erylus lendenfeldi Sollas.

Stelletta cuastrum (pars) Carter, 1880 : 136, pl. vii, fig. 42; *Erylus lendenfeldi* Sollas, 1888 : 239; Lendenfeld, 1903 : 85; Dendy, 1916 : 257, pl. xlvii, fig. 4; *nec Stelletta cuastrum* Schmidt.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 m.

DISTRIBUTION.—Freemantle, South Australia; Amirante; Indian Ocean; 37–80 m.

Family CHONDROSIIDÆ.

Genus *Chondrilla* Schmidt.

Chondrilla australiensis Carter.

C. australiensis Carter, 1873 : 23, pl. i, figs. 10–14, 16; Lendenfeld, 1885 : 153; *C. papillata* Lendenfeld, 1885 : 153, figs. 13–16; *C. corticata* Lendenfeld, 1885 : 154, figs. 17–20; *C. papillata* Carter, 1886 : 278; *C. corticata* Lendenfeld, 1888 : 70; *C. australiensis* Lendenfeld, 1888 : 71; *C. papillata* Lendenfeld, 1888 : 71; *C. globulifera* Keller, 1891 : 327, pl. xviii, figs. 34–35; *C. australiensis* Lindgren, 1897 : 484; Lindgren, 1898 : 38; *C. ternatensis* Thiele, 1900 : 65, pl. iii, fig. 19; *C. australiensis* Dendy, 1905 : 132; *C. australiensis*, var. *lobata* Dendy, 1905 : 132; *C. australiensis* Hentschel, 1909 : 377; Hentschel, 1912 : 320; Dendy, 1916 : 101; Dendy, 1916 : 267; *Chondrillastra australiensis* Topsent, 1918 : 604; *C. papillata* Topsent 1918 : 606; *C. corticata* Topsent, 1918 : 606; *C. globulifera* Topsent, 1918 : 607; *C. ternatensis* Topsent, 1918 : 608; *C. australiensis* Dendy and Frederick, 1924 : 496; Burton, 1924 : 207; Burton and Rao, 1932 : 325.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Red Sea; Indian Ocean (Okhamandal, Ceylon, Madras, Cargados Carajos, Amirante, Seychelles); Indonesia (Ternate, Aru Is.); Cochin-China; Australia (Great Barrier Reef, Port Jackson, Port Phillip, SW. Australia, Abrolhos Is., Port Western); littoral to 68 m., bottom rocks with sand and coral, mud and shells.

Genus *Chondrosia* Nardo.

Chondrosia reniformis Nardo.

Chondrosia reniformis Nardo, 1847 : 272; *Gummina gliricauda* Schmidt, 1862 : 38, pl. iii, fig. 20; *G. ecaudata* Schmidt, 1862 : 38, pl. iii, fig. 21; *Chondrosia reniformis* Schmidt, 1862 : 40; *C. gliricauda* Schmidt, 1864 : 30; *Chondrosia reniformis* Schmidt, 1864 : 30; *Gummina ecaudata* Koelliker, 1864 : 69, pl. viii; *Chondrosia reniformis* Schmidt, 1868 : 1; Schulze, 1877 : 97, pl. viii; Carter, 1881 : 248; Graeffe, 1882 : 315; *C. ramsayi* Lendenfeld, 1886 : 147, pl. iii, figs. 6–9; *C. reniformis* Vosmaer, 1887 : 325; (?) Levinsen, 1887 : 512; Lendenfeld, 1889 : 458, pl. xxvii, figs. 89, 90, 93, pl. xxix, figs. 94–112, pl. xxx, figs. 113–136, pl. xxxi, figs. 137–157, pl. xxxii, figs. 158–179, pl. xxxiii, figs. 180–187; Topsent, 1894 : 37; Lendenfeld, 1896 : 38, pl. i, figs. 7, 11, 12, pl. ix, figs. 118, 119; Topsent, 1896 : 568, pl. xxiii, figs. 1–5, pl. xxii, fig. 12b; Topsent, 1897 : 428; Kirkpatrick, 1900 : 129; *C. corticata* Thiele, 1900 : 67, pl. iii, fig. 21; *C. debilis* Thiele, 1900 : 68; *C. reniformis* Dendy, 1905 : 133; Topsent, 1906 : 568; Hentschel, 1909 : 378; *C. reniformis* var. *minor* Hentschel, 1909 : 379, pl. xxiii, fig. 19; *C. reniformis* Hentschel, 1912 : 322; Stephens, 1915 : 437; Babić 1921 : 89; Babić, 1922 : 269; Topsent 1925 : 630; Topsent 1928 : 143; Burton and Rao, 1932 : 324; Burton, 1933 : 236; Burton, 1936 : 8.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Remarks.—This is essentially a species of tropical and subtropical waters and for this reason Levinsen's (1887 and 1893) records for the Kara Sea and Cattegat must be suspect. I have examined numerous collections from the British Isles, Norway and the Arctic and have not found this species among them. Yet it is practically never absent from collections made in warmer waters.

Distribution.—? Kara Sea; ? Cattegat; Mediterranean; Cape Verde Islands; San Thomé; South Africa; Red Sea; Indian Ocean (Ceylon, Xmas Is.); Ternate, Amboina, Aru Is.; Australia (east, north-west and south-west coasts); Galapagos Is. littoral to 123 m., bottom sand, rock and coral.

Family Tetillidæ.

Genus *Tetilla* Schmidt.

Tetilla cranium (Müller).

Alcyonium cranium Müller, 1776 : 255; Müller, 1789 : 5, pl. lxxxv, fig. 1; *Tethya cranium* Lamarck, 1815: 71; *Alcyonium cranium* Lamarck, 1816 : 347; *Spongia pilosa* Montagu, 1818 : 119, pl. xiii, figs. 1–3; *Tethya cranium* Fleming, 1828 : 519; *Tethium cranium* Blainville, 1834 : 544; *Tethea cranium* Johnston, 1842 : 83, pl. i, figs. 1–8; Bowerbank, 1864 : 183, pl. xxxi, fig. 362; Bowerbank, 1866 : 83; *Tethya cranium* Schmidt, 1866 : 14, pl. i, fig. 14; Gray, 1867 : 543; *Tethea cranium* Wright, 1870 : 224; *Craniella tethyoides* Schmidt, 1870 : 66, pl. vi, fig. 9; *Tethya cranium* Carter, 1871 : 104; *T. cranium* Carter, 1872 : 419, pl. xxii, fig. 9; *Tethea unca* Bowerbank, 1872 : 118, pl. v, figs. 7–10; *T. cranium* Bowerbank, 1874 : 35, 315, pls. xiv, lxxxix; *Tethya cranium*, var. *abyssorum* Carter, 1876 : 405, pl. xvi, fig. 49; *T. cranium*, var. *typica* Bowerbank, 1882 : 41; *T. cranium*, var. *acufera* Bowerbank, 1882 : 42; *T. cranium*, var. *abyssorum* Bowerbank, 1882 : 42; *Craniella mülleri* Vosmaer, 1885 : 6, pl. ii, figs. 9–15, pl. v, figs. 1–2; *Tethya cranium* Hansen, 1885 : 18, pl. v, figs. 3–4, pl. vii, fig. 16; *Craniella carteri* Sollas, 1886 : 181; *C. schmidtii* Sollas, 1886 : 182; *C. mülleri* Vosmaer, 1887 : 322; *Tethya sibirica* Fristedt, 1887 : 436, pl. xxiv, figs. 22–28, pl. xxviii, fig. 17; *Craniella schmidtii* Sollas, 1888 : 38–39, pl. xlii, figs. 20–21; *C. abyssorum* Sollas, 1888 : 50; *C. cranium* Sollas, 1888 : 51; *C. tethyoides* Sollas, 1888 : 54; *C. zetlandica* Sollas, 1888 : 55; *C. cranium* Topsent, 1892 : 36; *C. spinosa* Lambe, 1894 : 35, pl. iv, fig. 1; *C. cranium* Topsent, 1894 : 388, pl. xv, figs. 6–14; Lendenfeld, 1897 : 84; *C. globosa* Thiele, 1898 : 26, pl. v, fig. 15, pl. vii, fig. 14; *C. ovata* Thiele, 1898 : 27, pl. v, fig. 16, pl. vii, fig. 15; *C. varians* Thiele, 1898 : 27, pl. v, figs. 17–18, pl. vii, figs. 16–17; *C. cranium* Lambe, 1900 : 277; Lambe, 1900 : 164; *Tethya tethyoides* Lendenfeld, 1903 : 24; *T. oscari* Lendenfeld, 1903 : 25; *T. abyssorum* Ledenfeld, 1903 : 25; *Craniella cranium* (pars), Topsent, 1904 : 99; *C. elegans* Dendy, 1905 : 95, pl. iv, fig. 1; *C. cranium* Lundbeck, 1909 : 454; *Tethya cranium* Topsent, 1913 : 12, pl. iii, fig. 3, pl. v, fig. 12; *T. abyssorum* Topsent, 1913 : 13, pl. v, figs. 4–6; *Craniellopsis azorica* Topsent, 1913 : 15, pl. iii, fig. 2, pl. v, figs. 1–2; *Tethya ovata* Lebwohl, 1914 : 5, pl. i, figs. 1–29; *T. cranium*, Babić, 1921 : 91; Babić 1922, : 276, fig. P; Hentschel, 1929 : 916; *T. sibirica* Hentschel, 1929 : 916.

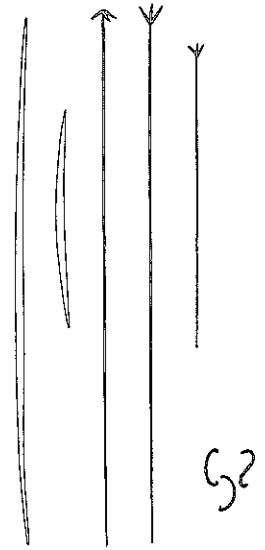
Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ B., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Remarks.—Although there are only two specimens from the present collection, they constitute the third record from the Indian Ocean. This is the more remarkable since the species has been so frequently recorded elsewhere. The significance of the new record is, however, lost except it be related to our total knowledge of the species. It is necessary, therefore, to include here a complete synonymy list, such as has not been published hitherto. Included in this synonymy list should be *Craniella disigma* Topsent, characterized by the possession of two well-marked categories of sigmaspiræ, although otherwise identical with

Tetilla cranium. In a jar of 30 specimens, in the British Museum collection, identified by Carter as *Craniella cranium*, all are typical except one, which, while differing in no other character from the rest, has two well marked categories of sigmaspiræ. The differentiation of the sigmaspiræ would appear, therefore, to be of occasional and sporadic occurrence, and without taxonomic significance.

Tetilla cranium Müller grows typically in the deeper waters of the continental shelf and is distributed throughout the Arctic, the North Atlantic and North Pacific; and some specimens have been recorded from South Africa, Australasia and the Antarctic. It is spherical to oval in shape, with a minutely papillate surface and ranges in size from a few millimeters to some 300 mm. (exceptionally up to 500 mm.) in diameter. The skeleton consists of oxea, protriænes, anatriænes and sigmaspiræ with a cortical palisade of stout microxea.

Distribution.—Arctic; western Atlantic to the Azores; South Africa (Natal); West Indies; Vancouver; Japan; Ceylon; 9–1828 m.



Text-fig. 4.—*Tetilla oxeata* sp. n. Oxea, of two sizes, anatriænes, and protriænes of two sizes, all ×500 sigmaspiræ, ×500.

Tetilla oxeata sp. n.

(Text-fig. 4.)

Holotype.—1936.3.4.377.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Diagnosis.—Sponge subspherical, with incipient root-tuft; surface subpapillate, with faintly-marked longitudinal grooves; oscule apical; texture firm; colour, in spirit,

yellowish-green; skeleton of radially-arranged oxea, anatriænes, and protriænes of two sizes, with small oxea scattered regularly throughout choanosome; microscleres sigmaspiræ.

Spicules:

(1) oxea, 2·0 by 0·032 mm.,
(2) oxea, 0·6–0·8 by 0·02–0·034 mm.,
(3) anatriænes, cladi 0·035 mm. chord, rhabdome 1·1–2·0 by 0·004–0·007 mm.
(4) protriænes, rarely prodiænes, cladi 0·07 mm. long, rhabdome 2·0 by 0·007 mm.,
(5) protriænes, cladi 0·05 mm. long, rhabdome 1·1 by 0·004 mm.,
(6) sigmaspiræ 0·012–0·014 mm. chord.

Remarks.—The species finds its nearest relative in *T. monodi* Burton from West Africa.

Genus *Chrotella* Sollas.

Chrotella Sollas, 1886 : 180; *Cinochyra* Sollas, 1886 : 182; *Cinachyra* Sollas 1887 : 20; *Cinachrya* Sollas, 1888 : cxxv; *Spiretta* Lendenfeld, 1888 : 42; *Cinachyrella* Wilson, 1925 : 356.

Chrotella cavernosa (Lamarck).

Tethya cavernosa Lamarck, 1815 : 70; Lamarck, 1816 : 385; Topsent, 1930 : 5, pl. ii, figs. 9–10.

(For synonymy and literature see Burton, 1934 : 523, under *Cinachyra australiensis*.)

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Distribution.—Red Sea and Indian Ocean generally; East Indies; Australia; littoral to 91 m.

Chrotella eurystoma (Keller).

Cinachyra eurystoma Keller, 1891 : 338, pl. xix, figs. 46–48; *Tetilla barodensis* Dendy, 1916 : 105, pl. i, fig. 3.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shell; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Red Sea; Indian Ocean (Okhamandal); 27–31 m.

Genus *Paratetilla* Dendy.

Paratetilla bacca (Selenka).

Stelletta bacca Selenka, 1867 : 569, pl. xxxv, figs. 14, 15; *Tethya merguiensis* Carter, 1883 : 366, pl. xv, figs. 6–8; Carter, 1887 : 80; *Tetilla merguiensis* Sollas, 1888 : 14; *T. ternatensis* Kieschnick, 1896 : 527; *T. merguiensis* Topsent, 1897 : 437, pl. xviii, figs. 4–5, pl. xxi, fig. 34; *T. bacca* Lindgren, 1897 : 485; Lindgren 1898 : 46; *T. amboinensis* Kieschnick, 1898 : 10; *T. violacea* Kieschnick, 1898 : 15; *T. rubra* Kieschnick, 1898 : 18; *T. amboinensis* Kieschnick, 1900 : 556, pl. xlv, figs. 1–7; *T. violacea* Kieschnick, 1900 : 559, pl. xlv, figs. 8–15; *T. rubra* Kieschnick, 1900 : 560, pl. xlv, figs. 23–29; *T. bacca* Thiele, 1900 : 39, pl. ii, fig. 13; Kirkpatrick, 1900 : 132; Lendenfeld, 1903 : 19; *Cinachyra amboinensis* Lendenfeld, 1903 : 26; Kirkpatrick, 1905 : 665; *Paratetilla cineriformis* Dendy, 1905 : 97, pl. iii, fig. 7; *P. eccentrica* Row, 1911 : 306, pl. xxxv, fig. 1, pl. xxxvi, fig. 8, text-figs. 5–7; *Cinachyra amboinensis* Hentschel, 1912 : 331; *P. bacca* Dendy, 1921 : 21; *P. bacca*, var. *violacea* Dendy, 1921 : 22, pl. i, fig. 6; *P. bacca*, var. *corrugata* Dendy, 1921 : 23, pl. i, fig. 7; *P. arcifera* Wison, 1925 : 381, pl. xl, fig. 2, pl. xlviii, fig. 6.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The single specimen, 50 mm. across, differs from most recorded specimens of this species in that the rhabdome of the orthotriænes, in this case measuring up to 0·9 by 0·048 mm., is consistently longer than the cladi, which do not exceed 0·64 mm. in length. Otherwise, the spiculation is typical except for the presence of abundant raphides, 0·3 mm. long, distributed in bundles throughout the choanosome. These correspond, evidently, to the "short, slender oxea, 0·3 by 0·002 mm." mentioned by Dendy (1921, p. 24) for his *P. bacca*, var. *corrugata*. I have re-examined all the material of *P. bacca* in the British Museum collection and find that in most of Dendy's (1921) specimens these raphides are present but scattered, and that in the other specimens (identified by Row, Kirkpatrick, Dendy, Sollas and Carter) they may be absent, sparingly present or abundant. The present specimen is, however, the first one I have seen to carry these spicules in dragmata.

Distribution.—Red Sea; Indian Ocean (Ceylon, Praslin Reef, Coevity, Egmont Reef, Salomon, Diego Garcia, Christmas Island); Indo-Pacific (Mergui Archipelago, Java, Amboina, Torres Straits, Philippines, Samoa); 8–18 m.

Genus *Fangophilina* Schmidt.

Fangophilina submersa Schmidt.

Fangophilina submersa Schmidt, 1880 : 73, pl. ix, fig. 3; Sollas, 1888 : 55; *Spongocardium gilchristi* Kirkpatrick, 1902 : 224, pl. ii, fig. 1, pl. iii, fig. 1; *Fangophilina submersa* Kirkpatrick, 1905 : 666; *F. gilchristi* Kirkpatrick, 1905 : 666; *F. hirsuta* Lendenfeld, 1906 : 157, pl. x, figs. 11–29, pl. xi, figs. 1–6, pl. xii, figs. 1–14; *F. kirkpatricki* Lendenfeld, 1906 : 169, pl. x, figs. 14–17; *F. submersa* Topsent, 1923 : 2.

Occurrence.—Stn. 106, January 12, 1934, Zanzibar Area (5° 38′ 54″ S., 39° 15′ 42″ E. to 5° 40′ 18″ S., 39° 17′ 36″ E.), 212 m., bottom green mud.

Remarks.—Ten specimens only have hitherto been recorded, from widely-separated localities, under three different specific names. Topsent's (1923) suggestion that all represent varieties of a single species is supported by my own observations on a further group of specimens from a single locality off the South African coast. In these the differences between the supposed species could be seen.

Distribution.—Caribbean Sea; Cape Verde Is.; Natal; Dar-es-Salaam; 217–400 m.

Acanthotetilla gen. n.

Genotype.—*Acanthotetilla hemisphærica* sp. n.

Diagnosis.—Tetillidæ with radially-arranged surface brushes of long oxea and protriænes; with the choanosome densely filled with stout acanthoxea; sigmaspiræ absent.

Acanthotetilla hemisphærica sp. n.

(Text-fig. 5.)

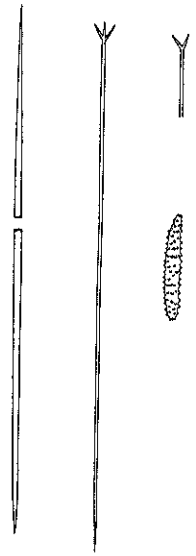
Holotype.—B.M. 1936.3.4.530.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Diagnosis.—Sponge massive, hemispherical; surface strongly pilose; oscules not apparent; texture firm, almost stony; colour, in spirit, pale flesh; skeleton of densely-

packed acanthoxea with oxea and protriænes projecting at surface; megascleres oxea, 4·0 by 0·032 mm., protriænes, occasionally prodiænes, cladi 0·056 m. long, shaft 2·0 by 0·014 mm., and acanthoxea, 0·4 by 0·06 mm.; microscleres absent.

Remarks.—Externally this sponge has the appearance of a normal Tetillid, but the presence of acanthoxea in association with oxea and protriænes is most remarkable. It is possible that the acanthoxea represent, more properly, microscleres derived from the sigmaspiræ characteristic of the Tetillidæ.



Text-fig. 5.—*Acanthotetilla hemispharica* sp. n. Oxeote, protriæne, head of prodiæne, acanthoxeote, all ×50.

Numerous embryos are present, of two kinds. The first is oval, 0·16 mm. along the long axis and composed of large granular cells. The larger are nearly spherical, 0·55 mm. diameter, heavily pigmented a rich amber so that their structure is not obvious.

Family Clavulidæ.

Genus *Suberites* Nardo.

Suberites domuncula (Olivi).

Alcyonium domuncula Olivi, 1792 : 241 ; *Suberites domuncula* Topsent, 1900 : 225, pl. vi, figs. 1–9.

(For synonymy see Burton, 1953.)

Occurrence.—Stn. 175, May 1, 1934, Gulf of Aden (12° 37′ 24″ N., 51° 21′ 12″ E. to 12° 43′ 18″ N., 51° 19′ 12″ E.), 1618 m., bottom green mud.

Remarks.—This is the first record for the Indian Ocean area, and it may represent a distribution through the Suez Canal from the Mediterranean.

Distribution.—Throughout the Northern Hemisphere.

Suberites ramulosus Ridley and Dendy.

Suberites ramulosus Ridley and Dendy, 1886 : 487 ; *S. ramulosa*, var. *cylindrifera* Ridley and Dendy, 1886 : 487 ; *S. ramulosus* Ridley and Dendy, 1887 : 207; *S. ramulosus*, var. *cylindrifera* Ridley and Dendy, 1887 : 208, pl. xxix, fig. 5, pl. xliii, figs. 13–14.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.; Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Distribution.—Philippines; 174–1280 m.

Suberites kelleri Burton.

Suberites incrustans Keller, 1891 : 318, pl. xvii, figs. 19–20 ; *S. kelleri* Burton, 1930 : 536 ; *nec S. incrustans*, Hansen.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shells and (?) rock.

Distribution.—Red Sea.

Genus *Pseudosuberites* Topsent.

Pseudosuberites hyalinus (Ridley and Dendy).

Hymeniacidon ? hyalinus Ridley and Dendy, 1887 : 168, pl. xlv, fig. 6 ; *Pseudosuberites hyalinus* Topsent, 1898 : 103 ; Topsent, 1900 : 170, pl. ii, fig. 9 ; Topsent, 1913 : 26, pl. iii, fig. 10 ; Kirkpatrick, 1908 : 21, pl. xxvi, fig. 7 ; Row 1911 : 305 ; Hentschel, 1914 : 52 ; *P. hyalinus*, var. *compacta* Hentschel, 1914 : 53, pl. iv, fig. 1 ; Topsent, 1917 : 37 ; *Pseudosuberites hyalinus* Burton, 1929 : 445.

Occurrence.—Stn. 194, May 7, 1934, Gulf of Aden (13° 16′ 00″ N., 46° 20′ 24″ E. to 13° 16′ 36″ N., 46° 14′ 00″ E.), 220 m.

Remarks.—This species, most commonly recorded from the Antarctic, has also been found off Norway, in the Mediterranean and at Suez. It is here recorded for the Gulf of Aden.

Distribution.—Between Norway and Bear Island; Banyuls; Suez; south-west coast of Patagonia; Antarctic; 40–456 m.

Genus *Laxosuberites* Topsent.

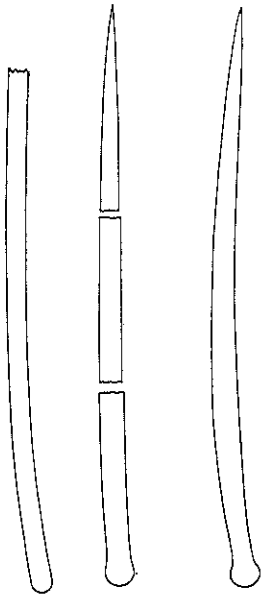
Laxosuberites longispiculus sp. n.

(Text-fig. 6.)

Holotype.—B.M. 1936.3.4.339.

Occurrence.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge a small incrustation on a piece of rock; oscules not apparent; texture soft; colour, in spirit, white; skeleton of tylostyli, rarely styli, of two sizes, 0·56–0·8 by 0·024 and 1·8–2·4 by 0·014–0·024 mm. respectively, with numerous intermediates, echinating on substratum; microscleres absent.



TEXT-FIG. 6.—*Laxosuberites longispiculus* sp. n. Style and tylostyli, ×200.

Genus *Tentorium* Vosmaer.

Tentorium semisuberites (Schmidt).

Thecophora semisuberites Schmidt, 1870 : 50, pl. vi, fig. 2; *T. ibla* Thomson, 1873 : 148, fig. 24; *T. semisuberites* Whitcaves, 1874 : 9; *T. ibla* Verrill, 1874 : 500, pl. viii; *T. elongata* Marenzeller, 1877 : 12, pl. ii, fig. 4; *T. semisuberites* Vosmaer, 1882 : 30; Vosmaer, 1885 : 18, pl. i, figs. 23–24, pl. iii, figs. 22–26; *Tentorium semisuberites* Ridley and Dendy, 1886 : 489; Ridley and Dendy, 1887 : 221; Vosmaer, 1887 : 329, pl. ii, fig. 4, pl. xxi, fig. 19; *Thecophora semisuberites* Fristedt, 1887 : 433; *Tentorium semisuberites* Topsent, 1892 : 132; Lambe, 1896 : 198, pl. iii, fig. 2; Lambe, 1900 : 25; Lambe, 1900 : 163; Topsent, 1904 : 124; Arndt, 1912 : 113; Topsent, 1913 : 25; Ferrer, 1914 : 19; Pawsey and Davis, 1924 : 14; Topsent, 1928 : 151; pl. vi, fig. 10; Rezvoj, 1928 : 81; Hentschel, 1929 : 924; Burton, 1932 : 337.

OCCURRENCE.—Stn. 108, January 13, 1934, Zanzibar Area (5° 18′ 06′ S., 39° 24′ 12″ E. to 5° 14′ 30″ S., 39° 25′ 36″ E.), 781 m., bottom grey mud.

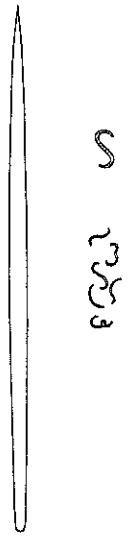
DISTRIBUTION.—Arctic Ocean between Canada and Barents Sea; Western North Atlantic (Nova Scotia, Gulf of St. Lawrence, north-east coast of U.S.A.); Eastern North Atlantic (Norway, Shetlands, Lousy Bank, coast of Asturias); Azores; Inaccessible Is.; Tristan da Cunha; 37–3018 m., bottom mud, muddy sand, gravel, rarely rocky.

Tentorina gen. n.

GENOTYPE.—*Tentorina sigmatophora* sp. n.

DIAGNOSIS.—Clavulidæ with skeleton of strongyloxea, sparsely present in choanosome and forming a continuous tangential layer in ectosome; microscleres sigmaspiræ.

REMARKS.—The external form of the genotype and also the structure of the skeleton recall those of the genus *Tentorium*. On the other hand, the megascleres are typical of the genus *Tethya* and the microscleres of *Tetilla*.



TEXT-FIG. 7.—*Tentorina sigmatophora* sp. n. Strongyloxeote, ×200, sigmaspiræ, ×500 (single sigmaspira, above, ×750).

Tentorina sigmatophora sp. n.

(Text-fig. 7.)

HOLOTYPE.—B.M. 1936.3.4.516.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge small, conical; surface even, smooth; oscules apical (?); texture soft, delicate; colour, in spirit, pale yellow; megascleres strongyloxea, 0·45–0·6 by 0·01–0·02 mm.; microscleres sigmaspiræ, 0·012 mm. chord.

Genus *Polymastia* Bowerbank.

Polymastia tubulifera Dendy.

Polymastia tubulifera Dendy, 1921 : 148, pl. iv, fig. 6, pl. xviii, fig. 7.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

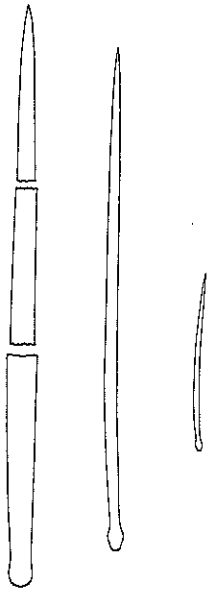
Distribution.—Indian Ocean (Saya de Malha) ; 90 m.

Polymastia murrayi **sp. n.**

(Text-fig. 8.)

Holotype.—B.M. 1936.3.4.305.

Occurrence.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock ; Stn. 177, May 2, 1934, Gulf of



Text-fig. 8.—*Polymastia murrayi* sp. n. Tylostyli, of three sizes, ×200.

Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock ; Stn. 185, May 5, 1934, Gulf of Aden (13° 48′ 06″ N., 49° 16′ 48″ E. to 13° 48′ 36″ N., 49° 16′ 24″ E.), 2001 m., bottom green mud.

Diagnosis.—Sponge subspherical (?), with a stout fleshy papilla ; surface hispid, except on papilla ; oscule small, apical on papilla ; texture firm ; colour, in spirit, greyish ; skeleton of stout radiating bundles of tylostyli, with a subectosomal, tangential layer medium-sized tylostyli and a dermal palisade of small tylostyli.

Spicules :

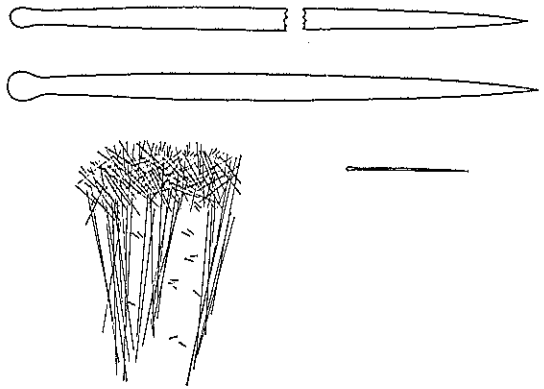
large tylostyli, 1·8 by 0·028 mm.,
medium-sized tylostyli, 0·48 by 0·014 mm.,
small tylostyli, 0.14–0·17 by 0·006 mm.,

Systematic notes.—There is only a fragment of this sponge, including the papilla, and the interior is sufficiently cleaned of flesh to leave doubt as to the presence or absence of small tylostyli in the choanosome.

Three small specimens must also be included in this species. They are subspherical, somewhat flattened dorso-ventrally, 10–20 mm. diameter. The spicules do not differ much in size from those of the holotype. On the other hand, the tangential subectosomal layer of tylostyli is more diffuse, and the radial bundles not so strongly marked. This may be due to the immature state of the specimens. In all three, both small and medium-sized tylostyli are abundantly scattered between the radial bundles of large tylostyli.

The characteristic feature of the species appears to be the single fleshy papilla, which is short and stout, and is surrounded by an area relatively less hispid, than the general surface of the sponge.

Although the bases of the large tylostyli of the holotype, of the specimen from Stn. 157, and one of those from Stn. 185 are all of the same shape, in the second specimen from Stn. 185 the large megascleres vary from styli to tylostyli, although in the latter the shape of the base is often typical for the species.



Text-fig. 9.—*Polymastia clavata* sp. n. Tylostyli, of three sizes, ×200 ; section at right angles to surface, ×10.

Polymastia clavata **sp. n.**

(Text-fig. 9.)

Holotype.—B.M. 1936.3.4.497.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shells and (?) rock.

DIAGNOSIS.—Sponge stipitate, with body irregularly rounded and bearing short, blind papillæ; surface even, hispid; oscules not apparent; texture firm; colour, in spirit, pale yellowish-grey; skeleton of slender radial bundles of long tylostyli, with a cortical layer of shorter tylostyli irregularly and densely arranged, and an ectosomal palisade of small, hair-like tylostyli; megascleres tylostyli, of the radial bundles, 1·2 by 0·02 mm., tylostyli of the cortical layer, 0·24–0·8 by 0·012–0·036 mm., and tylostyli of the ectosomal palisade, 0·12 by 0·003 mm.

REMARKS.—The species differs from all known species in its external form, as well as in details of its spiculation, particularly in the hair-like shape of the smallest tylostyli.

Genus *Radiella* Schmidt.

Radiella sarsii (Ridley and Dendy).

Trichostemma sarsii Ridley and Dendy, 1886 : 488; Ridley and Dendy, 1887 : 218, pl. xliii, figs. 1–3; *T. sarsi* Topsent, 1892 : 132; 1904, p. 120; *T. sarsii* Dendy, 1921 : 151; *T. sarsi*, Topsent 1928 : 154.

OCCURRENCE.—Stn. 108, January 13, 1934, Zanzibar Area (5° 18′ 06″ S., 39° 24′ 12″ E. to 5° 14′ 30″ S., 39° 25′ 36″ E.), 781 m., bottom grey mud; Stn. 145 E, April 2, 1934, Maldive Area (4° 58′ 42″ S., 73° 16′ 24″ E.), 494 m., bottom green mud and sand.

REMARKS.—The 18 specimens from Stn. 108 and the 12 specimens from Stn. 145 agree closely with the "Challenger" specimens (Stn. 73). They range in diameter from 9 to 22 mm.

DISTRIBUTION.—Azores (861–2102 m.); Madeira (1477–2380 m.); Morocco (851 m.); Saya de Malha, Indian Ocean (5(?)–914 m.); Australia, off Queensland (1829 m.).

Genus *Spirastrella* Schmidt.

Spirastrella cuspidifera (Lamarck).

Alcyonium cuspidiferum Lamarck, 1813 : 168; Lamarck, 1816 : 401; *Suberites capensis* Carter, 1882 : 350; *Spirastrella cunctatrix* var., Carter, 1882 : 351; *Suberites* sp., Carter, 1882 : 352; *Spirastrella vagabunda* Ridley, 1884 : 468, pl. xliii, fig. c; *S. vagabunda*, var. *trincomaliensis* Ridley, 1884 : 468; *S. congenera* Ridley, 1884 : 469, pl. xliii, fig. d; *S. punctulata* Ridley, 1884 : 623, pl. liv, fig. p; *Suberites capensis* Carter, 1886 : 114; *Spirastrella solida* Ridley and Dendy, 1886 : 491; 1887 : 231, pl. xli, fig. 7, pl. xlv, fig. 13; *S. trincomaliensis* Carter, 1887 : 74, pl. vi, figs. 7–8; *Suberites inconstans* Dendy, 1887 : 154; *S. inconstans*, var. *globosa* Dendy, 1887 : 155, pl. ix, fig. 1; *S. inconstans* var. *mæandrina* Dendy, 1887 : 155, pl. x, fig. 1; *S. inconstans*, var. *digitata* Dendy, 1887 : 155, pl. ix, fig. 2; ? *Papillina panis* (pars) Lendenfeld, 1888 : 58; *Suberites mastoideus* Keller, 1891 : 317, pl. xvii, figs. 16–18; *Spirastrella punctulata*, Topsent, 1893 : 177, fig. 4; *S. vagabunda*, var. *arabica* Topsent, 1893 : 177, fig. 1; *S. cylindrica* Kieschnick, 1896 : 534; *S. solida* Topsent, 1897 : 440; *S. carnosa* Topsent, 1897 : 441; *S. papillosa*, var. *porosa* Dendy, 1897 : 253; *Vioa florida* Lendenfeld, 1897 : 108, pl. x, figs. 78–105; *Spirastrella solida* Lindgren, 1897 : 484; 1898 : 43; *S. lacunosa* Kieschnick, 1898 : 45; *S. spiculifera* Kieschnick, 1898 : 45; *Spirastrella inconstans* Thiele, 1899 : 10, pl. i, fig. 3, pl. v, fig. 4; *S. cylindrica* Thiele, 1900 : 69, pl. iii, fig. 23; *S. lacunosa* Kieschnick, 1900 : 575; *S. spiculifera* Kieschnick, 1900 : 575; *S. carnosa* Kirkpatrick, 1900 : 128; *S. inconstans* Sollas, 1902 : 216, pl. xiv, fig. 3; *S. lacunosa* Dragnewitsch, 1905 : 13; *S. vagabunda* Dendy, 1905 : 122; *S. vagabunda*, var. *trincomaliensis* Dendy, 1905 : 123; *S. vagabunda*, var. *tubulodigitata* Dendy, 1905 : 123; *S. vagabunda*, var. *fungoides* Dendy, 1905 : 124; *S. vagabunda*, var. *gallensis* Dendy, 1905 : 124; *S. tentorioides* Dendy, 1905 : 125, pl. v, fig. 7; *S. cunctatrix* Hentschel, 1909 : 382; *S. tentorioides*, var. *australis* Hentschel, 1909 : 383; *S. digitata* Hentschel, 1909 : 385, pl. xxii, fig. 7, text-fig. 18; *Suberites capensis* Vosmaer, 1911 : 12; *Spirastrella congenera* Vosmaer, 1911 : 12; *S. punctulata* Vosmaer, 1911 : 14; *S. vagabunda* Vosmaer, 1911 : 14, pl. xi, fig. 5; *Suberites inconstans* Vosmaer, 1911 : 18; *S. trincomaliensis* Vosmaer, 1911 : 20; *Spirastrella cylindrica* Vosmaer, 1911 : 21; *S. carnosa* Vosmaer, 1911 : 22; *Vioa florida* Vosmaer, 1911 : 23; *Spirastrella tentorioides* Vosmaer, 1911 : 24; *S. digitata* Vosmaer, 1911 : 25; *S. purpurea* (pars), Vosmaer, 1911 : 6, pl. i, figs. 1–9, pl. ii, figs. 1, 3–4, 6, pl. iii, figs, 1–2, pl. iv, figs. 1–9, pl. v, figs. 1–23, pl. vi, figs. 1–12, pl. vii, figs. 1–6, pl. viii, figs. 2–3, 5–6, pl. ix, figs. 1–9, pl. xi, fig. 2, pl. xii, figs. 10, 12, pl. xiii, fig. 4, pl. xiv, figs. 2–4; *S. purpurea* Hentschel, 1912 : 324; *S. montiformis* Hallmann, 1912 : 119, pl. xxi, fig. 3, text-fig. 21; ? *Papillina panis* (pars), Hallmann, 1914 : 294; *Spirastrella vagabunda*, var. *arabica* Topsent, 1918 : 550, fig. x; *S. punctulata* Topsent, 1918 : 551, fig. xi; *S. solida* Topsent, 1918 : 551, fig. xii; *S. carnosa* Topsent, 1918 : 551, fig. xiii; *S. vagabunda* Dendy, 1921 : 139; *S. globularis* Dendy, 1921 : 141, pl. iv. fig. 5, pl. xviii, fig. 18; *S. vagabunda* Dendy and Frederick, 1924 : 508; Wilson 1925 : 343; *S. cuspidifera* Topsent, 1933 : 41, pl. ii, fig. 4, text-fig. 4; *S. inconstans* Burton, 1934 : 570; *Cliona arndtii* de Laubenfels, 1936 : 152.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shell and Lithothamnion; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 m.

DIAGNOSIS.—Sponge typically digitate or composed of a bunch of stout, erect, digitate processes springing from a basal mass, often fungiform, or massive with submeandrine surface, occasionally boring; surface minutely hispid, even or thrown into meandrine folds, plentifully beset with commensal cirripedes; oscules scattered in massive forms, at summit of processes in digitate forms; texture hard, incompressible; colour, in life, orange or brick-red, in spirit, yellow to brown; skeleton a coarse isodictyal, multispicular reticulation of tylostyli, 0·6 by 0·022 mm.; microscleres slender spinispiræ, beset with wart-like processes, 0·006–0·048 mm., or even 0·07 mm. long, and stout spinispiræ, 0·05–0·06 mm. long.

DISTRIBUTION.—Red Sea and Gulf of Aden; Indian Ocean (Ceylon, Madras, Diego Garcia, Seychelles, Amirante, Egmont, Salomon, Coin Peros, Cargado Carajos, Mauritius); Zanzibar; Mozambique; Port Elizabeth; Malay Area (Mergui Archipelago, Pulau Bidang, Singapore, Java, Xmas Is, Celebes, Ternate, Amboina, Aru and Kei Islands, Philippines); Australia (Torres Straits, Great Barrier Reef, Queensland, Port Jackson, Port Phillip Heads, Abrolhos Is., Sharks Bay); littoral to 59 m., bottom sand, rock, mud, shells and, above all, coral.

Spirastrella spinispirulifer (Carter).

Suberites spinispirulifer Carter, 1879 : 345, pl. xxviii, figs. 6–7; Carter 1886 : 456; *Spirastrella dilatata* Kieschnick, 1896 : 534; *S. spinispirulifer* Dendy, 1897 : 251; *S. dilatata* Thiele, 1900 : 70, pl. ii, fig. 22.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock(?).

DISTRIBUTION.—South Africa (Port Elizabeth); Australia (Port Western, Port Phillip); Ternate.

Genus *Diplastrella* Topsent.

Diplastrella gardineri Topsent.

Diplastrella gardineri Topsent, 1918 : 549, fig. viii.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.; Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

Remarks.—The dimensions of the spicules, which were not given by Topsent, are: tylostyli, 0·44 by 0·012 mm., diplasters, 0·012–0·02 mm. across, and amphiasters (? young diplasters), 0·008 mm. across.

Distribution.—Maldives, 42 m.

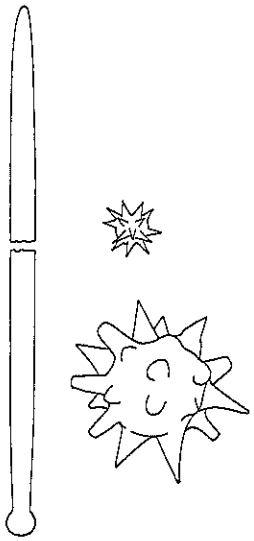
Genus *Timea* Gray.

Timea capitatostellifera (Carter).

Hymedesmia capitatostellifera Carter, 1880 : 51, pl. iv, fig. 12.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

Distribution.—Gulf of Manaar.



Text-fig. 10.—*Timea tethyoides* sp. n. Tylostyle, ×200, and two sizes of spherasters, ×500.

Timea tethyoides **sp. n.**

(Text-fig. 10.)

Holotype.—B.M. 1936.3.4.304.

Occurrence.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ N., 39° 13′ 18″ E.), 113 m., bottom coral rock.

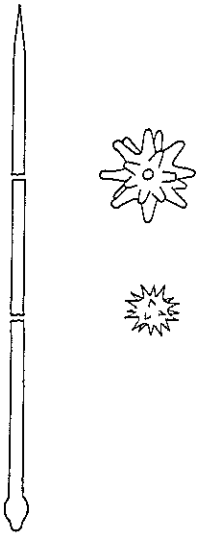
Diagnosis.—Sponge encrusting; surface uneven, hispid; oscules not apparent; texture soft; colour, in spirit, light greyish-brown; skeleton of tylostyli, 0·4–0·8 by 0·022 mm., arranged in divergent brushes arising from substratum, with small tylostyli near surface; microscleres choanosomal spherasters, with conical rays, rounded distally in early stages of development, later much-branched, 0·08 mm. diameter, and ectosomal spherasters, with rays conical and obtusely pointed, 0·02 mm. diameter.

Timea spherastræa **sp. n.**

(Text-fig. 11.)

Holotype.—B.M. 1936.3.4.303.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ N., 39° 14′ 12″ E.), (depth ?).



Text-fig. 11.—*Timea spherastræa* sp. n. Tylostyle, ×200, and spherasters, ×500.

Diagnosis.—Sponge encrusting; surface uneven, hispid in patches; oscules not apparent; texture soft; colour, in spirit, greyish; skeleton of sparsely distributed tylostyli, 1·1 by 0·012 mm.; microscleres spherasters, smaller with pointed, larger with conical obtusely-pointed rays, 0·02–0·035 mm. diameter.

Genus *Trachycladus* Carter.

Trachycladus tethyoides **sp. n.**

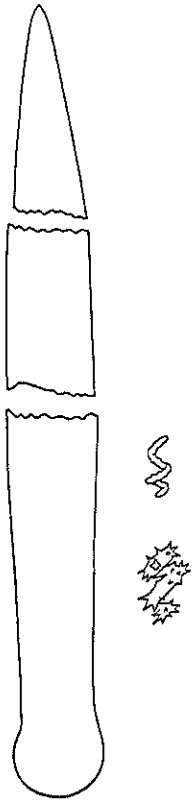
(Text-fig. 12.)

Holotype.—B.M. 1936.3.4.576.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

DIAGNOSIS.—Sponge subspherical, surface minutely and irregularly papillate, strongly hispid; oscules not apparent; texture firm, barely compressible; colour, in spirit, pale yellow; skeleton of loose radial strands of tylostyli, variable in size but averaging 2·0 by 0·09 mm.; microscleres spinispiræ, passing rarely to microstrongyla, 0·03 mm. chord.

REMARKS.—The species differs from all others in external form, and in the presence of tylostyli for megascleres.



TEXT-FIG. 12.—*Trachycladus tethyoides* sp. n. Tylostyle, ×300, sigmaspiræ, ×500.

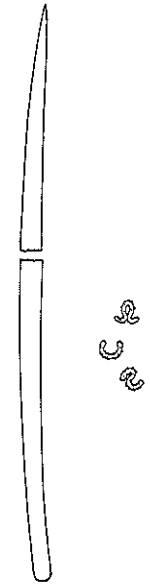
The only other feature worthy of note is that each of the three specimens recorded here bears on its surface an incrustation of *Biemna fortis* (Topsent), so thin that it is not immediately apparent even in sections. More obvious is the presence of numerous raphides scattered generally throughout the choanosome of the *Trachycladus* and appearing there as proper spicules. In fact, one could be led to believe, at first glance, that they belonged to the *Trachycladus*.

Trachycladus cervicornis sp. n.

(Text-fig. 13.)

HOLOTYPE.—B.M. 1936.3.4.610.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock.



TEXT-FIG. 13.—*Trachycladus cervicornis* sp. n. Tylostyle, ×200, sigmaspiræ, ×500.

DIAGNOSIS.—Sponge erect, stipitate, dichotomously branched; surface minutely papillate, strongly hispid; oscules not apparent; texture firm, compressible; colour, in spirit, pale yellow; skeleton of long, smooth styli, 1·4 by 0·02 mm., arranged in a dense axial core, with single spicules projecting well beyond surface of sponge; microscleres spinispiræ, 0·008 mm. chord.

REMARKS.—This is a well marked species differing from other species of *Trachycladus* in external form and in the large size of the megascleres.

Genus *Placospongia* Gray.

Placospongia carinata (Bowerbank).

Geodia carinata Bowerbank, 1858 : 308, 314, pl. xxv, fig. 19, pl. xxvi, fig. 10; Bowerbank 1864 : 254, pl. x, fig. 163; Bowerbank, 1874 : 298, pl. xlvi, figs. 1–5 Bowerbank, 1875 : 295; *Placospongia carinata* Ridley, 1884 : 376, 481; Sollas, 1888 : 272; *P. intermedia* Sollas, 1888 : 273; *P. carinata* Lindgren, 1897 : 485; Lindgren, 1898 : 45, pl. xviii, fig. 26; *P. mixta* Thiele, 1900 : 72, pl. iii, fig. 25; *P. carinata*

Vosmaer and Vernhout, 1902 : 9, pl. i, figs. 1–4, pl. ii, fig. 5, pl. iv, figs. 9–13, pl. v, figs. 1, 5, 7–9, 11; Dendy, 1905 : 126 ; Hentschel, 1912 : 324 ; Dendy, 1921 : 144.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Indian Ocean (Ceylon, Cargados Carajos, Egmont, Coevity) ; Straits of Malacca, Java, Ternate ; Torres Straits ; 13–55 m., bottom sand.

Family Astraxinellidæ.

Genus *Hemiasterella* Carter.

Hemiasterella typus Carter.

Hemiasterella typus Carter, 1879 : 146, pl. xxi, fig. 9 ; Sollas, 1888 : 434 ; Topsent, 1919 : 6.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

Remarks.—The single specimen is vasiform and stipitate, 160 mm. high and 140 mm. across. The microscleres, up to 0·05 mm. diameter, may have smooth pointed rays or strongylote and microspined rays.

Distribution.—(Hitherto unknown.)

Hemiasterella complicata Topsent.

Hemiasterella complicata Topsent, 1919 : 7, figs. 2–5.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shingle.

Remarks.—A typical specimen, vasiform and stipitate, 45 mm. high.

Distribution.—Madagascar.

Family Tethyadæ.

Genus *Tethya* Lamarck.

Tethya Lamarck, 1815 : 69 ; *Tethia* Lamarck, 1816 : 384 ; *Thethya* Cuvier, 1817 : 250 ; *Jethya* Rafinesque, 1820 : 364 ; *Donatia* Nardo, 1833 : 522 ; *Lyncuria* Nardo, 1834 : col. 715 ; *Tethea* Siebold, 1843 : 363 ; *Tethyum* Lieberkühn, 1859 : 522 ; *Thetea* Schmidt, 1866 : 13 ; *Amniscos* Gray, 1867 : 542 ; *Columnitis* Schmidt, 1870 : 25 ; *Thetya* Studer, 1879 : 120 ; *Ichthya* Mereschkowsky, 1880 : 418 ; *Alcmo* Wright, 1881 : 13 ; *Columnites* Lendenfeld, 1890 : 397 ; *Tethycordyla* de Laubenfels, 1934 : 8 ; *Tethytimea* de Laubenfels, 1936 : 164 ; *Taboga* de Laubenfels, 1936 : 452.
(See also Burton, 1934 : 568.)

Diagnosis.—Clavulidæ with main skeleton of radiating bundles of strongyloxea (styli or tylota) ; microscleres large cortical spherasters and various types of smaller asters scattered in cortex and choanosome.

Remarks.—Only three names included in the present list of synonyms of *Tethya* call for comment. The type of *Taboga* (*T. taboga*) is clearly synonymous with *Tethya diploderma* Schmidt. *Tethycordyla* and *Tethytimea* are equally recognizable as representing *Tethya repens* Schmidt. *Tethycordyla* was established for a small stalked sponge, but it appears that, throughout its range, *Tethya repens* is almost invariably stalked.

De Laubenfels (1936, p. 164) agrees that the genotype of *Tethytimea* "probably should be called *repens*." He adds that "Schmidt's description (of *Tethya repens*), however, is very unsatisfactory and the synonymy is not certain." I have indicated (1924, p. 1036) in my revision of the genus *Donatia* that I had access to Schmidt's original material. Moreover, having re-examined this and compared it with the original description of the genotype of *Tethytimea*, my impression that *Tethya repens* Schmidt and *Tethytimea* (*Donatia*) *tylota* (Hentschel) are synonymous is fully confirmed.

Tethya repens Schmidt.

Tethya repens Schmidt, 1870 : 51 ; *Tethya repens* Sollas, 1888 : 439 ; *Donatia fissurata*, var. *extensa* Hentschel, 1909 : 374, pl. xxii, fig. 6, text-fig. 14 ; *D. tylota* Hentschel, 1912 : 317, pl. xvii, fig. 6 ; *D. stellagrandis* Dendy, 1916 : 266, pl. xliv, fig. 8, pl. xlviii, fig. 5 ; *Tethya repens* Topsent, 1918 : 574 ; *Donatia fissurata*, var. *extensa* Topsent, 1918 : 599 ; *D. tylota* Topsent, 1918 : 599 ; *Donatia stellagrandis* Topsent, 1918 : 600 ; *Donatia repens* Burton, 1924 : 1036 ; *Donatia repens* Dendy and Burton, 1926 : 247 ; *Tethycordyla thyris* de Laubenfels, 1934 : 8 ; *Tethytimea tylota* de Laubenfels, 1936 : 164.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 12″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock ; Stn. 152, April 4, 1934, Maldive Area (4° 49′ 24″ N., 72° 46′ 30″ E. to 4° 48′ 42″ N., 72° 40′ 30″ E.), 878 m., bottom green sand.

Remarks.—The 18 specimens, from two widely separated areas, are all very alike and agree closely with Hentschel's *Donatia fissurata*, var. *extensa*. The spiculation also agrees closely with that of Hentschel's specimen, as well as the others represented in the synonymy list, except in the size of the large spherasters. In the specimens hitherto recorded, the spherasters have ranged in size from 0·08 to 0·25 mm. diameter. In the present collection the maxima for the spherasters are, for nearly two-thirds of the specimens, 0·4 mm. diameter, for another, 0·6 mm. diameter, and, for the occasional specimen, 0·5 mm. diameter.

At first sight it appeared probable that the present specimens represented a new species, but the very close agreement between them and the other specimens accepted under *Tethya repens*, in all respects but the maximal size of the spherasters, is against this. Moreover, since the present specimens were collected off the coasts of Arabia and off Zanzibar it is doubtful whether they represent a geographical variety, while the bathymetric range, 13·5–113 m., as compared with that of previously known specimens, 7–877 m., does not suggest an ecological variety. Further, the specimens from Stn. 45 alone show all maxima between approximately 0·35–0·6 mm. diameter in the spherasters.

It is of interest to record that in some specimens the cortex may contain mainly spherasters measuring 0·08–0·25 mm. diameter, with a few reaching a diameter of 0·4 or even 0·6 mm., and in others the cortex is almost entirely filled with spherasters of 0·3–0·6 mm. diameter with a few of the smaller sizes scattered between. It does seem therefore that we must accept a fairly wide range of variation in the sizes of the spherasters and in their relative abundance as normal for the species.

Distribution.—SW. Australia ; Aru Island ; Indian Ocean (Amirante, Andamans) ; Florida and West Indies ; 7–877 m.

Order LITHISTIDA.

Genus *Discodermia* Bocage.

Discodermia natalensis Kirkpatrick.

Discodermia natalensis Kirkpatrick, 1903 : 172, pl. iv, figs. 2–3 ; Burton, 1929 : 5.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

Distribution.—Natal ; 91–183 m.

Discodermia emarginata Dendy.

Discodermia emarginata Dendy, 1905 : 99, pl. iv, fig. 4 ; Wilson, 1925 : 455 ; *D. emarginata*, var. *lamellaris* Wilson, 1925 : 456, pl. xliii, fig. 5.

Occurrence.—Stn. 123, January 22, 1934, Zanzibar Area (5° 19′ 00″ S., 39° 32′ 30″ E. to 5° 19′ 12″ S., 39° 33′ 30″ E.), 256–366 m., bottom green sand, mud and rock.

Distribution.—Ceylon ; Philippines ; 183 m.

Genus *Theonella* Gray.

Theonella lacerata Lendenfeld.

Theonella lacerata Lendenfeld, 1906 : 347, pl. xliv, figs. 1–13, pl. xlv, figs. 1–7.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Distribution.—Sumatra ; 371 m.

Theonella discifera Lendenfeld.

Theonella discifera Lendenfeld, 1906 : 351, pl. xliii, figs. 5–18.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

Distribution.—West coast of Australia, 65 m.

Theonella pulchrifolia Dendy.

Theonella pulchrifolia Dendy, 1921 : 5, pl. ix, fig. 1.

Occurrence.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Remarks.—The species is represented by a small, ear-shaped specimen, 5 mm. high, the spiculation of which agrees very closely with that of the holotype except that the microscleres are microstrongyla instead of microxea.

Distribution.—Salomon ; 209–273 m.

Genus *Corallistes* Schmidt.

Corallistes bowerbanki (Johnson).

Dactylocalyx bowerbanki Johnson, 1863 : 257 ; *D. masoni* Bowerbank, 1869 : 91, pl. vi, figs. 1–4 ; *D. bowerbanki* Bowerbank, 1869 : 94, pl. vi, figs. 5–8 ; *Corallistes typus* Schmidt, 1870 : 22, pl. iii, fig. 3 ; *Dactylocalyx bowerbanki* Carter, 1873 : 437 ; *D. masoni* Carter, 1873 : 437 ; *Corallistes bowerbanki* Carter, 1876 : 460 ; Zittel, 1878 : 103 ; *C. masoni* Zittel, 1878 : 103 ; *C. typus* Zittel, 1878 : 103 ; *C. typus* Sollas, 1888 : 301, pl. xxxiv, figs. 14–18a ; *C. masoni* Sollas, 1888 : 303, pl. xxxiv, figs. 1–13 ; *C. bowerbanki* Sollas, 1888 : 308 ; Topsent, 1892 : 51, pl. viii, fig. 2 ; *Coscinospongia masoni* Lendenfeld, 1903 : 136 ; *C. typus* Lendenfeld, 1903 : 136 ; *C. bowerbankii* Lendenfeld, 1903 : 137 ; *Corallistes typus* Burton, 1929 : 5.

Occurrence.—Stn. 123, January 22, 1934, Zanzibar Area (5° 19′ 00″ S., 39° 32′ 30″ E. to 5° 39′ 12″ S., 39° 33′ 30″ E.), 256–366 m., bottom green mud, sand and rock.

Distribution.—Portugal, Azores, Madeira, Pernambuco, Florida, Natal ; 91–684 m.

Genus *Taprobane* Dendy.

Taprobane herdmani Dendy.

Taprobane herdmani Dendy, 1905 : 103, pl. i, fig. 8, pl. iv, fig. 2; Dendy, 1921 : 7, pl. i, fig. 1.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Amirantes ; Gulf of Manaar ; 16–71 m.

Genus *Microscleroderma* Kirkpatrick.

Microscleroderma hirsutum Kirkpatrick.

Microscleroderma hirsutum Kirkpatrick, 1903 : 173, pl. iv, fig. 1.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The specimens include a complex mass of caliculate individuals. 170 mm. across, and some fragments, all with typical spiculation.

Distribution.—Natal ; 165 m.

Sub-order Sigmatosclerophora.

Family Haploscleridæ.

Genus *Haliclona* Grant.

Haliclona camerata (Ridley).

Reniera camerata Ridley, 1884 : 605, pl. liii, fig. H, pl. liv, fig. n ; Topsent, 1897 : 474 ; Dendy, 1921 : 31 ; *Haliclona camerata* Burton, 1934 : 531.

Occurrence.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.

Remarks.—A typical specimen 25 mm. across.

Distribution.—Indian Ocean (Seychelles, Amirante, Salomon) ; Amboina ; Great Barrier Reef ; 4–31 m.

Haliclona cribriformis (Ridley).

Reniera cribriformis Ridley, 1884 : 606, pl. liii, fig. G, pl. liv, fig. o ; Topsent, 1897 : 475, pl. xviii, fig. 10 ; Dendy, 1921 : 31.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

Distribution.—Seychelles ; Amboina ; 22–80 m., bottom coral.

Haliclona flagellifer (Ridley and Dendy).

Gellius vagabundus, var. γ Vosmaer, 1885 : 28, pl. v, figs. 37–38 ; *G. flagellifer* Ridley and Dendy, 1886 : 333 ; Ridley and Dendy, 1887 : 42, pl. xiii, figs. 5, 10 ; Lundbeck, 1902 : 71, pl. ii, fig. 9, pl. xiv, fig. 1 ; Stephens, 1921 : 5 ; Dendy, 1921 : 26 ; *G. vagabundus* Babić, 1921 : 3 ; Babić 1922 : 228, fig. H ; *G. flagellifer* Dendy, 1924 : 320 ; Razvoj, 1928 : 91 ; Burton, 1928 : 114 ; *G. vagabundus* Topsent, 1928 : 314, pl. xi, fig. 1 ; *G. flagellifer* Hentschel, 1929 : 978.

Occurrence.—Stn. M.B. I (d), September 17, 1933, Bay between Great Hanish and Suyul Hanish Islands, Red Sea, 26 m., bottom sand, shells and coral ; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Remarks.—The specimen from Stn. 157 is encrusting, about 1 mm. thick, with oxea 0·32 by 0·02 mm., ordinary sigmata 0·03–0·08 mm. chord and flagellate sigmata 0·09 mm. chord. The specimen from Stn. M.B. I (d) is massive, 10 mm. across, with microscleres of similar dimensions but with oxea measuring 0·17 by 0·01 mm.

Distribution.—Arctic (Iceland, Barents Sea) ; North Atlantic (Canada : *teste* Stephens, 1921, SW. Ireland, Azores) ; Mediterranean (Monaco, Adriatic) ; Marion Is. ; Indian Ocean (Andamans, Saya da Malha) ; New Zealand ; 91–1378 m.

Haliclona cf. *ochracea* (Keller).

Ceraochalina ochracea Keller, 1889 : 387, pl. xxiv, fig. 46.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13′ 35″ 30″ N., 42° 35′ 05″ E.), 245 m.

Remarks.—The present specimen is so strikingly like the holotype, as figured by Keller, that it can be called in a literal sense, practically identical with it. Its spicules measure 0·2 by 0·012 mm., as against 0·1 by 0·0015 mm. in the holotype. In spite of the difference in the sizes of the spicules, however, I feel confident that this is a further representative of Keller's species.

Distribution.—Red Sea.

Haliclona contignata (Thiele).

Petrosia contignata Thiele, 1899 : 20, pl. ii, fig. 8, pl. v, fig. 13.

Occurrence.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m. ; Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ N., 39° 14′ 12″ E.), 73–165 m.

Distribution.—Celebes.

Haliclona irregularis (Kirkpatrick).

Stylotella irregularis Kirkpatrick, 1900 : 137, pl. xii, fig. 4, pl. xiii, fig. 6 ; *Axinosia irregularis* Hallmann, 1914 : 349.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m. ; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Distribution.—Indian Ocean (Christmas Island), littoral.

Haliclona expansa (Thiele).

Protoschmidtia expansa Thiele, 1903 : 939, fig. 4 ; Burton, 1928 : 116.

Occurrence.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Distribution.—Ternate ; Andamans ; 2377 m.

Haliclona obtusispiculifera (Dendy).

Chalina obtusispiculifera Dendy, 1905 : 150, pl. x, fig. 9.

Occurrence.—Stn. D (?), September 9, 1933, Red Sea, 23 m.

Distribution.—Ceylon.

Haliclona decidua Topsent.

Reniera decidua Topsent, 1906 : 560.

Occurrence.—Stn. 110, January 14, 1934, Zanzibar Area (5° 03′ 42″ S., 39° 15′ 24″ E. to 5° 05′ 48″ S., 39° 15′ 12″ E.), 73–165 m., bottom rock (?).

Distribution.—Red Sea.

Haliclona tabernacula (Row).

Reniera tabernacula Row, 1911 : 316, fig. 9 ; *R. spinosella* Row, 1911 : 317, fig. 10 ; *Halichondria bubastes* Row, 1911 : 319, fig. 11 ; *Reniera spinosella* Burton, 1926 : 73 ; *R. tabenacula* Burton, 1926 : 74 ; *nec R. spinosella* Thiele, 1905.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Suez Canal ; Red Sea.

Haliclona seychellensis (Dendy).

Petrosia seychellensis Dendy, 1921 : 35, pl. ii, figs. 3–4, pl. xii, fig. 5.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Remarks.—There are nine large specimens, the largest 130 mm. across, and one fragment. Although collected at two widely-separated stations there is a fair agreement between them in external and internal characters.

Distribution.—Indian Ocean (Amirante, 40–156 m., Seychelles, 68 m.).

Haliclona tuberosa (Dendy).

Reniera tuberosa Dendy, 1921 : 33, pl. iii, fig. 2, pl. xii, fig. 2.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Indian Ocean (Saya de Malha, Diego Garcia) ; 100 m.

Haliclona cerebrum (Burton).

Protoschmidtia cerebrum Burton, 1928 : 116, pl. i, fig. 2.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

Remarks.—There is a much damaged specimen, with a skeleton of strongyla forming a close-meshed reticulation, which seems to belong here. The consistency is hard, almost stony, and what little can be seen of the external features agrees with what is known of the holotype. The spicules themselves are 0·4 by 0·016 mm., which is larger than those of the holotype and they should perhaps be described as substrongyla. Despite these differences, and in spite of the geographical separation, the identification of this specimen with the holotype from the Andamans seems fairly well justified.

Distribution.—Andamans ; 82–378 m.

Haliclona carteri **sp. n.**

Isodictya simulans (No. 71), Carter, 1887 : 69 ; *nec Isodictya simulans* Bowerbank.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Diagnosis.—Sponge encrusting ; surface even, undulating, minutely hispid ; oscules small, scattered ; texture firm ; colour, dried, light brown ; skeleton a dense, somewhat confused, subisodictyal reticulation ; megascleres oxea, 0·14 by 0·008 mm. ; microscleres absent.

Distribution.—Mergui Archipelago.

Genus *Adocia* Gray.

Adocia sagittarius (Sollas).

Gellius sagittarius Sollas, 1902 : 212, pl. xv, fig. 7 ; *G. angulatus*, var. *canaliculata* Dendy, 1905 : 136, pl. ix, fig. 7 ; *G. canaliculata* Burton, 1928 : 114 ; *nec G. angulatus*, var. *canaliculata* Topsent, 1904.

Occurrence.—Stn. 139, March 25, 1934, Maldive Area (Anchorage, E. side of Kolumadulu Atoll : 2° 13′ 30″ N., 73° 09′ 00″ E.), 57 m., bottom coral sand.

Distribution.—Arabian Sea ; Ceylon ; west coast of Malay Peninsula ; littoral to 1150 m.

Adocia fibulatus (Schmidt), var. *microsigma* (Dendy).

Gellius fibulatus Dendy, 1905 : 136 ; *G. fibulatus*, var. *microsigma* Dendy, 1916 : 107 ; Dendy, 1921 : 26 ; *Adocia fibulatus*, var. *microsigma* Burton, 1934 : 539.

Occurrence.—Stn. 141, March 26, 1934, Maldive Area (3° 04′ 30″ N., 73° 22′ 42″ E.), 44 m., bottom coarse sand, shells and coral.

Distribution.—Indian Ocean (Okhamandal, Ceylon, Coevity, Coin Peros, Egmont Reef) ; Great Barrier Reef ; 0–31 m.

Adocia pigmentifera (Dendy).

Reniera pigmentifera Dendy, 1905 : 143, pl. ix, fig. 10.

Occurrence.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.

Distribution.—Ceylon, 18 m.

Adocia digitata (Baer).

Halichondria digitata Baer, 1906 : 12, pl. i, fig. 7, pl. iv. figs. 12–14.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

Remarks.—The single specimen, a fragment, is digitate, 25 mm. long and 3 mm. diameter. The colour is greenish-yellow and the skeleton like that described by Baer, except that the spicules measure 0·17 by 0·009 mm. instead of 0·1 by 0·005 mm.

Distribution.—Zanzibar.

Adocia cf. *semifibrosa* (Dendy).

Reniera semifibrosa Dendy, 1916 : 111, pl. ii, fig. 13.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

Remarks.—The skeleton of the present specimen contains a good deal of sand in its slender fibres, so that an exact comparison with known species is not possible. It could with equal justice be assigned to *Adocia ramusculoides* (Topsent), *A. hornelli* (Dendy) or *A. fibroreticulata* (Dendy), all from this same area of the Indian Ocean.

Adocia tufoides (Dendy).

Reniera tufoides Dendy, 1921 : 33, pl. ii, fig. 2, pl. xii, fig. 3.

Occurrence.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Distribution.—Amirante, 512 m.

Petrosia testudinaria (Lamarck).

Alcyonium testudinarium Lamarck, 1815 : 167 ; Lamarck, 1816 : 401 ; *Reniera crateriformis* Carter, 1882 : 115 ; *R. testudinaria* Ridley, 1884 : 409 ; *R. crateriformis* Carter, 1887 : 71 ; *Petrosia testudinaria* Dendy, 1889 : 77, pl. iii, figs. 1–3 ; Dendy, 1905 : 144, fig. 1 ; Hentschel, 1912 : 403 ; Topsent, 1920 : 7 ; Wilson, 1925 : 399, pl. xl, fig. 6 ; *P. testudinaria* var. *fistulophora* Wilson, 1925 : 401, pl. xl, fig. 5, pl. xli, figs. 1–2, pl. xlviii, fig. 8 ; *P. testudinaria* Topsent, 1933 : 40.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand ; Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m. ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

DISTRIBUTION.—Ceylon; Mergui; Aru Is.; Queensland, Australia; Philippines; 7–15 m.

Petrosia mauritiana (Carter).

Chalina polychotoma, var. *mauritiana* Carter, 1885 : 402, pl. xiv, fig. 13.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

REMARKS.—Carter's original specimen has the main skeleton a loose reticulation of strongyla, 0·017 by 0·003 to 0·32 by 0·018 mm. In addition, there is a dense tangential ectosomal skeleton of similar spicules.

DISTRIBUTION.—Mauritius.

Petrosia nigricans Lindgren.

Petrosia nigricans Lindgren, 1897 : 480; Lindgren, 1898 : 5, pl. xvii, fig. 5, pl. xix, fig. 4; *P. imperforata* Thiele, 1899 : 20, pl. ii, fig. 7, pl. v, fig. 12; *P. cancellata* Thiele, 1903 : 938, fig. 3; *P. similis*, var. *delicatula* Dendy, 1905 : 145; *P. similis*, var. *halichondrioides* Dendy, 1905 : 145; *P. densissima* Dendy, 1905 : 145, pl. ix, fig. 9; *P. nigricans*, var. *irregularis* Hentschel, 1912 : 405; *P. mammiformis* Dendy, 1921 : 36, pl. xii, fig. 6; *P. dura* Dendy and Frederick, 1924 : 498.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand; Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ N., 39° 14′ 12″ E.), (73–165 m.); Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DISTRIBUTION.—Ceylon, Salomon, Java, Celebes, Ternate, SW. Australia; 18–137 m.

Genus *Oceanapia* Gray.

Oceanapia putridosum (Lamarck).

Alcyonium putridosum Lamarck, 1815 : 168; Lamarck, 1816 : 402; 1836 : 608; *Rhizochalina putridosa* Ridley and Dendy, 1886 : 332; Ridley and Dendy, 1887 : 33, pl. viii, fig. 5, pl. ix, figs. 1, 7; Whitelegge, 1906 : 406; ? Wilson, 1925 : 419; ? Burton, 1928 : 118; *Phlæodictyon putridosum* Topsent, 1933 : 42, pl. iii, fig. 8; *nec Rhizochalina putridosa* Topsent, 1892.

OCCURRENCE.—Stn. 144, March 31, 1934, Maldive Area (5° 26′ 06″ N., 73° 22′ 24″ E.), 31 m., bottom coral, shell and sand.

DISTRIBUTION.—Australia (Bass Strait, Port Jackson), 55–70 m., ? Philippines; ? Indian Ocean (Orissa Coast).

Oceanapia fistulosa (Bowerbank).

Desmacidon fistulosa Bowerbank, 1873 : 19, pl. iv, figs. 7–8; Carter, 1882 : 121.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Australia (Freemantle).

Oceanapia canalis (Ridley).

Rhizochalina canalis Ridley, 1884 : 422, pl. xxxix, fig. F, pl. xli, fig. r.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Arafura Sea; Torres Straits; Port Darwin; 17–66 m.

Oceanapia elastica (Keller).

Reniera elastica Keller, 1891 : 306, pl. xvi, figs. 3, 7; *Petrosia elastica* Lindgren, 1897 : 480; Lindgren, 1898 : 5, pl. xviii, fig. 13, pl. xix, fig. 5; *Oceanapia elastica* Burton, 1934 : 546.

OCCURRENCE.—Stn. 139, March 25, 1934, Maldive Area (2° 13′ 30″ N., 73° 09′ 00″ E.), 57 m., bottom coral and sand.

DISTRIBUTION.—Red Sea; Java; Australia (Great Barrier Reef); 34–45 m.

Ocenapia media (Thiele).

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

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

DISTRIBUTION.—Celebes.

Oceanapia zoologica (Dendy).

Reniera zoologica Dendy, 1905 : 143, pl. ix. fig. 8.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area '5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 m.; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Gulf of Manaar).

Oceanapia incrustata (Dendy).

Phlæodictyon incrustatum Dendy, 1921 : 49, pl. xii, fig. 15.

OCCURRENCE.—Stn. 11, September 18, 1933, Red Sea (12° 55′ 42″ N., 43° 11′ 42″ E. to 12° 53′ 36″ N., 43° 11′ 18″ E.), 207 m., bottom rock.

DISTRIBUTION.—Indian Ocean (Egmont Reef).

Oceanapia cf. *cagayense* (Wilson).

Phlæodictyon cagayense Wilson, 1925 : 420, pl. xlii, fig. 3, pl. xlviii, fig. 10.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

REMARKS.—Of the two specimens, one is large, in pieces, and probably measured 100 mm. across when complete. It is irregularly massive and the colour is a deep greenish-grey, almost black. The second, a fragment, is digitate, a slightly lighter colour than the first, and about 30 mm. long. In appearance and in the structure of the skeleton both bear a strong resemblance to Wilson's species, and the spicules are oxea and sub-

strongyla. The main difference rests in the dimensions of the spicules, which are 0·36 by 0·012 mm., against 0·2 by 0·01–0·014 mm. in the holotype.

DISTRIBUTION.—Philippines.

Genus *Callyspongia* Duchassaing and Michelotti.

Callyspongia diffusa (Ridley).

(For synonymy see Burton, 1934 : 541.)

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth uncertain, 73–165 m.

DISTRIBUTION.—Ceylon ; Singapore ; Java ; Australia (Torres Straits, east and south-west coasts) ; littoral to 18 m.

Callyspongia subarmigera (Ridley).

Cladochalina subarmigera Ridley, 1884 : 397, pl. xxxix, fig. H, pl. xli, fig. L ; *Chalinopora subarmigera* Lendenfeld 1887 : 767 ; *Chalina subarmigera* Lindgren, 1897 : 481 ; Lindgren, 1898 : 13 ; *Callyspongia subarmigera* Burton, 1934 : 540.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Red Sea, 26 m. ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?) ; Stn. M.B. I (b), September 17, 1933, Bay between Great Hanish and Suyul Hanish Islands, Red Sea, 29 m., bottom sand, shell and coral.

DISTRIBUTION.—Northern Australia (Torres Straits, Albany Island) ; Cochin-China ; 5–45 m.

Callyspongia confœderata (Ridley).

Tuba confœderata Ridley, 1884 : 400 ; *Siphonella laxa* Lendenfeld, 1887 : 803, pl. xxiv, fig. 55 ; *Siphonochalina confœderata* Lendenfeld, 1887 : 803, pl. xxv, fig. 60 ; *S. typica* Lendenfeld, 1887 : 804, pl. xxiv, fig. 54, pl. xxvii, figs. 2–19 ; *S. elastica* Lendenfeld, 1887 : 805 ; *S. paucispina* Lendenfeld, 1887 : 805 ; *S. axialis* Lendenfeld, 1887 : 805, pl. xxiv, fig. 53 ; *S. extensa* varr. *dura*, *elegans* Lendenfeld, 1887 : 806 ; *Siphonella tuberculata* Lendenfeld, 1887 : 808 ; *Spinosella confœderata* Topsent, 1897 : 479, pl. xix, fig. 20 ; *Callyspongia confœderata* Burton, 1934 : 541.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Amboina ; Australia (north, west and east coasts).

Callyspongia fibrosa (Ridley and Dendy).

Dasychalina fibrosa Ridley and Dendy, 1886 : 330.

(For synonymy see Burton, 1934 : 540.)

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—? Off Bahia and Bermuda ; ? Mergui ; Ceylon ; Java ; Cochin-China ; Aru and Kei Is. ; Philippines ; Great Barrier Reef ; 10–45 m.

Callyspongia spinosissima (Dendy).

Pachychalina spinosissima Dendy, 1887 : 524, pl. xliv ; *P. subcylindrica* Dendy, 1905 : 148, pl. x, figs. 1–2 ; Dendy, 1921 : 41, pl. viii, fig. 1 ; *Cladochalina subcylindrica* Burton, 1927 : 511.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 50, October 31, 1933, South Arabian Coast (18° 38′ 00″ N., 58° 05′ 00″ E.), 1939 m., bottom brown mud ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

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

DISTRIBUTION.—Indian Ocean (Providence, Ceylon, Christmas Island) ; 16–53 m.

Callyspongia clathrata (Dendy).

Chalina clathrata Dendy, 1905 : 151, pl. x, fig. 3 ; *Callyspongia clathrata* Burton, 1934 : 543.

OCCURRENCE.—Stn. A, September 3, 1933, Red Sea (29° 17′ 00″ N., 32° 43′ 00″ E.), 65 m., bottom soft yellow mud.

DISTRIBUTION.—Ceylon.

Callyspongia barodensis **sp. n.**

Siphonochalina communis (pars), Dendy, 1905 : 155 ; *S. crassifibra* Dendy, 1916 : 114.

HOLOTYPE.—B.M. 25.11.1.230.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge tubular ; surface even, smooth ; oscules apical ; texture firm, elastic ; colour, in spirit, yellow to brown ; main skeleton a subrectangular reticulation of multispicular fibres (20–30 spicules) ; ectosomal skeleton a triangular reticulation of multispicular fibres (5–8 spicules) subdivided by a secondary, uni- to bispicular mesh ; megascleres oxea, 0·07 by 0·003 mm. ; microscleres absent.

DISTRIBUTION.—Indian Ocean (Okhamandal, Ceylon) ; 5–15 m.

Callyspongia rowi **sp. n.**

Gelliodes poculum, var., Row, 1911 : 328.

HOLOTYPE.—B.M. 12.2.1.53.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge tubular; surface even, smooth; oscules apical; texture soft, fragile; colour, in spirit, yellowish-white; main skeleton a subregular rectangular reticulation of multispicular fibres (ascending fibres 3–7 spicules, connectives 2–5 spicules), with occasional uni- or bispicular secondary connectives; ectosomal skeleton a tangential reticulation of uni- or trispicular fibres, enclosing triangular to rectangular mesh, subdivided by a unispicular reticulation; megascleres oxea, 0·14 by 0·008 mm.; microscleres absent (sigmata recorded by Row appear to be foreign).

DISTRIBUTION.—Red Sea; 9 m.

Genus *Gelliodes* Ridley.

Gelliodes fibulatus Ridley.

? *Gellius couchi*, var. *ceratina* Ridley, 1884 : 423; *Gelliodes fibulatus* Ridley, 1884 : 427, pl. xxxix, fig. I, pl. xli, fig. b; ? *Fibularia ramosa* Carter, 1887 : 71, pl. vii, figs. 1–3; *Gelliodes fibulata* Ridley and Dendy, 1887 : 47, pl. xii, fig. 2; Lendenfeld, 1887 : 793; ? *Pachychalina joubini* Topsent, 1897 : 480, pl. xix, fig. 19; *P. fragilis* Lindgren, 1897 : 481; Lindgren, 1898 : 8; *Gelloides* (sic) *ramosa* Kieschnick, 1898 : 47; ? *Pachychalina conulosa* Kieschnick, 1898 : 51; *Gelloides ramosa* Kieschnick, 1900 : 565, pl. xliv, fig. 3; ? *Pachychalina conulosa* Kieschnick, 1900 : 568, pl. xliv, fig. 8; *Gelliodes fibulatus* Hentschel, 1912 : 393; ? *Cladochalina joubini* Burton, 1927 : 510; *Sigmaxynissa fibulata* Burton, 1928 : 115; *nec Fibularia ramosa* Carter, 1882.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

DISTRIBUTION.—Malay Area (Mergui Archipelago, Amboina, Java, Aru Is., Torres Strait); 5–20 m. (? also to 65 m.).

Family DESMACIDONIDÆ.

Sub-family MYCALINÆ.

Genus *Biemna* Gray.

Biemna fortis (Topsent).

Desmacella fortis Topsent, 1897 : 463, pl. xxi, fig. 30; Sollas, 1902 : 213; *Biemna fortis* Hentschel, 1912 : 350; Burton, 1930 : 523.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

DISTRIBUTION.—Red Sea, Amboina (Topsent); Malay Peninsula, littoral (Sollas); Aru and Kei Islands; 18–40 m., on rocks (Hentschel).

Biemna trirhaphis (Topsent).

Desmacella peachi, var. *trirhaphis* Topsent, 1897 : 461, pl. xviii, fig. 9, pl. xxi, fig. 35; *Biemna trirhaphis* Burton, 1930 : 523.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.

DISTRIBUTION.—Amboina.

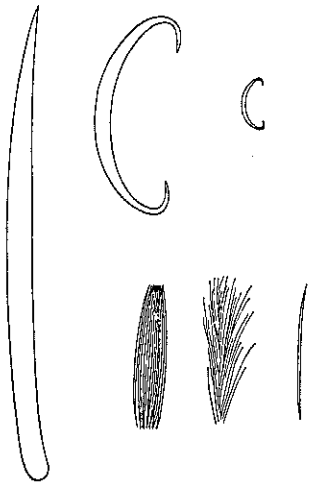
Biemna ciocalyptoides sp. n.

(Text-fig. 14.)

HOLOTYPE.—B.M. 1936.3.4.431.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shingle.

DIAGNOSIS.—Sponge massive, pyramidal, bearing numerous erect, slender, pointed processes; surface mainly smooth, minutely aculeate on the processes; oscules conspicuous, 2–5 mm. diameter, irregularly scattered; texture firm, compressible, fragile; colour



TEXT-FIG 14.—*Biemna ciocalyptoides* sp. n. Style, ×150, sigmata, of two sizes, and microxea, in dragmata and one isolated spicule with hair-like raphides between, ×600.

in spirit, pale yellowish-grey; skeleton of irregularly scattered styli, 0·9 by 0·032 mm.; microscleres sigmata, of two sizes, 0·012–0·02 and 0·052–0·075 mm. chord respectively, microxea, 0·16 by 0·004 mm., in dragmata, and hair-like raphides, 0·16 mm. long, in wisp-like dragmata measuring 0·4 mm. long.

REMARKS.—The species is characterized by its striking external form and by the undulating, wisp-like strands of raphides. In addition, it differs from all known species of *Biemna* in other details of its spiculation.

It is not possible to be sure of the exact measurements of the raphides. The dragmata measure about 0·4 mm. in length, but in spicule preparations the separated raphides are too fine and too sinuous to be followed readily; and although individual spicules were measured, always about 0·16 mm. long, there was the constant suspicion that they might be incomplete. For the most part, the dragmata remain intact after boiling in nitric acid, and, as a consequence, it is not easy to find individual spicules to measure.

Genus *Desmacella* Schmidt.

Desmacella annexa Schmidt.

(For synonymy see Burton, 1930 : 525.)

Occurrence.—Stn. 122, January 22, 1934, Zanzibar Area (5° 21′ 24″ S., 39° 23′ 00″ E. to 5° 22′ 36″ S., 39° 22′ 18″ E.), 732 m., bottom grey-green mud.

Remarks.—This is the second record for the Indian Ocean of a common North Atlantic species. The present specimen is, moreover, more nearly typical than those from the "Investigator" collections (see Burton, 1928, p. 120).

Distribution.—Iceland; Norway; south-west Ireland to Bay of Biscay; Mediterranean; Florida; Indian Ocean (Gulf of Oman and Laccadive Sea); 40–1331 m., bottom sand and shells, coral, Pteropod ooze.

Genus *Mycale* Gray.

Mycale (*Mycale*) *sulevoidea* (Sollas).

Esperella sulevoidea Sollas, 1902 : 213, pl. xiv, figs. 8–9, pl. xv, fig. 10; *Mycale sulevoidea* Hentschel, 1912 : 335, pl. xiii, fig. 6, pl. xviii, fig. 14.

Occurrence.—Stn. M.B.I.(d), September 17, 1933, Red Sea, 26 m., bottom sand, shells and coral.

Distribution.—Straits of Malacca; Arafura Sea; littoral to 18 m.

Mycale (*Mycale*) *murrayi* (Ridley and Dendy).

Esperella murrayi Ridley and Dendy, 1886 : 338; Ridley and Dendy, 1887 : 67, pl. xiii, figs. 11, 13–18, pl. xiv, fig. 1.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.) 73–220 m., bottom coarse sand, shingle and (?) rock.

Remarks.—Topsent (1924) saw in *Esperella murrayi* a synonym of the North Atlantic *Mycale lingua* (Bowerbank). He may have been right in this, but in view of small differences in the spiculation, and the wide geographical separation, it is preferable to retain a distinction between the two, at least for the moment.

Distribution.—Off Port Jackson, Australia, 55–64 m.

Mycale (*Mycale*) *sulcata* Hentschel.

Mycale sulcata Hentschel, 1911 : 307, fig. 11.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″E.), 113 m., bottom coral rock.

Remarks.—This species is represented by a small encrusting specimen, having the large anisochelæ so characteristic in shape. Instead of small sigmata (0·014–0·016 mm.) it has large sigmata, 0·04–0·086 mm. chord but mainly of the larger sizes. In addition, the subtylostyli are 0·8 by 0·02 mm., the anisochelæ are 0·04–0·1, 0·024 and 0·016 mm. chord respectively, and the trichodragmata up to 0·12 mm. long. In spite of these differences, however, the striking appearance of the large anisochelæ is still sufficient to identify this specimen with Hentschel's species.

Distribution.—South-West Australia; 1–6 m.

Mycale (*Mycale*) *massa* (Schmidt) var. *occanica* Topsent.

Mycale massa, var. *occanica* Topsent, 1924 : 91, fig. 2 m–n.

Occurrence.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

Remarks.—This small, oval specimen, 30 mm. high, has a skeleton very like that described for the var. *occanica* from the Atlantic. Its megascleres are strongyloxea, 1·0 by 0·02 mm.; its microscleres anisochelæ, of three sizes, 0·09–0·1, 0·04–0·044 and 0·02 mm. chord respectively, sigmata, of two sizes, 0·01–0·012 and 0·052–0·072 mm. chord respectively, and trichodragmata, 0·03–0·1 mm. long. Not only do the dimensions of the spicules agree closely, but their shapes do also.

It is interesting to find the typical Mediterranean species having a variety in the Atlantic, and the same variety (apparently) in the Indian Ocean.

Distribution.—North-West Africa; Azores; 140–175 m.

Mycale (*Mycale*) *topsenti* **sp. n.**

(Text-fig. 15.)

Holotype.—B.M. 1936.3.4.542.

Occurrence.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

Diagnosis.—Sponge small, massive rounded; surface uneven, markedly hispid, with inconspicuous pore-cracks; oscules not apparent; texture soft, compressible; colour, in spirit, pale yellow to dark greenish-grey; skeleton of ascending bundles of subtylostyli ending in a tangential layer of similar megascleres beyond which extend diffuse brushes projecting at right angles to surface; megascleres subtylostyli, 0·9 by 0·018 mm.; microscleres anisochelæ of three sizes, 0·088, 0·04 and 0·02 mm. chord respectively, sigmata, 0·06–0·08 mm. chord, and trichodragmata, 0·06 mm. long.

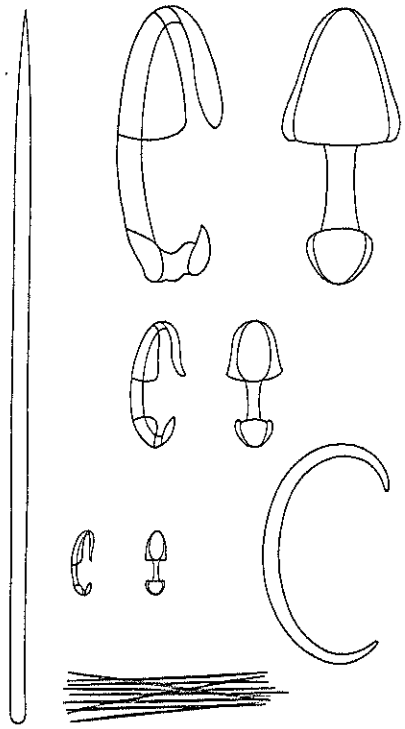
Remarks.—The shapes of the spicules and the combination of categories present gives this species a strong resemblance to *M. pellucida* (Ridley) and *M. gelatinosa* (Ridley), which have much in common with each other. But whereas these two fall into the subgenus *Ægagropila* (see Topsent, 1924), the present species is more properly to be placed in the subgenus *Mycale*.

Genus *Hamacantha* Gray.

Hamacantha mindanaensis Wilson.

Hamacantha esperioides, var. *mindanaensis* Wilson, 1925 : 437.

Occurrence.—Stn. 152, April 4, 1934, Maldive Area (4° 49′ 24″ N., 72° 46′ 30″ E. to 4° 48′ 42″ N., 72° 40′ 30″ E.), 878 m., bottom green sand; Stn. 157, April 6, 1934, Maldive



TEXT-FIG. 15.—*Mycale topsenti* sp. n. Subtylostyle, ×150, anisochelæ of three sizes, sigma and trichodragmata, all ×600.

Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DISTRIBUTION.—Philippines.

Hamacantha simplex sp. n.

(Text-fig. 16.)

HOLOTYPE.—B.M. 1936.3.4.412.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge thinly encrusting; surface smooth, even; oscules not apparent; textile soft; colour, in spirit, white; main skeleton a confused reticulation of oxea, 0·24 by 0·007 mm., with a ectosomal, tangential reticulation of similar spicules; microscleres diancistra, 0·17 mm. chord, and sigmata, 0·017–0·02 mm. chord.

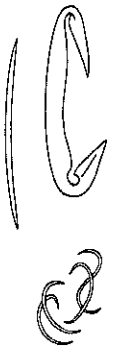
Genus *Guitarra* Carter.

Guitarra fimbriata Carter.

(For synonymy see Burton, 1929 : 426.)

OCCURRENCE.—Stn. 11, September 18, 1933, Red Sea (12° 55′ 42″ N., 43° 11′ 42′ E. to 12° 53′ 36″ N., 43° 11′ 18″ E.), 207 m., bottom rock; Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

DISTRIBUTION.—Gulf of Mexico; Azores; Falkland Islands; South Georgia; Antarctic; New Zealand; Indian Ocean (Okhamandal); 64–1165 m.



TEXT-FIG. 16.—*Hamacantha simplex* sp. n. Oxeote, ×150, diancistron and sigmata, ×600.

Sub-family MYXILLINÆ.

Genus *Myxilla* Schmidt.

Myxilla simplex (Baer).

Dendoryx simplex Baer, 1906 : 21, pl. ii, fig. 7, pl. v, figs. 20–25; *Myxilla simplex* Stephens, 1915 : 447, pl. xxxix, figs. 1b, 4c.

OCCURRENCE.—Stn. 24, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shells and (?) rock.

REMARKS.—It is surprising to find this species represented in the hauls from the Gulf of Aden and I was inclined at first to doubt the accuracy of the identification. The spiculation is, however, so closely similar to that described by Stephens that there is little room for doubt.

DISTRIBUTION.—South Africa (Table Bay, Saldanha Bay); littoral to 46 m.

Myxilla dendyi sp. n.

Myxilla incrustans Dendy, 1921 : 89; *nec M. incrustans* (Johnson) Autt.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge massive or encrusting, and agglutinating, usually containing a considerable quantity of sand and other foreign matter in its tissues; surface even, smooth; texture soft and compressible; vent not seen; pores in sieves; colour, in spirit, pale greyish-yellow to light brown; skeleton a subisodictyal network of acanthostyli, with mucronate tornota; microscleres chelæ spatuliferæ and sigmata of one size only.

Dimensions of spicules:

(1) acanthostyli, 0·16 by 0·008 mm.,
(2) tornota, with a single mucron at each end, 0·16 by 0·003 mm.,
(3) chelæ spatuliferæ, 0·02 mm., chord,
(4) sigmata, up to 0·035 mm. chord.

REMARKS.—This species has some resemblance to the well known *Myxilla incrustans* (Johnson) but differs in four well defined characters:

(1) The spicules are smaller;
(2) the chelæ are not differentiated into two categories;
(3) the tornota have no ornament other than the single mucron;
(4) the body of the sponge is filled with foreign matter.

DISTRIBUTION.—Praslin Reef, Indian Ocean.

Genus *Lissodendoryx* Topsent.

Lissodendoryx ciocalyptoides sp. n.

(Text-fig. 17.)

HOLOTYPE.—B.M. 1936.3.4.488.

OCCURRENCE.—Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

DIAGNOSIS.—Sponge incomplete, consisting of a hollow digitate process; surface rugose, hirsute; oscules not apparent; texture soft; colour, in spirit, pale yellow; skeleton subisodictyal, ascending fibres 2–4 spicules thick, connectives uni- or bispicular; megascleres styli, 0·6 by 0·024 mm., tornota, with ends strongylote, subtylote or bluntly oxeote, 0·28 by 0·008 mm.; microscleres isochelæ, 0·08 mm. chord, rarely as little as 0·04 mm. chord.

REMARKS.—The species differs from others of the genus in the absence of a second category of microscleres combined with the large size of the styli.

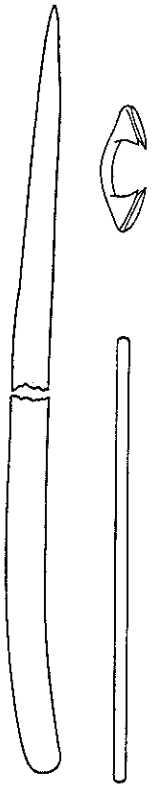
Lissodendoryx damirioides sp. n.

(Text-fig. 18)

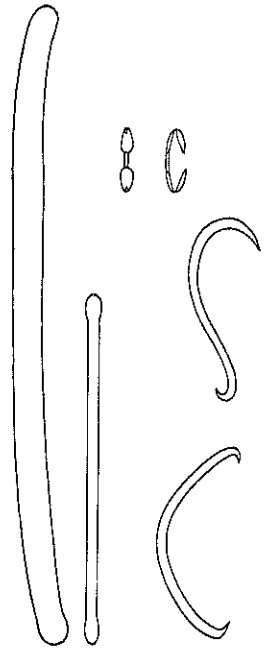
HOLOTYPE.—B.M. 1936.3.4.547.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

DIAGNOSIS.—Sponge small, encrusting to irregular, low-lying and massive; surface uneven, subaculeate; oscules minute, scattered; texture delicate, friable; colour, in spirit, pale yellow; skeleton an irregular sub-isodictyal reticulation of smooth, flexuous strongyla, 0·41 by 0·018 mm.; tornota with tylote ends scattered in ectosome and interstitially to main skeleton, 0·22 by 0·006 mm.; microscleres isochelæ, 0·02 mm. chord, and sigmata, 0·06 mm. chord.



TEXT-FIG. 17.—*Lissodendoryx ciocalyptoides* sp. n. Style and tornote, ×300, isochela, ×600.



TEXT-FIG. 18.—*Lissodendoryx damirioides* sp. n. Stongyle and tornote, ×300, isochelæ and sigmata, ×600.

REMARKS.—At first sight these specimens appeared to represent a new genus related to *Damiria* Keller and *Damiriopsis* Burton. Their real place seems, however, to be in the genus *Lissodendoryx*, where they find their nearest relative in *L. grata* (Thiele). Examination of the new species leads to the suggestion that *Damiria simplex* Keller and *Damiriopsis brondstedti* Burton should be more correctly regarded as aberrant members of the genus *Lissodendoryx*.

Lissodendoryx tubicola sp. n.

(Text-fig. 19.)

HOLOTYPE.—B.M. 1936.3.4.555.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

TEXT-FIG. 19.—*Lissodendoryx tubicola* sp. n. Style and tornote, ×300, isochela, ×600.

DIAGNOSIS.—Sponge small, encrusting to low-lying and irregularly massive, living on worm-tubes; surface subcerebriform, minutely hispid; oscules minute, scattered; texture soft, compressible; colour, in spirit, pale yellow; skeleton an irregularly subisodictyal reticulation of smooth styli, 0·5 by 0·018 mm.; tornota with tylote ends, occasionally bearing a few microspines, 0·36 by 0·006 mm.; microscleres isochelæ, 0·028–0·036 mm. chord.

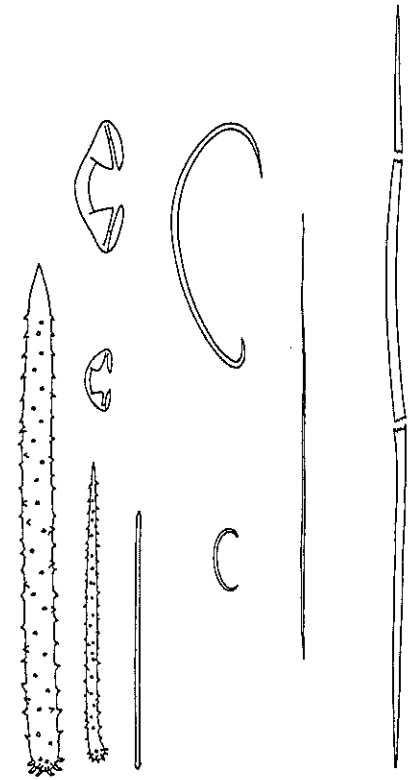
Genus *Ectyodoryx* Lundbeck.

Ectyodoryx rhaphidiophora sp. n.

(Text-fig. 20.)

HOLOTYPE.—B.M. 1936.3.4.482.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shells and (?) rock.

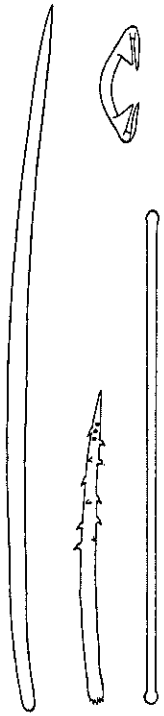


TEXT-FIG. 20.—*Ectyodoryx rhaphidiophora* sp. n. Acanthostyli and tornote, ×300, isochelæ, sigmata and raphides, of two sizes, ×600.

DIAGNOSIS.—Sponge massive, somewhat lobose; surface even, minutely hispid; oscules small, scattered; texture soft, compressible; colour, in spirit, yellowish-brown; skeleton a subisodictyal reticulation of acanthostyli, 0·32 by 0·016 mm., sparingly echinated at nodes by curved acanthostyli, 0·1–0·22 by 0·008 mm., and with scarce tornota, strongyote or subtylote or submucronate at ends, 0·16 by 0·004 mm., scattered interstitially;

microscleres isochelæ, of two sizes, 0·016–0·02 and 0·04–0·06 mm. chord respectively, sigmata, of two sizes, 0·02 and 0·08 mm. chord respectively, and trichodragmata, 0·14 by 0·002 mm. and 0·4 by 0·004 mm.

Remarks.—The species is distinguishable from others of the genus by the presence of trichodragmata.



Text-fig. 21.—*Ectyodoryx coralliophila* sp. n. Style, acanthostyle and tornote, ×300, isochela, ×600.

Ectyodoryx coralliophila **sp. n.**

(Text-fig. 21.)

Holotype.—B.M. 1936.3.4.505.

Occurrence.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud; Stn. 157, April 6, 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Diagnosis.—Sponge encrusting to massive and low-lying on coral; surface uneven, glabrous; oscules small, inconspicuous; texture soft, delicate; colour, in spirit, pale yellowish-brown; skeleton a scattered and irregular reticulation of smooth styli, echinated at nodes by acanthostyli, with an ectosomal, tangential layer of tornota; megascleres

styli, 0·45 by 0·012 mm., acanthostyli, 0·2 by 0·012 mm., and tornota with tylote ends, 0·32 by 0·006 mm.; microscleres isochelæ arcuatæ, 0·024–0·052 mm. chord.

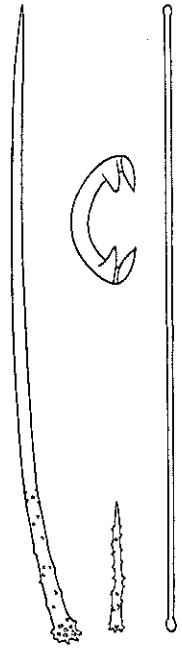
Genus *Hymedesmia* Bowerbank.

Hymedesmia murrayi **sp. n.**

(Text-fig. 22.)

Holotype.—B.M. 1936.3.4.487.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.



Text-fig. 22.—*Hymedesmia murrayi* sp. n. Acanthostyli, of two sizes, and tornote, ×300, isochela, ×600.

Diagnosis.—Sponge thinly encrusting; surface even; oscules not apparent; texture soft; colour, in spirit, whitish; skeleton of wisp-like fibres of tornota, with single tornota scattered in ectosome, and occasional acanthostyli; megascleres acanthostyli, of two sizes, larger spined in basal third only, 0·4 by 0·008 mm., smaller entirely-spined, 0·08 by 0·008 mm., tornota, with strongylote to submucronate ends, 0·4 by 0·004 mm.; microscleres isochelæ, 0·04–0·044 mm. chord.

Genus *Phorbas* Duchassaing and Michelotti.

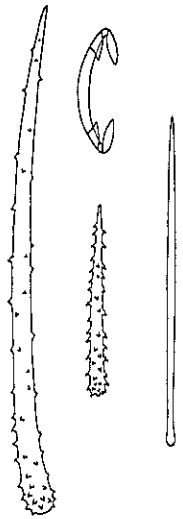
Phorbas styliferus **sp. n.**

(Text-fig. 23.)

HOLOTYPE.—1936.3.4.526.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coral, sand and shells.

DIAGNOSIS.—Sponge lamellar, irregular, with much foreign debris incorporated; surface uneven, minutely hispid; oscules not apparent; pores in sieves; texture firm,



TEXT-FIG. 23.—*Phorbas styliferus* sp. n. Acanthostyli, of two sizes, and tornote, ×300, isochela, ×600.

compressible; colour in spirit, light brown; skeleton of ascending plumose fibres, branching and anastomosing, of large and small acanthostyli, cored by styliform tornota, with ectosomal brushes of similar tornota; spicules acanthostyli, 0·12 by 0·008 and 0·32 by 0·012 mm., the two sizes connected by intermediates; tornota styliform, 0·212 by 0·004 mm.; microscleres isochelæ, 0·028–0·068 mm. chord.

REMARKS.—The specimen is fragmentary and is in a poor state of preservation. In addition to the sand and calcareous debris included in the tissues, there are in places foreign spicules, such as large oxea and anatriænes. Some raphides noted in places are probably also foreign to this sponge.

Genus *Desmapsamma* Burton.

Desmapsamma anchorata (Carter).

Fibularia anchorata Carter, 1882 : 283; *Desmacidon reptans* Ridley and Dendy, 1886 : 345; Ridley and Dendy, 1887 : 105, pl. xxiii, fig. 7; Lindgren, 1897 : 482; Lindgren, 1898 : 21; *D. carterianum* Arndt, 1927 : 147; *Desmapsamma anchorata* Burton, 1934 : 547.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

DISTRIBUTION.—West Indies; Bahia; Great Barrier Reef; 13–82 m.

Genus *Iotrochota* Ridley.

Iotrochota baculifera Ridley.

Iotrochota baculifera Ridley, 1884 : 435, pl. xxxix, fig. M, pl. xlii, fig. f; *I. baculifera*, var. *flabellata* Dendy, 1887 : 158; Dendy, 1889 : 84; *I. baculifera* Topsent, 1893 : 174; Topsent, 1897 : 455; Lindgren, 1897 : 482; Lindgren, 1898 : 18; Thiele, 1899 : 18, pl. ii, fig. 6; *I. baculifera*, var. *tumescens* Kirkpatrick, 1900 : 136, pl. xiii, fig. 1; *I. baculifera* Thiele, 1903 : 947; Dendy, 1905 : 165; *I. baculifera*, var. *minor* Hentschel, 1911 : 329; *I. baculifera* Hentschel, 1912 : 347; Dendy, 1916 : 123; Dendy, 1921 : 97; Burton and Rao, 1932 : 353.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m.; Stn. M.B. I(d), September 17, 1933; Red Sea (13° 39′ 30″ N., 42° 43′ 00″ E.), 26 m.

DISTRIBUTION.—Okhamandal; Ceylon; Madras; Providence; Amirante; Seychelles; Mascarenes; Nicobars; Christmas Is.; Celebes; Amboina; Ternate; Cochin-China; Aru Is.; Port Darwin; South-West Australia; littoral to 66 m., bottom mud, sand, rock and coral.

Genus *Acanthancora* Topsent.

Acanthancora stylifera, **sp. n.**

(Text-fig. 24.)

HOLOTYPE.—B.M. 1936.3.4.600.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

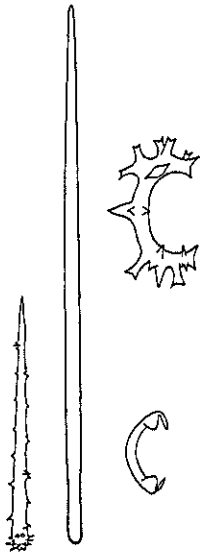
DIAGNOSIS.—Sponge encrusting, small, agglutinating; surface even; oscules not apparent; texture firm, compressible; colour, in spirit, pale yellow; skeleton a dense mass of spined chelæ, with stylote tornota scattered between acanthostyli (presumably) echinating substratum; megascleres acanthostyli, 0·16 by 0·008 mm., tornota styliform, 0·36 by 0·008 mm.; microscleres isochelæ arcuatae, 0·026 mm. chord, and spined isochelæ, 0·04 mm. chord including spines.

REMARKS.—The holotype is a very small specimen growing among a mixture of calcareous debris, and the form of the skeleton is obscured by the abundant spined chelæ. Acanthostyli occur in the boiled-out spicule preparations though they were not seen in hand sections. It is presumed that these echinate the substratum.

Damirina gen. n.

GENOTYPE.—*Damirina verticillata* sp. n.

DIAGNOSIS.—Myxillinæ with skeleton an isodictyal reticulation of verticillately-spined acanthostrongyla; with dermal tornota; microscleres absent.



TEXT-FIG. 24.—*Acanthancora stylifera* sp. n. Acanthostyle and tornote, ×300, isochelæ, simple and ornamented, ×600.

Damirina verticillata sp. n.

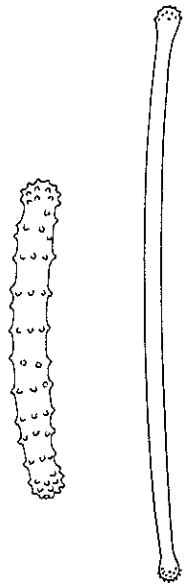
(Text-fig. 25.)

HOLOTYPE.—B.M. 1936.3.4.510.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge encrusting, with hollow fistulæ; surface even, glabrous; oscules (? at ends of fistulæ); texture firm, friable; colour, in spirit, deep brown; main skeleton a unispicular, subisodictyal skeleton of acanthostrongyla, 0·2 by 0·02 mm., with tornota, having tylote ends microspined, 0·36 by 0·01 mm.; microscleres absent.

REMARKS.—The genus *Damirina* is of uncertain position and finds its nearest relatives among certain Myxillinæ with reduced spiculation, such as *Damiriella* Burton (1935, p. 404).



TEXT-FIG. 25.—*Damirina verticillata* sp. n. Acanthostrongyle and tornote, ×300.

Genus *Tedania* Gray.

Tedania nigrescens (Schmidt).

Myxilla anhelans (pars) Schmidt, 1862 : 72; *Reniera nigrescens* Schmidt, 1862 : 74; *R. digitata* Schmidt, 1862 : 75, pl. vii, fig. ii; *R. ambigua* Schmidt, 1864 : 39, pl. iv, fig. 8; *Thalysias ignis* Duchassaing and Michelotti, 1864 : 83, pl. xviii, figs. 1–2; *Tedania digitata* Gray, 1867 : 520; *T. ambigua* Gray, 1867 : 520; *Reniera muggiana* Schmidt, 1868 : 28; *R. ambigua* Schmidt, 1868 : 31; ? *Halichondria aspera* Bowerbank, 1875 : 237; *Reniera digitata* Carter, 1882 : 287, pl. xi, fig. 3; *Tedania digitata* Ridley, 1884 : 417; Carter, 1886 : 52; *T. digitata*, var. *verrucosa* Carter, 1886 : 53; *T. digitata* Ridley and Dendy, 1887 : 51, pl. ix, fig. 3; *T. digitata* varr. *fibrosa*, *bermudensis* Ridley and Dendy, 1887 : 51; *T. nigrescens* Vosmaer, 1887 : 338; *T. digitata* Dendy, 1887 : 157; *T. rubicunda* Lendenfeld, 1888 : 190; *T. rubra* Lendenfeld, 1888 : 191; *T. chevreuxi* Topsent, 1891 : 13, pl. ii, figs. 1–2; *T. assabensis* Koller, 1891 : 313, pl. xvi, figs. 11–12; *T. brucei* Wilson, 1894 : 320, pls. xix, xx; *T. digitata* Dendy, 1895 : 258; Lindgren, 1897 : 481; *T. digitata*, var. *vulcani* Lendenfeld, 1897 : 112, pl. x, figs. 117–119; *T. digitata* Lindgren, 1898 : 17, pl. xix, fig. 10; Wilson, 1902 : 395; *T. digitata* var. *sansibarensis* Baer, 1906 : 17, pl. i, fig. 11, pl. iv, figs. 26–31, pl. v, figs. 1–2; *T. digitata*, var. *fragilis* Baer, 1906 : 18, pl. ii, fig. 3; *T. digitata*, var. *conica* Baer, 1906 : 19, pl. ii, fig. 4; *T. ignis* Verrill, 1907 : 339; *T. assabensis* Row, 1911 : 353; *T. digitata* Hentschel, 1911 : 332; *T. digitata*, var. *inermis* Hentschel, 1911 : 333; *T. digitata*, var. *polytyla* Hentschel, 1911 : 333; *T. rubicunda* Hentschel, 1911 : 334; *T. digitata* Hentschel, 1912 : 348; *T. dirhaphis* Hentschel, 1912 : 349, pl. xix, fig. 20; *T. digitata*, var. *rubicunda* Hallmann, 1914 : 366, pl. xvii, fig. 4, text-fig. 11; *T. digitata*, var. *rubra* Hallmann, 1914 : 371, text-fig. 12; *T. nigrescens* Topsent, 1920 : 16; *T. digitata* Dendy, 1921 : 99; *T. nigrescens* Babić, 1921 : 84; Babić, 1922 : 245; *T. digitata* Topsent, 1925 : 703; *T. assabensis* Burton, 1926 : 81; *T. digitata* Shaw, 1927 : 434; Arndt, 1927 : 146, pl. iii, fig. 7;

Topsent, 1928 : 247 ; *T. chevreuxi* Burton, 1929 : 71 ; *T. nigrescens* Burton, 1932 : 346, fig. 44 ; Burton and Rao, 1932 : 353 ; *Xytopsihis asperus* de Laubenfels, 1936 : 61.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 40° 35′ 05″ E.), 245 m. ; Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m. ; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

Remarks.—This species has been recorded many times from a world-wide belt bounded by latitudes 40° north and 40° south, outside which it is rarely found (see Burton 1932, p. 346). It is apparently of common occurrence, having been taken from sandy, muddy and rocky substrata, from corals and from mangrove roots. Its abundance and ecology seem to approximate to those of the *Hymeniacidon perlevis* in the north temperate zone. Most abundant in the littoral zone and in shallow waters, it has hitherto been found at depths not exceeding 120 m.

Distribution.—Between latitudes 40° N. and 40° S. ; littoral to 245 m.

Genus *Strongylacidon* Lendenfeld.

Strongylacidon inæqualis (Hentschel).

Cacochalina truncatella, var. *mollissima* Lendenfeld, 1887 : 763, pl. xxvii, fig. 27 ; *Batzella inæqualis* Hentschel, 1911 : 325, fig. 20 ; Burton, 1927 : 292 ; Burton, 1934 : 550.

Occurrence.—Stn. M.B. II(b), October 28, 1933, coastal zone of Arabian coast (17° 33′ 30″ N., 56° 01′ 30″ E.), 26 m.

Remarks.—*Cacochalina truncatella* var. *mollissima* and *Batzella inæqualis* appear to be identical in all respects, but the first was taken at Port Chalmers, New Zealand, and the second off the South-West coast of Australia. The present specimens agree very closely in the size and shape of the spicules and in the structure of the skeleton. Their external form is irregularly branched (probably repent) and in their present macerated condition look very like what is understood by a *Cacospongia*. The surface tissues are gone, so that it is not possible to say if the surface was smooth. There is, however, every indication that it was conulose ; and this constitutes the main difference between the " John Murray " specimens and those described by Lendenfeld and Hentschel.

Distribution.—Port Chalmers, New Zealand (depth unknown) ; South-West Australia ; 0·7–5·5 m.

Genus *Lithoplocamia* Dendy.

Lithoplocamia lithistoides Dendy.

Lithoplocamia lithistoides Dendy, 1921 : 79, pl. xiv, fig. 6.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Mauritius, 183 m. ; Seychelles, 71 m.

Genus *Agelas* Duchassaing and Michelotti.

Agelas mauritianus (Carter).

Ectyon mauritianus Carter, 1883 : 310, pl. xii, fig. 3 ; *Agelas mauritianus* Ridley and Dendy, 1887 : 164, pl. xxix, fig. 10 ; *A. cavernosa* Thiele, 1903 : 963, fig. 28 ; *A. mauritiana* Dendy, 1905 : 174.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

Distribution.—Mauritius ; Ceylon ; Ternate ; (the " Challenger " record for Tristan da Cunha is almost certainly incorrect).

Sub-family Clathriinæ.

Genus *Clathria* Schmidt.

Clathria frondifera (Bowerbank).

Halichondria frondifera Bowerbank, 1875 : 288 ; *Amphilectus frondifera* Vosmaer, 1880 : 115 ; *Clathria frondifera* Ridley, 1884 : 488, pl. xlii, fig. i, pl. liii, fig. J.

Occurrence.—Stn. M.B. I (d), September 17, 1933, Red Sea (13° 39′ 30″ N., 42° 43′ 00″ E.), 26 m., bottom sand, shells and coral.

Distribution.—Straits of Malacca ; Thursday Island ; Price of Wales Channel, Percy Island and Fitzroy Island, Australia ; 7–20 m., bottom sand, mud and shells.

Clathria aculeata Ridley.

Clathria aculeata Ridley, 1884 : 443, pl. xl, fig. I, pl. xlii, fig. K ; Ridley and Dendy, 1887 : 147 ; Burton, 1934 : 558.

Occurrence.—Stn. 10, September 17, 1933, Red Sea (13° 31′ 00″ N., 42° 31′ 00″ E.), 55 m. ; Stn. M.B. I (d), September 19, 1933, Red Sea (13° 39′ 30″ N., 42° 43′ 00″ E.), 29 m., bottom sand, shells and coral ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The skeletons of both the " Alert " and the " Challenger " specimens agree in their gross structure, though they differ in the finer details of spiculation. The same is true of the Barrier Reef specimens. In all there is a network of spongin fibres cored by subtylostyli and echinated by acanthostyli, with main styli (often spined or tuberculated at the base) sparingly echinating the fibres. There is a dermal skeleton of smaller subtylostyli and the microscleres are isochelæ palmatæ, and toxa varying from 0·04 to 0·35 mm. long. The present specimens, though separated geographically resemble the others closely.

It is possible that *C. coralliophila* Thiele is synonymous with *C. aculeata*.

Distribution.—Australia (Torres Straits and Great Barrier Reef) ; 5–15 m., bottom sand and coral mud.

Clathria procera (Ridley).

Rhaphidophlus procerus Ridley, 1884 : 451, pl. xxxix, fig. K, pl. xlii, fig. O ; *Echinonema gracilis* Ridley, 1884 : 617, pl. liv, fig. 1 ; *Rhaphidophlus spiculosus* Dendy, 1889 : 86, pl. iv, fig. 4 ; *Clathria spiculosa*, et var. *ramosa* Dendy, 1905 : 171 ; *C. spiculosa*, et varr. *ramosa*, *macilenta* Hentschel, 1912 : 363–364 ; *C. spiculosa* Dendy, 1916 : 128 ; *C. procera* Dendy, 1921 : 64 ; *Tenacia procera* Burton and Rao, 1932 : 340.

Topsent, 1928
Burton

...tember 17, 1933, Red Sea (13° 39′ 30″ N., 42°
...s and coral; Stn. M.B. II (b), October 28, 1933,
...01′ 30″ E.), 26 m.
...nat *Clathria cervicornis* Thiele (1903 : 959) is synonymous

...n Ocean (Arabian Sea, Okhamandal, Gulf of Manaar, Cape
...icorin, Amirante, Seychelles, Praslin Reef, Cargados Carajos,
... Is.; Australia; Port Darwin; 4–71 m., bottom sand, mud, shells

Clathria mæandrina Ridley.

...æandrina Ridley, 1884 : 614, pl. liii, fig. I, pl. liv, fig. h.

Occurrence.—Stn. M.B. I (d) September 17, 1933, Red Sea (13° 39′ 30″ N., 42° ...3′ 00″ E.), 26 m., bottom sand, shells and coral.

Distribution.—Amirante; 31 m., bottom coral.

Clathria mixta Hentschel.

Clathria mixta Hentschel, 1912 : 367, pl. xiii, fig. 8, pl. xix, fig. 30.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N. 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Remarks.—The specimen is irregularly massive and the skeleton typical except for the absence of small toxa and the inclusion of much sand in the fibres.

Distribution.—Aru Island; 18 m., bottom rocky.

Clathria spicata Hallmann.

Echinonema anchoratum, var. *lamellosa* Whitelegge, 1901 : 82; *Clathria spicata* Hallmann, 1912 : 210; Dendy, 1921 : 65, pl. v, fig. 2, pl. xiii, fig. 4; *nec Echinonema anchoratum*, var. *lamellosa* Lendenfeld, 1888.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.

Remarks.—Dendy speaks of there being no well developed dermal skeleton. This is, however, true of the abraided parts of the surface only. Where the surface is intact, the smaller subtylostyli are arranged in surface brushes, not only in the present specimen but in Dendy's (1921) specimen.

Distribution.—Indian Ocean (Cargados Carajos); Western Australia; 55 m.

Clathria transiens Hallmann.

Clathria transiens Hallmann, 1912 : 226, pl. xxxiii, figs. 1–3, pl. xxxiv, fig. 2, text-figs. 47–48a.

Occurrence.—Stn. M.B. I (b), September 17, 1933, Red Sea, 29 m., bottom sand, shells and coral.

Distribution.—East coast of Australia; 55 m.

Clathria whiteleggii Dendy.

Clathria whiteleggii Dendy, 1921 : 67, pl. vii, fig. 1, pl. xiii, fig. 5.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–200 m., bottom coarse sand and shingle; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. M.B. II (c), October 28, 1933, Arabian Coast (17° 33′ 30″ N., 56° 01′ 30″ E.), 29 m.

Remarks.—The two specimens are very like the holotype in form, though more irregularly clathrate, and with spiculation almost identical.

A single small specimen consisting of a mass of irregular slender branches, each 1 or 2 mm. in diameter, is doubtfully assigned to this species. The skeleton is very like that of the holotype except that the main styli are always smooth at the base, the acanthostyli are rare and the auxiliary subtylostyli measure 0·4 by 0·004 mm. instead of 0·33 by 0·006 mm.

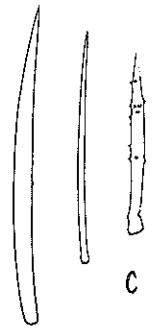
Distribution.—Indian Ocean (Saya de Malha); 100 m.

Clathria spongiosa sp. n.

(Text-fig. 26.)

Holotype.—1936.3.4.427.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells.



Text-fig. 26.—*Clathria spongiosa* sp. n. Style, subtylostyle and acanthostyle, ×200, sigma, ×300.

Diagnosis.—Sponge subflabellate, palmo-digitate or ramose, with irregular nodose branches; surface uneven, minutely hispid; oscules not apparent; texture firm, elastic; colour, in spirit, reddish-brown; skeleton an irregular reticulation of stout horny fibres, with main styli, 0·3–0·4 by 0·017 mm., coring, serially-arranged or subplumose, or scattered interstitially; with acanthostyli, 0·17 by 0·014 mm., echinating on fibres and ectosomal skeleton of loose brushes of subtylostyli; microscleres sigmata, 0·014 mm. chord.

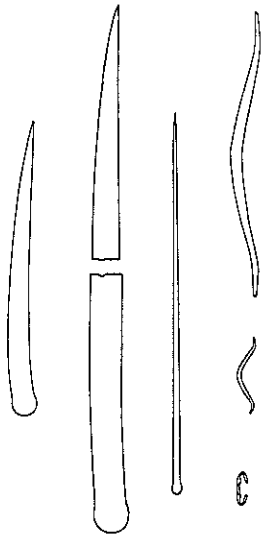
Genus *Ophlitaspongia* Bowerbank.

Ophlitaspongia minor sp. n.

(Text-fig. 27.)

HOLOTYPE.—B.M. 1936.3.4.609.

OCCURRENCE.—Stn. 89, December 7, 1933, Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shells and rock.



TEXT-FIG. 27.—*Ophlitaspongia minor* sp. n. Styli, of two sizes, and auxiliary subtylostyli, ×200, toxa of two sizes, and isochela, ×300.

DIAGNOSIS.—Sponge small, stipitate, irregularly branching; surface even, minutely hispid; oscules not apparent; texture firm; colour in spirit, pale cream; skeleton a subisodictyal almost halichondroid, reticulation of tylostyli, with auxiliary subtylostyli mainly in an ectosomal layer; main spicules styli to subtylostyli or even tylostyli, 0·28–0·8 by 0·02–0·032 mm.; auxiliary subtylostyli, 0·32–0·42 by 0·005–0·008 mm.; microscleres isochelæ palmatæ, 0·022 mm. chord, and toxa, 0·045–0·18 mm. chord.

REMARKS.—The species finds its nearest relative in *Echinoclathria hjorti* Arnesen, from the Canaries, which clearly belongs to *Ophlitaspongia*. Indeed, but for the geographical separation I would have accepted the present specimen as a mere variety of Arnesen's species.

KEY TO THE SPECIES OF *Ophlitaspongia*.

1.	Microscleres present	2
	Microscleres absent	12
2.	Microscleres isochelæ and toxa	3
	Microscleres toxa only	9
3.	Largest toxa always less than 0·1 mm. chord	4
	Largest toxa exceeding 0·1 mm. chord	6
4.	Isochelæ 0·015 mm. chord or less	5
	Isochelæ exceeding 0·015 mm. chord	*arcifera*
5.	Isochelæ 0·01 mm. chord	*confragosa*
	Isochelæ 0·012–0·015 mm. chord	*californiana*
6.	Toxa slender and in dragmata	*thetidis*
	Toxa stout, strongly curved, not in dragmata	7
7.	Isochelæ not exceeding 0·016 mm. chord	*thiclei*
	Isochelæ exceeding 0·016 mm. chord	8
8.	Fibres cored and echinated by main styli	*hjorti*
	Fibres cored mainly by auxiliary subtylostyli	*rimosa*
9.	Main megascleres more than 0·3 mm. long	*basifixa*
	Main megascleres less than 0·3 mm. long (average)	10
10.	Toxa more than 0·1 mm. chord	*pennata*
	Toxa less than 0·1 mm. chord	11
11.	Sponge encrusting to massive	*seriata*
	Sponge branching	*subhispida*
12.	Sponge massive with tubular oscules	*tubulosa*
	Sponge branching or flabellate	see note below

Note.—There are five species, all described from Australia that are either branching or flabellate, stipitate, and with similar spiculations. They will probably prove, eventually, to be synonymous. These species are:

O. axinelloides Dendy.
O. chalinoides (Carter).
O. inornata Hallmann.
O. leporina (Lamarck) (= *O. tenuis* (Carter)).
O. nodosa (Carter).

Genus *Microciona* Bowerbank.

Microciona affinis Carter.

Microciona affinis Carter, 1880 : 41, pl. iv, fig. 15.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge thinly encrusting; colour, in spirit, white or pale yellow; skeleton of basally-tuberculate styli, 0·14–1·0 by 0·024–0·038 mm., and acanthostyli, 0·1–0·15 by 0·006–0·008 mm., both spicules echinating substratum; auxiliary subtylostyli, basally microspined, 0·3–0·6 by 0·006–0·01 mm.; microscleres isochelæ, 0·012 mm. chord, and toxa, 0·06–0·1 mm. chord, strongly curved and 0·002 mm. thick.

REMARKS.—The holotype is represented by a small piece mounted whole and it contains no toxa. The two specimens recorded here agree closely with it in all respects, but in the Zanzibar specimen one toxon was found, and in that from the Arabian coast not more than half a dozen. It seems, therefore, that toxa constitute a scanty but constant part of the skeleton, which may be missing from preparations of small fragments of the sponge.

DISTRIBUTION.—Gulf of Manaar.

Microciona longitoxa (Hentschel).

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

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shell.

Remarks.—The single specimen consists of an irregular lobe, 60 mm. high by 40 by 20 mm. The surface seems to have lost its ectosomal tissues and the present appearance is cerebriform and minutely hirsute. The oscules are small, few in number, and each is the centre of 4 or 5 radiating grooves. The texture is firm but compressible ; the colour, in spirit, light brown.

There is sufficient likeness to Hentschel's description to leave no doubt of the identity of the present specimen. It remains therefore to record the few details in which the encrusting holotype and this massive specimen differ. The skeleton consists of a close network of stout spongin fibres, with main styli coring and arranged in a plumose manner, and echinated by acanthostyli. The main styli are almost identical in shape and size with those of the holotype, and there are the same infrequent intermediates between them and the acanthostyli. The latter measure, however, 0·1–0·28 by 0·008–0·02 mm. The auxiliary sybtylostyli are few and measure 0·3 by 0·004 mm., or half the size of those of the holotype. The toxa are typical, except that most of them are nearly 0·8 mm. long, and the chelæ, although typical in form, measure 0·02 as against 0·013 mm.

Distribution.—Aru Is. ; 15 m.

Microciona rhopalophora (Hentschel).

Hymeraphia rhopalophora Hentschel, 1912 : 380, pl. xx, fig. 37.

Occurrence.—Stn. 157, April, 6 1934, Maldive Area (4° 43′ 48″ N., 72° 55′ 24″ E. to 4° 44′ 00″ N., 72° 54′ 18″ E.), 229 m., bottom coral rock.

Remarks.—A very thin crust contains acanthostyli, singly or in brushes, 0·1–0·45 mm. long, of very similar type to those figured by Hentschel. In addition, there are dermal styli, 0·45 by 0·006 mm. on an average. The larger tylostyli are missing, but there are several incomplete spicules which might well be the remains of such spicules broken in mounting the specimen.

This present specimen is clearly a young one. Throughout the greater part of it the tissues are without spicules, and the dermal styli particularly are sparsely present. The absence (or apparent absence) of the large tylostyli may be due merely to age.

Distribution.—Aru Is. ; 16 m.

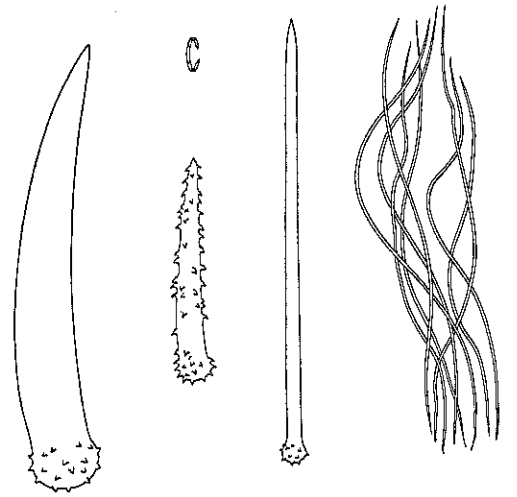
Microciona densa sp. n.

(Text-fig. 28.)

Holotype.—B.M. 1936.3.4.456.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Diagnosis.—Sponge massive, lobate ; surface sub-cerebriform ; oscules minute, scattered ; texture firm, incompressible ; colour, in spirit, light brown ; skeleton of dense columns of styli and acanthostyli arranged in a semi-plumose manner, with aspiculous or sparingly spiculous spongin connectives ; auxiliary spicules subtylostyli, sparingly associated with main skeleton and forming a dense ectosomal layer ; main styli smooth or, more commonly, spined basally, very stout, 0·28 by 0·04 mm. ; acanthostyli 0·14 by 0·016 mm. ; auxiliary subtylostyli, 0·28 by 0·008 mm. ; microscleres isochelæ palmatæ, 0·012 mm. chord, and hair-like toxa, usually in wisp-like bundles, 0·28 mm. long.



Text-fig. 28.—*Microciona densa* sp. n. Style, acanthostyle and auxiliary subtylostyle, ×200, isochela and wisp-like toxa, ×300.

Remarks.—The holotype consists mainly of two confluent lobes. It is distinguished from all the other species of *Microciona* mainly by the denseness of its skeleton and the robust character of its main megascleres.

Microciona longistyla sp. n.

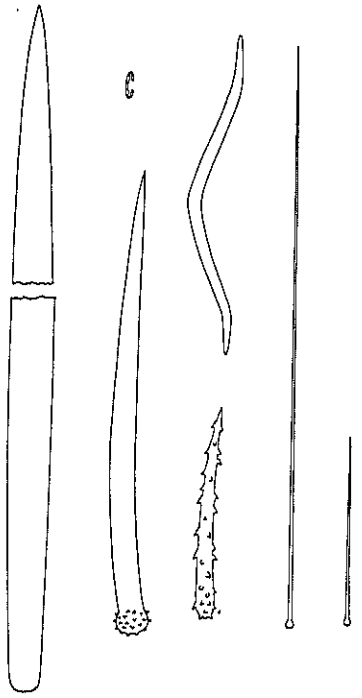
(Text-fig. 29.)

Holotype.—B.M. 1936.3.4.583.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Diagnosis.—Sponge small, low-lying and massive ; surface hispid ; oscules not apparent ; texture firm compressible ; colour, in spirit, pale yellow ; skeleton of plumose columns of styli and tuberculate tylostyli, echinated by acanthostyli, with interstitial and ectosomal subtylostyli ; megascleres, 0·32–1·2 by 0·024–0·04 mm. (smaller tylostyli sparingly-spined along shaft as well as basally tuberculate), acanthostyli, 0·06–0·2 by 0·016 mm., interstitial subtylostyli, 0·56 by 0·004 mm., and ectosomal subtylostyli, 0·18 by 0·004 mm. ; microscleres isochelæ, 0·016 mm., and toxa, 0·09–0·24 mm. chord.

Remarks.—The species is characterized, above all, by the size of the tylostyli. The isochelæ are very rare, and it is possible that the few seen may be foreign to the sponge.



Text-fig. 29.—*Microciona longistyla* sp. n. Style, basally-tuberculate tylostyle, acanthostyle and auxiliary subtylostyli, ×200, isochela and toxon, ×300.

Microciona anonyma sp. n.

(Text-fig. 30.)

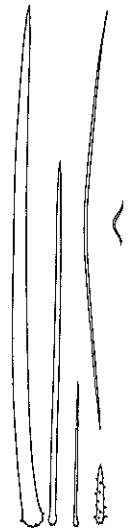
Holotype.—B.M. 1936.3.4.575.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rack (?).

Diagnosis.—Sponge thinly encrusting; surface even, minutely hispid; oscules not apparent; texture soft; colour, in spirit, pale yellow; skeleton of acanthostyli echinating substratum, with columns of subtylostyli rising from substratum, echinated by large styli or tylostyli, and with ectosomal brushes of smaller subtylostyli; megascleres styli or tylostyli, often basally-spined, 0·36–0·8 by 0·012–0·02 mm., auxiliary subtylostyli 0·36–0·52 by 0·006–0·008 mm., ectosomal sybtylostyli, 0·2 by 0·003 mm., and acanthostyli,

0·08 by 0·008 mm.; microscleres toxa, of usual form, 0·04 mm. chord, and hair-like, 0·2–0·4 mm. long.

Remarks.—The holotype is a small incrustation, mixed up with organic debris and tiny fragments of a *Petrosia* sp. indet. Its characters are ill-defined and its nearest relative is *Microciona longitoxa* Hentschel, which has isochelæ in addition to toxa, and one kind of subtylostyli only.



Text-fig. 30.—*Microciona anonyma* sp. n. All spicules, ×200.

Genus *Echinodictyum* Ridley.

Echinodictyum nervosum Ridley.

? *Spongia nervosa* Lamarck, 1813 : 450; 1816 : 377; *Echinodictyum nervosum* Ridley, 1881 : 496, pl. xxviii, figs. 7–10; ? *Spongia nervosa* Topsent, 1932 : 114.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Distribution.—South-east coast of Arabia.

Echinodictyum jousseaumi Topsent.

Echinodictyum jousseaumi Topsent, 1892 : 24, pl. i, fig. 3; Burton, 1931 : 348, pl. xxiii, fig. 7.

Occurrence.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand.

Distribution.—Red Sea; Natal.

Genus *Antho* Gray.

Antho tawiensis (Wilson).

Lissodendoryx tawiensis Wilson, 1925 : 432, pl. xlii, fig. 4, pl. xlix, fig. 5.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.; Stn. 89, December 7, 1933, northern area of Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shingle and rock.

Remarks.—The four specimens are small and irregular, but one at least is incipiently cup-shaped. The spiculation of all is fairly typical though styli, smooth or basally-spined, 0·28 by 0·017 mm., are associated with the main skeleton, and the acanthostyli measure 0·16 by 0·014 mm. instead of 0·28–0·35 by 0·005 mm. Embryos are present in some specimens.

It seems that this species is as variable as *Antho involvens* (Schmidt) (see Burton, 1933, pp. 504–508 under *Dictyoclathria beanii* (Bowerbank), a species which must now be known as *Antho involvens*).

Distribution.—Philippines.

Echinoplocamia **gen. n.**

Genotype.—*Echinoplocamia arbuscula* **sp. n.**

Diagnosis.—Clathriinæ with reticulate skeleton of amphitylota and styli echinated by acanthostyli; with auxiliary subtylostyli; microscleres toxa.

Echinoplocamia arbuscula **sp. n.**

(Text-fig. 31.)

Holotype.—B.M. 1936.3.4.413.

Occurrence.—Stn. 177, May 2, 1934, Gulf of Aden (12° 01′ 54″ N., 50° 39′ 12″ E.), 366 m., bottom green mud and rock.

Diagnosis.—Sponge ramose; surface hispid; oscules not apparent; texture firm; colour, in spirit, brown; skeleton a reticulation of spongin fibres, with ascending fibres cored by plumosely-arranged styli, often basally-microspined, 0·35–0·9 by 0·018–0·03 mm., connective fibres cored by amphytylota, microspined at each end, 0·24 by 0·035 mm., the whole echinated by acanthostyli, 0·05–0·07 by 0·005–0·007 mm.; auxiliary subtylostyli, basally-microspined, 0·28 by 0·003 mm.; microscleres toxa, up to 0·1 mm. long.

Remarks.—The holotype is in an unsatisfactory state of preservation, being fragmentary and macerated, 8 mm. long by 4 mm. diameter. The characters of the skeleton are, however, sufficiently striking to justify their description.

Genus *Plocamilla* Topsent.

Plocamilla manaarensis (Carter).

Dictyocylindrus manaarensis Carter, 1880 : 37, pl. iv, fig. 1; *Dirrhopalum manaarensis* Ridley, 1881 : 482; *Plocamia manaarensis* Dendy, 1905 : 179, pl. viii, fig. 1; Burton and Srinivasa Rao, 1932 : 355; *Plocamilla manaarensis* Burton, 1935 : 402; *nec Plocamia manaarensis* Lambe, 1894.

Occurrence.—Stn. 89, December 7, 1933, northern area of Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shingle and rock.

Remarks.—A small branching specimen 20 mm. high.

Distribution.—West coast of India; Ceylon; Laccadives; 41–57 m.

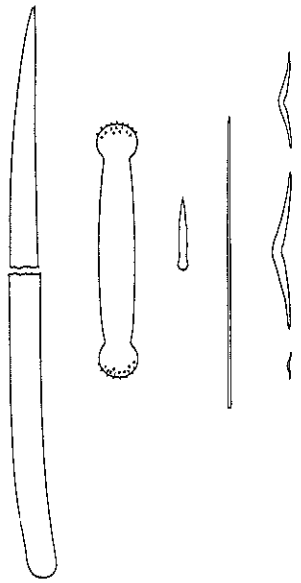
Genus *Acarnus* Gray.

Acarnus topsenti Dendy.

Acarnus topsenti Dendy, 1921 : 98, pl. iv, fig. 3, pl. xv, fig. 8.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Indian Ocean (Cargados Carajos); 55–165 m.



Text-fig. 31.—*Echinoplocamia arbuscula* sp. n. Style, amphitylote, acanthostyle and auxiliary subtylostyle, ×200, toxa, ×300.

Sub-family Raspeliinæ.

Genus *Aulospongus* Norman.

Aulospongus tubulatus (Bowerbank).

Haliphysema tubulatus Bowerbank, 1873 : 29, pl. vii; *Aulospongus tubulatus* Norman, 1878 : 267; Dendy, 1889 : 89, pl. v, fig. 11; Dendy, 1921 : 61.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E, to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 53, November 2.

1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle and Lithothamnion.

DISTRIBUTION.—Ceylon; Amirantes; 51–53 m.

Genus *Rhabderemia* Topsent.

Rhabderemia indica Dendy.

Rhabderemia indica Dendy, 1905 : 180, pl. xii, fig. 10.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 209, May 17, 1934, Red Sea (15° 54′ 36″ N., 41° 13′ 00″ E.), 366 m., bottom green and brown mud and rock.

DISTRIBUTION.—Ceylon.

Genus *Endectyon* Topsent.

Endectyon thurstoni (Dendy).

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

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—India (Cape Cormorin, Madras, Tuticorin); 70 m.

Hemectyonilla **gen. n.**

GENOTYPE.—*Stylostichon involutum* Kirkpatrick 1903 : 250, pl. v, fig. 6, pl. vi, fig. 17.

DIAGNOSIS.—Raspeliinæ with skeleton of plumose columns of large and small rhabdostyli; and with slender oxea (styloids ?), more rarely styli, occurring interstitially to columns and in ectosomal brushes; microscleres absent.

Hemectyonilla involutum (Kirkpatrick).

Stylostichon involutum Kirkpatrick, 1903 : 250, pl. v, fig. 16, pl. vi, fig. 17; *Plumohalichondria gardineri* Dendy, 1921 : 87, pl. ii, fig. 9, pl. xv, fig. 4.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shell; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 185, May 5, 1934, Gulf of Aden (13° 48′ 06″ N., 49° 16′ 48″ E. to 13° 48′ 36″ E., 49° 16′ 24″ E.), 2001 m.

DISTRIBUTION.—Natal; Amirante; 37–80 m., bottom broken shells.

Genus *Higginsia* Higgin.

Higginsia petrosioides Dendy.

Higginsia petrosioides Dendy, 1921 : 126, pl. vii, fig. 9, pl. xvii, fig. 7.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

REMARKS.—There are 50 specimens all closely similar in external form and spiculation. They are massive and rounded, with surface mainly papillate. In places the surface may be apparently smooth, but closer examination shows, even here, incipient papillæ. The oscules are small, few and scattered, about 1 mm. diameter, and the summit of each papilla bears a pore, presumably inhalant. The colour, in all, is yellow.

Apart from the main oxea being slightly thicker, up to 0·05 mm., the skeleton differs in no respect from that of the holotype except that in all but one specimen the acanthoxea form a distinct ectosomal layer, as well as being scattered in the choanosome.

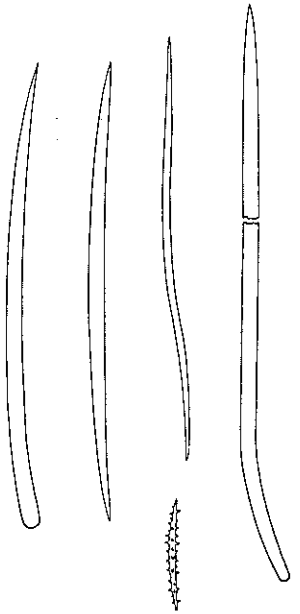
DISTRIBUTION.—Indian Ocean (Seychelles, 80 m.).

Higginsia robusta **sp. n.**

(Text-fig. 32.)

HOLOTYPE.—B.M. 1936.3.4.342.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells; Stn. 35, October 16, 1933,



TEXT-FIG. 32.—*Higginsia robusta* sp. n. Styli, oxeote and styloid, ×100, acanthoxeote, ×300.

Gulf of Aden (13° 14′ 24″ N., 46° 14′ 12″ E. to 13° 13′ 24″ N., 46° 10′ 00″ E.), 441 m., bottom green mud, sand and shingle; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N. to 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge ranging from clavate to stipitate, when small, to branching or flabellate in large specimens; surface papillose; oscules not apparent; texture firm;

colour, in spirit, yellow to yellowish-green ; skeleton in small specimens of dense ascending plumose columns of styli, sometimes modified to oxea, in larger specimens of a dense axial concentration with longer styli radiating to surface ; megascleres styli or oxea, 0·3–0·88 by 0·016–0·032 mm., longer styli, 1·4–2·0 mm., scattered irregularly among spicules of main skeleton, and styloids with ends oxeote, rarely bidentate, in ectosomal brushes or interstitial to main skeleton, 0·48–0·8 by 0·004–0·014 mm. ; microscleres acanthoxea, chiefly in ectosomal layer, 0·05–0·07 mm. long.

Remarks.—The dozen specimens are obviously conspecific but whereas in the majority the main skeleton is composed almost entirely of styli there is much variation, the larger specimens having a mixture of styli and oxea, with in one case the oxea predominating.

The present specimens are related to *H. mixta* (Hentschel) but differ in the smaller size of the acanthoxea.

Key to the Species of *Higginsia*.

1.	Main megascleres seldom exceeding 0·9 mm. in length	2
	Main megascleres seldom less than 1·0 mm. long	*papillosa*
2.	With long slender styli included in main skeleton	3
	Without long slender styli	*petrosioides*
3.	With ectosomal styloids mainly oxeote, rarely stylote, and very rarely bidentate	4
	With ectosomal styloids bidentate at one end	*bidentifera*
4.	Main megascleres up to 0·032 mm. thick	5
	Main megascleres up to 0·021 mm. thick	*coralloides*
5.	Surface of sponge strongly hispid	*mixta*
	Surface of sponge papillose, non-hispid	*robusta*

Raspailopsis gen. n.

Genotype.—*Raspailopsis cervicornis* sp. n.

Diagnosis.—Corticate Raspeliinæ with axial skeleton of large and small styli embedded in spongin fibres, an extra axial skeleton of small styli and brushes of pseudoxea, each such brush having one long style at its centre ; microscleres absent.

Remarks.—A second species should be placed in this genus, namely, *Raspailia* (*Syringella*) *nuda* Hentschel (1909, p. 383), in which the positions of the short styli and pseudoxea are reversed. Otherwise, the two species are very alike.

Neither of these species is typical of the sub-family Raspeliinæ but the ectosomal brushes with long styli set at their centres is indicative of their affinities.

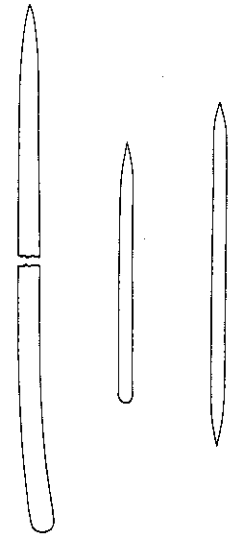
Raspailopsis cervicornis sp. n.

(Text-fig. 33.)

Holotype.—B.M. 1936.3.4.604.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 24″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

Diagnosis.—Sponge erect, stipitate, dichotomously branched or caliculate ; surface even, strongly hispid ; oscules not apparent ; texture firm, incompressible ; colour, in spirit, dark grey ; spicules large styli, base sometimes slightly tylote, 1·6–3·0 by 0·032–0·05 mm., small styli, 0·5 by 0·024 mm., and tornotiform pseudoxea, 0·66 by 0·028 mm.



Text-fig. 33.—*Raspailopsis cervicornis* sp. n. Styli, of two sizes, and tornotiform pseudoxeote, ×100.

Family Axinellidæ.

Genus *Amorphinopsis* Carter.

Amorphinopsis Carter, 1887 : 77 ; *Dactylella* Thiele, 1898 : 55 ; *Trachyopsis* Dendy, 1905 : 147 ; *Migas* Sollas, 1908 : 395 ; *Dactyella* Annandale, 1915 : 470, *nec Dactylella* Gray.

Genotype.—*Amorphinopsis excavans* Carter, 1887 : 77.

Diagnosis.—Axinellidæ with skeleton of oxea, variable in size, arranged loosely, without order or in loose fibres running to surface and projecting beyond ; without special ectosomal skeleton.

Amorphinopsis megalorhaphis (Carter).

Amorphina megalorhaphis Carter, 1881 : 368 ; *A. megalorrhaphis* Ridley, 1884 : 416 ; *Halichondria solida* Ridley and Dendy, 1886 : 326 ; *Amorphinopsis excavans* Carter, 1887 : 77, pl. v, figs. 12–15 ; *Halichondria solida* Ridley and Dendy, 1887 : 4, pl. ii, fig. 5 ; *H. solida*, var. *rugosa* Ridley and Dendy, 1887 : 4 ; *H. panicea*, var. Dendy, 1887 : 157 ; *H. granulata* Keller, 1891 : 310, pl. xvi, fig. 8 ; *H. tuberculata* Keller, 1891 : 310, pl. xvi, fig. 10 ; *H. panicea*, var. *rameswarans* Thurston, 1895 : 102–105 ; *H. variabilis* Lindgren, 1897 : 480 ; *H. armata* Lindgren, 1897 : 480 ; *H. dura* Lindgren, 1897 : 480 ; *H. cavernosa* Topsent, 1897 : 477, pl. xix, fig. 16 ; *H. variabilis* Lindgren, 1898 : 3, pl. xviii, fig. 1, pl. xix, fig. 1 ; *H. armata* Lindgren, 1898 : 3, pl. xvii, fig. 1, pl. xix, fig. 2 ; *H. dura*

Lindgren, 1898 : 4, pl. xvii, fig. 2, pl. xix, fig. 3 ; *Dactylella hilgendorfi* Thiele, 1898 : 56, pl. v, fig. 25, pl. iv, fig. 8, pl. viii, fig. 41 ; *H. solida* Kirkpatrick, 1900 : 139 ; *H. solida*, var. *rugosa* Kirkpatrick, 1900 : 139 ; *H. panicea*, var. *megalorhaphis*, Dendy, 1905 : 146 ; *H. panicea*, var. *hemispherica* Dendy, 1905 : 146 ; *Trachyopsis halichondrioides* Dendy, 1905 : 147, pl. x, fig. 10 ; *Halichondria papillata* Baer, 1906 : 11, pl. i, fig. 5, pl. iv, figs. 7–9 ; *Migas porphyrion* Sollas, 1908 : 395 ; *Trachyopsis halichondrioides* Row, 1911 : 321 ; *Halichondria variabilis* Hentschel, 1912 : 408 ; *Spongosorites* sp. Sewell, 1913 : 346 ; *Amorphinopsis excavans* Annandale, 1915 : 467 ; fig. 4A ; *A. excavans*, var. *digitifera* Annandale, 1915 : 469, figs. 4B, 5 ; *Halichondria panicea* Dendy, 1921 : 37 ; *H. aplysinoides* Dendy, 1921 : 39, pl. iii, figs. 3–5, pl. xii, fig. 9 ; *H. panicea* Wilson, 1925 : 394 ; *H. variabilis* Wilson, 1925 : 396 ; *Trachyopsis halichondrioides* Wilson, 1925 : 409 ; Burton, 1926 : 75, figs. 6–7.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m. ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shell, Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m.

Remarks.—Attention has already been drawn (Burton, 1926) to the variation in the skeleton of specimens from the Suez Canal, identified under *Trachyopsis halichondrioides*, and it is my experience that there is here a species, recorded under a variety of names, which occupies in the Indian Ocean and Indo-Pacific the position held by *Halichondria panicea* in the northern hemisphere. The specimens represented in the synonymy list given here have certain features in common, and the differences between them are no more than the differences found over a wide range of *H. panicea*, from which the present species differs most markedly in the absence of a special ectosomal skeleton.

One specimen in the present collection is a subcylindrical fragment, 30 by 10 mm., whitish, with an irregular, subaculeate surface and a single small oscule, 1 mm. diameter, towards one end. The skeleton is an irregular reticulation of oxea, in which the spicules run more or less vertical to the surface. The oxea measure 1·2 by 0·03 to 2·0 by 0·08 mm., the majority being of the larger size. The specimen is included in this species with some hesitation since the oxea are rather thicker than usual.

Distribution.—The Indian Ocean generally, eastwards to Formosa, the Philippines, and New Hebrides and southwards to Australia (Torres Straits and Bass Straits) : littoral to 183 m.

Genus *Axinella* Schmidt.

Axinella carteri (Dendy).

Acanthella carteri Dendy, 1889 : 93, pl. iv, fig. 6 ; *A. aurantiaca* Keller, 1889 : 396, pl. xxiv, fig. 47 ; *A. carteri* Dendy, 1905 : 193, pl. viii, fig. 6 ; *A. aurantiaca* Topsent, 1906 : 562 ; Row, 1911 : 356 ; *A. carteri* Dendy, 1921 : 119, pl. v, fig. 5.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shell and Lithothamnion.

Remarks.—The single specimen is flabellate, 12 cm. high by 12 cm. across, resembling closely the type of *Acanthella aurantiaca*. The spicules are styli 0·4 mm. long.

In the original description of *A. carteri*, Dendy mentioned the presence of a second category of styli, long and slender, lying between the main fibres of the skeleton. It seems that the occurrence of these spicules is sporadic, and the fact that they have not been found in the present specimen need not invalidate its being identified with Dendy's species.

Distribution.—Red Sea ; Indian Ocean (Gulf of Manaar, Cargados Carajos, Diego Garcia, Amirante, Salomon, Seychelles) ; 7–80 m.

Axinella lamellata (Dendy).

Spongosorites lamellata Dendy, 1905 : 184, pl. xii, fig. 2.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The 26 specimens, ranging from 5 to 10 cm. high, have a stronger outward resemblance to *Axinella* (*Ceratopsis*) *ramosa* (Thiele) than *A. lamellata*. In fact, the only reason for separating these two species seems to lie in the size of their megascleres, which are 0·7–1·4 mm. long in Thiele's species and 0·95 mm. in Dendy's. In the present specimens, on the other hand, they rarely exceed 0·5 mm. in length.

Distribution.—Ceylon.

Aximella agariciformis (Dendy).

Thrinacophora agariciformis Dendy, 1905 : 186, pl. xii, fig. 6 ; *Dragmacidon agariciformis* Hallmann, 1917 : 639.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Ceylon.

Axinella durissima (Dendy).

Thrinacophora durissima Dendy, 1905 : 187, pl. xii, fig. 5 ; *Sigmaxinella durissima* Dendy, 1921 : 113 ; *S. durissima*, var. *massalis* Dendy, 1921 : 113, pl. v, fig. 4, pl. vii, fig. 4 ; *S. durissima*, var. *erecta* Dendy, 1921 : 113, pl. vii, fig. 5 ; *S. durissima*, var. *tethyoides* Dendy, 1921 : 114, pl. vii, fig. 6.

Occurrence.—Stn. M.B. I (c), September 17, 1933, Red Sea (13° 39′ 30″ N., 42° 43′ 00″ E.), 26 m., bottom coral rock ; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Occurrence.—Indian Ocean (Providence, Amirante, Saya de Malha, Seychelles, Ceylon) ; 54–143 m.

Axinella conulosa (Dendy).

Phakellia conulosa Dendy, 1921 : 116, pl. vi, fig. 4, pl. xvii, fig. 2 ; *P. conulosa*, var. *mauritiana* Dendy, 1921 : 117, pl. vi, fig. 5.

Occurrence.—Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ N., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Distribution.—Indian Ocean (Mauritius, Cargados Carajos) ; 55–183 m.

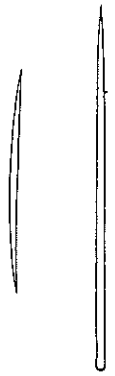
Axinella bidderi **sp. n.**

(Text-fig. 34.)

HOLOTYPE.—B.M. 1936.3.4.316.

OCCURRENCE.—Stn. 35, October 16, 1933, Gulf of Aden (13° 14′ 24″ N., 46° 14′ 12″ E. to 13° 13′ 24″ N., 46° 10′ 00″ E.), 441 m., bottom green mud, sand and shells; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 54, November 3, 1933, South Arabian Coast (21° 50′ 00″ N., 59° 52′ 00″ E.), 1046 m., bottom green mud.

DIAGNOSIS.—Sponge flabellate, stipitate; surface even, minutely hispid; oscules not apparent; texture firm, flexible; colour, in spirit, brown to reddish-brown; skeleton an



TEXT-FIG. 34.—*Axinella bidderi* sp. n. Oxeote and style, ×100.

irregular reticulation of ascending, subplumose fibres, with (mainly) unispicular connectives; megascleres oxea, 0·35–0·48 by 0·007–0·024 mm., and styli, 0·35–0·96 by 0·007–0·024 mm.; microscleres trichodragmata, of occasional occurrence, possibly.

SYSTEMATIC NOTES.—In the specimen from Stn. 35, and in one specimen from Stn. 45, the oxea and styli are of about equal length, 0·35–0·48 mm., but in the second specimen from Stn. 45, otherwise agreeing in all respects with the first two, the styli occasionally measure up to 0·96 mm. long, and there are, in addition trichodragmata.

From Stn. 54 there is an encrusting specimen growing on a worm-tube which agrees closely with the specimen from Stn. 45 except in external form.

Axinella ventilabrum **sp. n.**

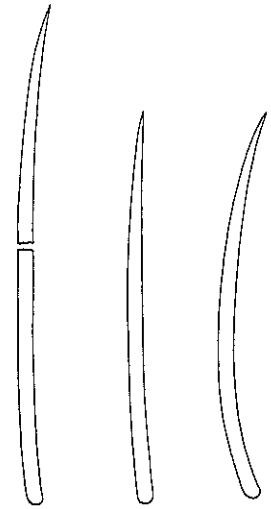
(Text-fig. 35.)

HOLOTYPE.—B.M. 1936.3.4.315.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ N., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge flabellate, substipitate; surface uneven, minutely hispid, prominently marked by a dendritic system of raised ridges (representing an internal system

of skeleton bundles running from base to apex of sponge); oscules not apparent; texture firm, flexible; colour, in spirit, pale yellowish-brown; skeleton a dense, confused reticulation of styli of two sizes (in dendritic systems of fibres, spicules are even more densely packed); megascleres styli, of two sizes, 1·6 by 0·032 and 0·8 by 0·032 mm. respectively; microscleres absent.



TEXT-FIG. 35.—*Axinella ventilabrum* sp. n. Styli, of two sizes, ×100.

Axinella flabello-reticulata **sp. n.**

(Text-fig. 36.)

HOLOTYPE.—B.M. 1936.3.4.325.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ N., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge flabellate (to subcaliculate ?), substipitate; inner surface even, outer surface marked with a reticulation of ridges, both surfaces minutely hispid; oscules not apparent; texture firm, flexible; colour, in spirit, pale brownish-yellow; skeleton an irregular reticulation, mainly multispicular (2–6 spicules), of styli, sharply bent in basal third, 0·6 by 0·04 mm.; microscleres absent.

Axinella dragmaxioides **sp. n.**

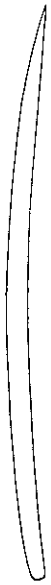
(Text-fig. 37.)

HOLOTYPE.—B.M. 1936.3.4.319.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge caliculate, rarely flabellate ; surface even, minutely hispid, outer surface of cup often marked by a number of low, rounded mounds ; oscules not apparent ; texture firm, flexible ; colour, in spirit, pale yellow to brown ; skeleton a dense irregular unispicular reticulation ; megascleres styli, 1·1 by 0·04 mm. ; microscleres absent.

TEXT-FIG. 36.—*Axinella flabello-reticulata* sp. n. Style, ×100.



TEXT-FIG. 37.—*Axinella dragma-xioides* sp. n. Style, ×100.

TEXT-FIG. 38.—*Axinella massalis* sp. n. Style and microxeote, × 100.

Axinella massalis sp. n.

(Text-fig. 38.)

HOLOTYPE.—B.M. 1936.3.4.509.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge irregularly massive ; surface uneven, hispid, harsh to touch ; oscules few, small, scattered ; texture firm, barely compressible ; colour, in spirit, ash grey to dark brown ; skeleton an irregular reticulation of styli, 0·45–0·64 by 0·03–0·044 mm., with microxea, 0·24 by 0·006–0·012 mm. and trichodragmata, 0·036 mm. long, scattered interstitially.

REMARKS.—The species varies from the known species of *Axinella* bearing microxea and trichodragmata in its external form as well as in details of its spiculation.

Genus *Phakellia* Bowerbank.

Phakellia radiata (Dendy).

Axinella mastigophora Lindgren, 1897 : 483 ; Lindgren, 1898 : 32, pl. xvii, fig. 6, pl. xix, fig. 20 ; *Bubaris radiata* Dendy, 1916 : 131, pl. i, fig. 8, pl. iv, fig. 24 ; *B. conulifera* Dendy, 1921 : 62, pl. vii, fig. 3, pl. xiii, fig. 2 ; Burton, 1928 : 130 ; *B. columnata* Burton, 1928 : 130, pl. ii, fig. 1 ; *nec Axinella mastigophora* Schmidt.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea (13° 35′ 30″ N., 42° 35′ 05″ E.), 245 m., bottom rock and sand ; Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 89, December 7, 1933, Northern Area of Arabian Sea (19° 14′ 00″ N., 69° 42′ 18″ E.), 193 m., bottom sand, shells and rock ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), (73–165 m.) ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

REMARKS.—There is, in the Indo-Pacific area, a group of species which certainly belong to the genus *Phakellia* and probably constitute a single species. Their common characteristic is a skeleton composed of plumose columns of styli of two sizes with their bases implanted in an axial core of short strongyla. The group includes *Axinella mastigophora* Lindgren (*nec* Schmidt), *Bubaris radiata* and *B. conulifera*, both of Dendy, and *B. columnata* Burton. If these can be accepted as a single species, as seems likely, then the specimen from Stn. 27 must be included with them. It has the external form of *B. columnata*, with the axial spicules slightly vermiform as in *Axinella mastigophora* Lindgren ; but although the dimensions of the various spicule categories, and the shape of the styli, are in accord with those of the rest of this group, the axial spicules are bluntly-ended oxea instead of strongyla.

A specimen from Stn. 112 is thinly flabellate, very like *Bubaris columnata* except that the longitudinal ridges are very few in number and ill-defined. The spiculation is, however, typical except that the axial spicules are oxea instead of strongyla.

From Stn. 89 there comes a small, thinly encrusting specimen, bearing isolated, erect processes. The skeleton consists of a basal layer of oxea and strongyla, and two categories of styli with their bases implanted therein. The erect processes have an axial core of, mainly, strongyla with some oxea, and radially-arranged styli. The skeleton of the basal mass and that of the processes is markedly different. The strongyla (with some oxea) of the processes are up to 0·8 mm. long and are bent in the middle ; the oxea (with some strongyla) of the basal mass rarely exceed 0·4 mm. long and are often slightly vermiform. The large styli of the processes sometimes attain a length of 3 mm.

In addition there are 8 other specimens from Stns. 9, 45, 111 and 112, all of which are typical of *Bubaris radiata* (*sensu stricto*). Two are 20 and 25 mm. high respectively, both columnar, the first dividing into two and the second into three digitate processes at the apex. The remaining six specimens are globular or subglobular, 5–45 mm. high.

DISTRIBUTION.—Indian Ocean (Okhamandal coast, Providence, Andamans) ; Pacific (Straits of Formosa) ; 71–165 m.

Genus *Hymeniacidon* Bowerbank.

Hymeniacidon virgultosa (Carter).

Axinella virgultosa Carter, 1887 : 68, pl. v, fig. 11 ; Dendy, 1916 : 118.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Indian Ocean (Okhamandal, Mergui Archipelago) ; 27–31 m.

Hymeniacidon variospiculata Dendy.

Hymenicidon variospiculata Dendy, 1921 : 122, pl. xvii, fig. 4.

Occurrence.—Stn. 45, October 29, 1933. South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Salomon ; 137 m.

Genus *Ciocalypta* Bowerbank.

Ciocalypta penicillus Bowerbank.

Spongia cavernosa Lamarck, 1813 : 371 ; Lamarck, 1816 : 353 ; *Ciocalypta penicillus* Bowerbank, 1864 : 180, pl. xxx, fig. 360 ; Bowerbank, 1866 : 81 ; Gray, 1867 : 522 ; *Axinella penicillus* Schmidt, 1870 : 76 ; *Ciocalypta tyleri* Bowerbank, 1873 : 21, pl. iv, figs. 9–12 ; *C. penicillus* Bowerbank, 1874 : 33, pl. xiii, figs. 2–4 ; *C. leei* Bowerbank, 1874 : 255, pl. lxxxvi, figs. 1–4 ; *C. penicillus*, var. *tuberculata* Carter, 1876 : 235 ; *C. penicillus* Ridley, 1881 : 116 ; *C. leei* Ridley, 1881 : 116 ; *C. penicillus* Bowerbank, 1882 : 38 ; *C. leei* Bowerbank, 1882 : 38 ; *Leucophlœus massalis* Carter, 1883 : 323, pl. xiv, fig. 15 ; *Ciocalypta penicillus*, var. *aciculata* Carter, 1885 : 366 ; *Leucophlœa massalis* Carter, 1885 : 366 ; *Ciocalypta tyleri* Carter, 1885 : 366 ; ? *Stylotella polymastia* Lendenfeld, 1888 : 186, pl. iv, fig. 1 ; *Ciocalypta penicillus* Topsent, 1888 : 140 ; *C. tyleri*, var. *manaarensis* Dendy, 1889 : 91 ; *Apatospongia fallax* Marshall, 1892 : 16, pl. viii, figs. 1–5 ; *C. penicillus* Marshall, 1897 : 238 ; *C. tyleri* Marshall, 1897 : 239 ; *C. penicillus*, var. *gracilis* Topsent, 1897 : 445, pl. xviii, figs. 6–7 ; *Apathospongia fallax* Delage, 1899 : 172 ; *Ciocalypta tyleri* Dendy, 1905 : 197 ; ? *C. tyleri*, var. *aberrans* Dendy, 1905 : 198 ; ? *C. tyleri* Row, 1911 : 359 ; Hentschel, 1912 : 422 ; *C. melichlora* Hentschel, 1912 : 423 ; *C. rutila*, var. *gracilis* Hentschel, 1912 : 423 ; *C. heterostyla* Hentschel, 1912 : 424, pl. xiv, fig. 3, pl. xxi, fig. 58 ; *C. mertoni* Hentschel, 1912 : 424, pl. xiv, fig. 4, pl. xxi, fig. 59 ; ? *C. stalagmites* Hentschel, 1912 : 426, pl. xxi, fig. 60 ; ? *C. oculata*, var. *maxima* Hentschel, 1912 : 428, pl. xxi, fig. 61 ; ? *Leucophlœus incrustans* Ferrer, 1912 : 17 ; ? *Ciocalypta polymastia* Hallmann, 1914 : 353, fig. 7 ; *C. weltneri* Arnesen, 1920 : 24, pl. ii, fig. 7, pl. v, fig. 1 ; *C. penicillus* Topsent, 1921 : 687 ; *C. penicillus*, var. *dendyi* Topsent, 1921 : 690 ; *C. penicillus* Ferrer, 1922 : 2 ; Topsent, 1925 : 635 ; Arndt, 1928 : 54, figs. 60–61 ; Topsent, 1930 : 13 ; *C. alleni* de Laubenfels, 1936 : 134 ; *nec Spongia cavernosa* Pallas.

Occurrence.—Stn. 161, April 8, 1934, Maldive Area (5° 04′ 48″ N., 72° 50′ 30″ E.), 46 m., bottom coarse sand.

Remarks.—A few fragmentary fistulæ occur, with oxea only for spicules.

Distribution.—Coasts of Europe (from southern England to Spain and Portugal) ; Mediterranean ; Canaries ; South Africa ; Red Sea ; Ceylon ; Indo-Pacific ; Australia ; New Zealand ; 6–40 m.

Genus *Collocalypta* Dendy.

Collocalypta digitata Dendy.

Collocalypta digitata Dendy, 1905 : 199, pl. vii, fig. 6, pl. xiii, figs. 1–2.

Occurrence.—Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom rock and coral.

Distribution.—Gulf of Manaar.

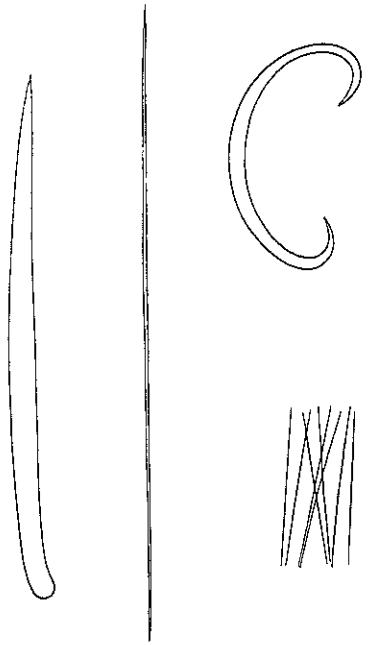
Genus *Sigmaxinella* Dendy.

Sigmaxinella megastyla **sp. n.**

(Text-fig. 39.)

Holotype.—B.M. 1936.3.4.536.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shells and (?) rock.



Text-fig. 39.—*Sigmaxinella massalis* sp. n. Style ×100, trichites, of two sizes, and sigma, ×600.

Diagnosis.—Sponge massively digitate ; surface strongly hispid, harsh to touch ; oscules not apparent ; texture firm, slightly compressible ; colour, in spirit, pale yellow ; skeleton of loose plumose columns of styli running from centre of lobe to surface ; mega-

scleres styli, usually slightly curved in basal third, 1·0 by 0·07 mm.; microscleres sigmata, 0·06–0·08 mm. chord, and trichites, scattered, of two sizes, 0·1 and 0·4 mm. long.

Remarks.—The holotype was either moribund when taken or has macerated since and is not in a good condition for accurate description. The microscleres are numerous, distributed generally through the tissues, but more especially at the surface; and throughout their occurrence is patchy. It could be that they represent foreign inclusions and that the sponge belongs to *Axinella*, but after due consideration it is assumed that the microscleres are proper to this specimen and that it represents a new species of *Sigmaxinella* characterized by the large size of the styli.

Genus *Stylissa* Hallmann.

Stylissa massa (Carter).

Axinella virgultosa, var. *massa* Carter, 1887 : 68, pl. vii, figs. 6–7; *Stylotella conulosa* Topsent, 1897 : 466; *Hymeniacidon conulosa* Lindgren, 1897 : 483; Lindgren, 1898 : 31, pl. xvii, fig. 13, pl. xix, fig. 19; ?*Suberites mollis* Kieschnick, 1898 : 46; Kieschnick, 1900 : 576, pl. xliv, fig. 4.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Distribution.—Mergui Archipelago; Amboina; Java; ? Ternate.

Stylissa coccinea (Keller).

Reniera coccinea Keller, 1891 : 307, pl. xvi, figs. 5–6; *Hymeniacidon coccinea* Burton, 1926 : 81.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Remarks.—The single typical specimen contains no sigmaspiroids (cf. Burton, l.c.). Embryos are present.

Distribution.—Red Sea; Suez Canal.

Genus *Ptilocaulis* Carter.

Ptilocaulis spiculifera (Lamarck).

Spongia spiculifera Lamarck, 1813 : 449; Lamarck, 1816 : 376; *Ptilocaulis gracilis* Carter, 1883 : 321, pl. xiii, fig. 8, pl. xiv, fig. 13; *Axinella spiculifera* Ridley, 1884 : 617, pl. liv, fig. b; Dendy, 1921 : 115, pl. viii, fig. 7; *Ptilocaulis digitatus* Topsent, 1928 : 172, pl. ii, fig. 52, pl. vi, fig. 15; *P. digitatus*, var. *spiculifera*, Topsent, 1932 : 111, pl. v, fig. 8; *P. spiculifer* Topsent, 1933 : 23.

Occurrence.—Stn. 151, April 3, 1934, Maldive Area (4° 50′ 00″ N., 72° 50′ 12″ E.), 101 m., bottom coral rock.

Distribution.—West Indies; Cape Verde Is.; Indian Ocean (Amirante); Australia (King Island); 40–52 m.

Genus *Raspaigella* Schmidt.

Raspaigella salomonensis (Dendy).

Spongosorites salomonensis Dendy, 1921 : 125, pl. xvii, fig. 6.

Occurrence.—Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Distribution.—Salomon; 110–219 m.

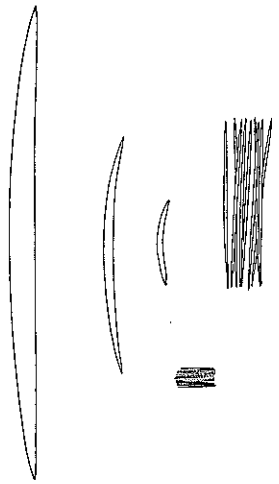
Raspaigella ? suluensis (Wilson).

Spongosorites suluensis Wilson, 1925 : 331, pl. xxxviii, fig. 8, pl. xlviii, fig. 3.

Occurrence.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Remarks.—A small irregular, massive sponge about 2 cm. across is referred doubtfully to this species. The ectosome is lacking entirely, and the interstices of the sponge contain sufficient calcareous debris to suggest that it has been subject to wave action on the bottom of the sea. The spicules are large oxea and frequent styli, average 1·0 by 0·048 mm., small oxea, average 0·24 by 0·012 mm. long, and trichodragmata. The last-named are abundant and measure 0·012, 0·028, 0·04 and 0·12 mm. (with, possibly, intermediates between these sizes). It would be inadvisable to refer so incomplete a specimen to a new species and its nearest relative is *Spongosorites suluensis*, which contains " not very abundant " trichodragmata 0·1 mm. long. Otherwise there is a fairly close agreement.

Distribution.—Philippines.



Text-fig. 40.—*Raspaigella dendyi* sp. n. Oxea, of three sizes, ×100, trichodragmata, of two sizes, ×600.

Raspaigella dendyi sp. n.

(Text-fig. 40.)

Holotype.—B.M. 1936.3.4.354.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion; Stn. 112, January 15, 1933, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Diagnosis.—Sponge massive, rounded, sometimes with large and small erect digitate processes; surface even, non-hispid; oscules, up to 4 mm. diameter, grouped in one or

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...pper surface ; texture hard ; colour, in spirit, a pale yellowish-brown ; ...ttered reticulation of large and small oxea, with dense, ectosomal small oxea ; megascleres oxea, of three sizes, 0·9 by 0·048, 0·45 by 0·01 mm. respectively ; microscleres trichodragmata, of two sizes, 035–0·07 by 0·014 mm. respectively.

Genus *Pseudaxinyssa* Burton.

Pseudaxinyssa tenuispiculata Burton.

...iculata Burton, 1931 : 350, pl. xxiii, fig. 10.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—A fragment, resembling the holotype in appearance and texture, is assigned with hesitation to this species. Its spicules are oxea, styli and pseudoxea but all are double the size of those originally described.

Distribution.—Natal.

Order KERATOSA.

Family Darwinellidæ.

Genus *Darwinella* Müller.

Darwinella simplex Topsent.

Darwinella simplex Topsent, 1892 : xxvii ; Topsent, 1904 : 55, pl. ix, fig. 3 ; Topsent, 1905 : clxxvi ; Dendy, 1905 : 204, pl. xv, figs. 1–2.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Western Mediterranean ; Azores ; Ceylon ; 200 m.

Family Aplysinidæ.

Genus *Aplysina* Nardo.

Aplysina euplectella (Hentschel).

Stelospongia euplectella Hentschel, 1912 : 442, pl. xv, fig. 5, pl. xvi, fig. 8.

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

Distribution.—Aru Is.

Aplysina mollis Row.

Aplysina mollis Row, 1911 : 376, pl. xxxviii, fig. 18 ; Burton, 1926 : 82.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Suez Canal ; Red Sea ; 8 m.

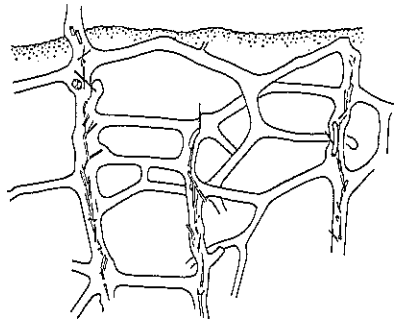
Aplysina primitiva **sp. n.**

(Text-fig. 41.)

Holotype.—B.M. 1936.3.4.532.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), 73–165 m., bottom rock (?).

Diagnosis.—Sponge encrusting ; surface conulose, even and smooth between conuli ; oscules small, inconspicuous ; texture soft ; colour, in spirit, light purple ; skeleton a



Text-fig. 41.—*Cacospongia symbiotica* sp. n. Section at right angles to surface, ×15.

delicate reticulation, with meshes somewhat irregular and confused, more or less oblong and measuring 0·3 by 0·1 mm. ; diameter of fibres 0·05 mm.

Remarks.—Although the structure of the fibres in this species recalls that of the fibres of *Aplysilla*, the fact that the skeleton forms a definite network is justification for regarding it as a species of *Aplysina*.

Genus *Aplysinopsis* Lendenfeld.

Aplysinopsis reticulata Hentschel.

Aplysinopsis reticulata Hentschel, 1912 : 437, pl. xv, fig. 1, pl. xvi, fig. 9.

Occurrence.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04′ 18″ S., 39° 14′ 12″ E.), depth unknown.

Remarks.—The single specimen is small and massive, and has the reticulations of the surface considerably less strongly marked than in the holotype. The skeleton, on the other hand, appears to be typical.

Distribution.—Aru Is. ; 10–40 m.

Genus *Druinella* Lendenfeld.

Druinella ramosa Thiele.

Druinella ramosa Thiele, 1899 : 24, pl. iii, fig. 3, pl. iv, fig. 5.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Celebes.

Genus *Megalopastas* Dendy.

Megalopastas retiaria Dendy.

Megalopastas retiaria Dendy, 1921 : 137, pl. iv, fig. 27.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Distribution.—Okhamandal ; 7 m.

Family Spongiidæ.

Genus *Spongia* Linnaeus.

Spongia officinalis Linnaeus.

Occurrence.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29′ 00″ N., 55° 47′ 00″ E.), 95 m.

Remarks.—A small, irregularly massive specimen appears to belong to this species, but is much too small to be assigned to any of the many varieties.

Genus *Spongionella* Bowerbank.

Spongionella pulvilla (Dendy).

Megalopastas pulvillus Dendy, 1905 : 206, pl. xv, fig. 3.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Gulf of Manaar.

Spongionella nigra Dendy.

Spongionella nigra Dendy, 1889 : 94 ; *Megalopastas nigra* Dendy, 1905 : 205, pl. xiv, fig. 7, pl. xv, figs. 5–8.

Occurrence.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57′ 12″ N., 50° 35′ 00″ E. to 11° 56′ 42″ N., 50° 39′ 12″ E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The four specimens include two of less than 1 cm. across, irregularly encrusting. The third is some 2 cm. high and irregularly massive, and the fourth is nearly 3 cm. across. In one only is the flesh retained and this is pale yellow in colour. The skeleton in each is closely similar to that of the holotype.

Distribution.—Gulf of Manaar.

Spongionella frondosa (Hentschel).

Hippospongia frondosa Hentschel, 1912 : 435, pl. xvi, fig. 4.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Remarks.—The generic position of this species must remain in doubt until such time as a revision of the species, as well as the genera, of Keratosa can be made. It is not a true *Spongia*. Perhaps its closest affinities are with *Spongionella*.

Distribution.—Aru Is. ; 10–40 m., bottom coral rock.

Genus *Psammaplysilla* Keller.

Psammaplysilla arabica Keller.

Psammaplysilla arabica Keller, 1889 : 358, pl. xxii, figs. 23–27.

Occurrence.—Stn. M.B. I (d), September 17, 1933, Red Sea (13° 39′ 30″ N., 42° 43′ 00″ E.), 26 m., bottom sand, shell and coral.

Remarks.—A single irregularly massive specimen, 20 mm. high and the same across, coloured purple-brown in spirit.

Distribution.—Reefs at Suakin ; 4–10 m., on coral.

Genus *Cacospongia* Schmidt.

Cacospongia Schmidt, 1862 : 26 ; *Taonura* Carter, 1882 : 108.

Genotype.—*Cacospongia mollior* Schmidt, 1862 : 27.

Diagnosis.—Keratosa with skeleton a rectangular reticulation of medullated fibres ; without ectosomal skeleton, foreign inclusions, filaments or horny spicules.

Cacospongia herdmani (Dendy).

Aplysina herdmani Dendy, 1905 : 225, pl. xvi, fig. 4.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Distribution.—Ceylon.

Cacospongia symbiotica **sp. n.**

(Text-fig. 43.)

Holotype.—B.M. 1936.3.4.391.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Diagnosis.—Sponge irregularly massive, with numerous bivalves (species not determined) set in body vertically to surface ; surface minutely conulose, and slightly shaggy from projecting ends of main fibres ; oscules small, scattered ; texture compressible, elastic ; pale brown to brownish-purple ; skeleton subscalariform, of ascending fibres, about 1 mm. apart, 0·06–0·12 mm. diameter, cored with broken spicules, and connective fibres, without foreign inclusions, 0·02–0·06 mm. diameter ; without special ectosomal skeleton.

Remarks.—There are 22 specimens, ranging from 10 to 60 mm. across. The skeleton is typically a regularly scalariform reticulation but this may readily become more irregular, especially in those cases where large sand-grains are included in the tissues.

Genus *Dysidea* Johnston.

Dysidea fragilis (Montagu).

(For synonymy see Burton, 1934 : 582.)

Occurrence.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53′ 42″ N., 51° 13′ 12″ E.), 73–220 m., bottom coarse sand and shingle ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 109, January 13, 1934, Zanzibar Area (5° 10′ 36″ S., 39° 33′ 48″ E.), 640 m., bottom light-grey mud.

Remarks.—The sample from Stn. 109 includes an irregularly massive fragment and two digitate processes 60 by 6 mm., completely macerated. It is similar to that figured by me (l.c., fig. 26). The specimen from Stn. 45 is 10 mm. high by 6 mm. across and 3 mm. thick, a thin erect lamella bearing two incipient digitate processes. The third specimen (Stn. 24) is irregularly ramose, about 25 mm. across, with slender branches averaging 3 mm. diameter. The skeleton of these last two specimens contains sponge spicules only and approximates to that shown in my fig. 31 (l.c.).

Dysidea cinerea Keller.

Dysidea cinera Keller, 1889 : 337, pl. xx, fig. 2 ; Row, 1911 : 365 ; *Spongelia cinerea* Dendy, 1916 : 140 ; *Dysidea cinerea* Burton, 1926 : 82.

Occurrence.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04′ 57″ S., 39° 13′ 18″ E.), 113 m., bottom coral rock.

Distribution.—Red Sea ; Indian Ocean (Okhamandal Coast) ; 16 m.

Genus *Eurypongia* Row.

Eurypongia lactea Row.

Eurypongia lactea Row, 1911 : 366, pl. xxxix, fig. 23, pl. xli, figs. 27–28 ; Burton, 1926 : 82.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Suez Canal ; Red Sea.

Genus *Hircinia* Nardo.

Hircinia arenosa Lendenfeld.

Hircinia arenosa Lendenfeld, 1889 : 583, pl. xxxvi, fig. 3 ; Kirkpatrick, 1903 : 256.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Remarks.—Of the two specimens from Stn. 45, one is irregular but incipiently cup-shaped, 40 mm. across by 10 mm. high, the other cup-shaped and 170 mm. high, being 180 mm. across the mouth of the cup. Consequently, the first agrees in external form with Kirkpatrick's South African specimens, the second with the holotype, from Australia. A similar series was obtained from Stn. 53. The five smallest, from 30 to 90 mm. high, are very like Kirkpatrick's smallest specimen, another is of irregular form, incipiently cup-shaped, 40 mm. across and 20 mm. high, and the largest is subglobose with an oscular depression on the upper surface. This last specimen is hollow, with openings connecting the central cavity with the exterior.

The skeleton in all differs from that of the holotype in containing more spicule-fragments than sand.

Distribution.—Australia (all coasts) ; South Africa, 155 m.

Hircinia aruensis Hentschel.

Hircinia aruensis Hentschel, 1912 : 445, pl. xvi, fig. 6 ; Burton, 1934 : 580.

Occurrence.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22′ 36″ N., 57° 53′ 00″ E.), 13·5 m., bottom rock, shingle, shells and Lithothamnion.

Distribution.—Aru Is. ; Great Barrier Reef ; 12–30 m., bottom coral rock or hard and shelly.

Genus *Carteriospongia* Hyatt.

Carteriospongia cordifolia Keller.

Carteriospongia cordifolia Keller, 1889 : 352, pl. xxi, fig. 15 ; *Phyllospongia cordifolia* Row, 1911 : 378.

Occurrence.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03′ 30″ N., 57° 02′ 30″ E.), 38 m., bottom Lithothamnion.

Distribution.—Red Sea, 9 m.

LIST OF WORKS REFERRED TO.

Annandale, N. 1914. Fauna Symbiotica Indica. No. 5—Some sponges commonly associated with oysters and mussels in Madras Harbour and the Chilka Lake. *Rec. Ind. Mus. Calcutta*, **10** : 149–158.

1915. Indian boring sponges of the family Clionidæ. *Rec. Ind. Mus. Calcutta*, **11** : 1–24.

—— 1915. Some sponges parasitic on Clionidæ with further notes on that family. *Rec. Ind. Mus. Calcutta*, **11** : 457–458.

—— 1918. Zoological results of a tour in the Far East. *Mem. Asiatic Soc. Bengal*, **6** : 193–218, 1 pl.

Arndt, W. 1912. Zoologische Ergebnisse der ersten Lehr-Expedition. *Jber. schles. Ges. vaterl. Kult.* **90** : 110–136.

—— 1927. Kalk- und Kieselschwämme von Curaçao. *Bijdr Dierk. Amsterdam*, **25** : 133–158, 3 pls. 16 text-figs.

—— 1928. Porifera, Schwämme, Spongien [in] Die *Tierwelt Deutschlands* Jena, **4** : 1–89, 110 text-figs.

Arnesen, E. 1901. Spongier fra den norske kyst. Calcarea. Systematik katalog med bemerkinger og bestommelstabel. *Bergens Mus. Aarb.* **1900** (5) : 1–46, 1 pl.

—— 1901. Calcarea [in] *Meeresfauna von Bergen*, **1** : 67–72.

—— 1920. Spongia [in] *Rep. Sci. Res.* " *Michael Sars* " *North Atlantic Deep Sea Expedition*, **3** (2) : 1–28, 5 pls. [Issued separately in 1920 : finally published in 1932.]

Babić, K. 1914. Über Ancorina (Thenca) muricata (Bowerbank). *Zool. Anz.* **45** : 152–158, 3 figs.

—— 1915. (A Magyar Adria Egyesulet kutatasainka eredemenyeiboi). *Az Adria Thenea-fajáról. Allatt. Kozlem.* **14** : 240–277, 5 figs.

—— 1916. Zur Kenntnis der Thenaen. *Zool. Jb. Syst.* **40** : 389–408, 3 pls.

—— 1921. Monactinellida and Tetractinellida der Adria. *Glasn. nov. prirodose* **33** : 77–93, 9 figs.

—— 1922. Monactinellida und Tetractinellida der Adria. *Zool. Jb. Syst.* **46** : 217–302, 2 pls., 50 figs.

Baer, L. 1905. Silicospongien von Sansibar, Kapstadt und Papeete. *Arch. naturgesch.* **72** : 1–32, 5 pls.

—— 1906. Silicospongien von Sansibar, Kapstadt und Papeete. *Inaug. Dissert. Berlin* : 5–36, 5 pls.

BATE, C. S. 1868. Report of the Committee appointed to explore the Marine Fauna and Flora of the South Coast of Devon and Cornwall, No. 2. *Rep. 37th Meeting Brit. Ass.* : 275–287, 3 pls.

BLAINVILLE, M. H. D. DE. 1830. Zoophyta. *Dict. Sci. nat.* **60** : 1–546.

—— 1834. *Manuel d'Actinologie*, Strasbourg : vii + 695 pp.

BÖSRAUG, E. 1913. Die Tetractinelliden. *Reise in Ostafrika von A. Voeltzkow, Stuttgart*, **3** (3) : 231–251, 4 pls.

BOWERBANK, J. S. 1857. On the vital powers of the Spongiadæ. *Rep. Brit. Ass.* 1856 : 439–451.

—— 1858. On the anatomy and physiology of the Spongiadæ. *Philos. Trans.* **148** : 279–332, 4 pls.

—— 1862. On the anatomy and physiology of the Spongiadæ. *Philos. Trans.* **153** : 747–829, 1087–1135, 12 pls.

—— 1864. *A Monograph of the British Spongiadæ*, I. London : 290 pp., 37 pls.

—— 1866. *A Monograph of the British Spongiadæ*, II. London : 388 pp.

—— 1869. A monograph of the siliceo-fibrous sponges. Parts I and II. *Proc. zool. Soc. Lond.* : 66–100, 325–351, 9 pls.

—— 1872. Contributions to a general history of the Spongiadæ. *Proc. zool. soc. Lond.* : 115–129, 196–202, 626–635, 8 pls.

—— 1873. Contributions to a general history of the Spongiadæ. *Proc. zool. Soc. Lond.* : 3–25, 319–333, 8 pls.

—— 1873. Report on a collection of sponges found at Ceylon by E. W. H. Holdsworth, Esq. *Proc. zool. Soc. Lond.* : 25–32, 3 pls.

—— 1874. Contributions to a general history of the Spongiadæ. Part VI. *Proc. zool. Soc. Lond.* : 298–305, 2 pls.

—— 1874. *A Monograph of the British Spongiadæ*, III. London : 376 pp., 92 pls.

—— 1875. Contributions to a general history of the Spongiadæ. Part VII. *Proc. zool. Soc. Lond.* : 281–296.

—— 1882. *A Monograph of the British Spongiadæ*, IV. London : 250 pp., 17 pls.

BRANDT, J. F. VON. 1857. Extrait d'un Mémoire. *Bull. Acad. St. Pétersbourg*, 16 : coll. 65–67. [Also in Melanges Biol. (1858) : 606–608.]

—— 1859. *Symbolæ ad polypos Hyalochætides spectantes*. Petropoli : 24 pp.

BURTON, M. 1924. The genus *Chondrilla*. *Ann. Mag. nat. Hist.* (9) **14** : 206–209.

—— 1924. A revision of the Sponge Family Donatiidæ. *Proc. zool. Soc. Lond.* **1924** : 1033–1045, 1 pl.

—— 1926. Description of South African sponges collected in the South African Marine Survey. Pt. I. Myxospongida and Astrotetraxonida. *Fish. Mar. Biol. Survey Cape Town Rep.* **3** : 1–29, 6 pls.

—— 1926. Sponges [in] Zoological Results of the Suez Canal Expedition. *Trans. zool. Soc. Lond.*, 22 : 71–83, 7 figs.

—— 1926. *Stelletta purpurea* Ridley, and its variations. *Ann. Mag. nat. Hist.* **18** : 44–49.

—— 1927. A revision of the genera and species contained in Lendenfeld's ' Die Chalineen des australischen Gebietes '. *Ann. Mag. nat. Hist.* **19** : 289–296, 502–512.

—— 1928. Hexactinellida [in] *Danish Ingolf Exped. Copenhagen*, **6** (4) : 1–18, 9 figs.

—— 1928. Report on some deep-sea sponges from the Indian Museum collected by the R.I.M.S. " Investigator ". Part II. Tetraxonida (concluded) and Eucoratosa. *Rec. Ind. Mus. Calcutta*, **30** (1) : 109–138, 2 pls. 9 figs.

—— 1929. Description of South African sponges collected in the South African Marine Survey. Part II. The " Lithistidæ ". *Fish. Mar. Biol. Surv. S. Africa*, spec. Rep. 7 : 1–12, 2 pls.

—— 1929. Contribution a l'étude de la faune du Cameroun. Porifera. *Faune Colon. franç.* **3** : 65–71, 1 pl., 2 figs.

—— 1929. Porifera. Part II. Antarctic sponges. *British Antarctic* (" *Terra Nova* ") *Expedition* 1910, *Natural History Report, Zool.* **6** (4) : 393–458, 5 pls., 9 figs.

—— 1930. Norwegian sponges from the Norman Collection. *Proc. zool. Soc. Lond.* **1930** : 487–546, 2 pls., 8 figs.

—— 1931. On a collection of marine sponges mostly from the Natal coast. *Ann. Natal Mus. Pmburg.* **6** : 337–358, 1 pl., 9 figs.

—— 1932. Sponges [in] *Discovery Report Cambridge*, **4–6** : 327–392, 20 pls., 56 figs.

—— 1933. Report on a small collection of sponges from Stil Bay, South Africa. *Ann. Mag. nat. Hist.* (10) **12** : 235–244, 5 figs.

—— 1934. Zoological results of the Norwegian Scientific Expeditions to East-Greenland. III. Report on the sponges of the Norwegian Expeditions to East-Greenland (1930, 1931 and 1932). *Skr. Svalbard Ishavet Oslo*, **61** : 3–33, 1 map, 4 figs.

BURTON, M. 1934. Sponges [in] *Sci. Rep. Gr. Barrier Reef Exped.* **4** : 513–621, 2 pls., 33 figs.

—— 1935. The family Plocamiidæ, with descriptions of four new genera of sponges. *Ann. Mag. nat. Hist.* **15** : 399–404.

—— 1936. Sponges [in] The Fishery Grounds near Alexandria, *Notes Dir. Rech. Pêche le Caire*, **17** : 1–28, 16 figs.

—— 1953. *Suberites domuncula* (Olivi) : its synonymy, distribution and ecology. *Bull. Brit. Mus.* (*nat. Hist.*) *Zool.* **1** (12) : 353–378.

BURTON, M. and SRINIVASA RAO, H. 1932. Report on the shallow-water marine sponges in the collection of the Indian Museum. *Rec. Indian Mus.* **34** : 299–356, 1 pl., 16 figs.

CARTER, H. J. 1871. Description and illustrations of a new species of *Tethya*. *Ann. Mag. nat. Hist.* (4) **8** : 99–105, 1 pl.

—— 1872. Additional information on the structure of *Tethya dactyloidea* Carter. *Ann. Mag. nat. Hist.* (4) **9** : 409–435.

—— 1873. On two new species of Gummineæ (*Corticium abyssi*, *Chondrilla australiensis*) with special and general observations. *Ann. Mag. nat. Hist.* (4) **12** : 17–30.

—— 1873. On the Hexactinellidæ and Lithistidæ generally, and particularly on the Aphrocallistidæ, *Aulodictyon*, and Farreæ. *Ann. Mag. nat. Hist.*, (4) **12** : 349–373, 437–472, 5 pls.

—— 1876. Descriptions and figures of deep-sea sponges and their spicules, from the Atlantic Ocean, dredged up on board H.M.S. " Porcupine ", chiefly in 1869 (concluded). *Ann. Mag. nat. Hist.* (4) **18** : 226–240, 307–324, 388–410, 458–479, 5 pls.

—— 1878. Position of the sponge-spicule in the Spongida ; and postscript on the identity of *Squamulina scopula* with the sponges. *Ann. Mag. nat. Hist.* (5) **1** : 170–174.

—— 1879. On *Holasterella*, a fossil sponge of the Carboniferous Era, and on *Hemiasterella*, a new genus of recent sponges. *Ann. Mag. nat. Hist.* (5) **3** : 141–150, 1 pl.

—— 1879. Contributions to our knowledge of the Spongida. *Ann. Mag. nat. Hist.* (5) **3** : 284–360, 5 pls.

—— 1880. Report on specimens dredged up from the Gulf of Manaar. *Ann. Mag. nat. Hist.* (5) **6** : 35–61, 129–156, 5 pls.

—— 1881. Supplementary Report on specimens dredged up from the Gulf of Manaar. *Ann. Mag. nat. Hist.* (5) **7** : 361–385, 1 pl.

—— 1881. Contributions to our knowledge of the Spongida : Carnosa. *Ann. Mag. nat. Hist.* (5) **8** : 101–112, 241–259, pl. 9.

—— 1882. New sponges, observations on old ones, and a proposed new Group. *Ann. Mag. nat. Hist.* (5) **10** : 106–125, 2 figs.

—— 1882. Some sponges from the West Indies and Acapulco. *Ann. Mag. nat. Hist.* (5) **9** : 266–301, 346–368, 2 pls.

—— 1883. Contributions to our knowledge of the Spongida : Pachytragida. *Ann. Mag. nat. Hist.* (5) **11** : 308–329, 344–369, 6 pls.

—— 1885. Report on a Collection of marine sponges from Japan. *Ann. Mag. nat. Hist.* **15** : 387–406, 3 pls.

—— 1885. Descriptions of sponges from the neighbourhood of Port Phillip Heads, South Australia. *Ann. Mag. nat. Hist.* (5) **15** : 107–117, 196–222, 301–321, 1 pl. **16** : 277–294, 347–368.

—— 1886. Descriptions of sponges from the neighbourhood of Port Phillip Heads, South Australia (cont'd.). *Ann. Mag. nat. Hist.* (5) **17** : 40–53, 112–127, 431–441, 502–516 ; **18** : 34–55, 126–149.

—— 1886. Supplement to the descriptions of Mr. J. Bracebridge Wilson's Australian sponges. *Ann. Mag. nat. Hist.* (5) **18** : 271–290, 445–466.

—— 1887. Report on the marine sponges, chiefly from King Island in the Mergui Archipelago, collected for the Trustees of the Indian Museum, Calcutta, by Dr. John Anderson. *J. linn. Soc.* (Zool.) **21** : pp. 61–84, 3 pls.

CUVIER, G. L. C. F. D. 1817. *Le règne animal*. Paris, 4.

DELAGE, Y. 1899. *Spongiaires* [in] *Delage et Hérouard, Traité de Zoologie Concrète*, **2** (1) : 49–244, 11 pls., text-figs.

LAUBENFELS, M. W. DE. 1934. New sponges from the Puerto Rican deep. *Smithson. misc. Coll.* **91** (17) : 1–28.

—— 1936. A discussion on the sponge fauna of the Dry Tortugas in particular and the West Indies in general, with material for a Revision of the Families and Genera of the Porifera. *Pap. Tortugas Lab.* **30** : 1–225, 22 pls.

DENDY, A. 1887. The sponge-fauna of Madras. *Ann. Mag. nat. Hist.* (5) **20** : 153–165, 4 pls.

DENDY, A. 1887. Report on a Zoological Collection made by the Officers of H.M.S. "Flying Fish" at Christmas Island, Indian Ocean: *Proc. zool. Soc. Lond.*, **3**: 524–526, 1 pl.

—— 1889. Report on a Second Collection of sponges from the Gulf of Manaar. *Ann. Mag. nat. Hist.* (6) **3**: 73–99, 3 pls.

—— 1895. Catalogue of non-calcareous sponges collected by J. Bracebridge Wilson, Esq., M.A., in the neighbourhood of Port Phillip Heads. Part I. *Proc. roy. Soc. Vict.* **7**: 232–260.

—— 1897. Catalogue of non-calcareous sponges collected by J. Bracebridge Wilson, Esq., M.A., in the neighbourhood of Port Phillip Heads. Part III. *Proc. roy. Soc. Vict.* **9**: 230–259.

—— 1905. Report on the sponges collected by Professor Herdman at Ceylon in 1902. *Rep. Pearl Oyster Fish.*, Gulf of Manaar Suppl. **18** (Roy. soc. 1905) **3**: 57–246, 16 pls.

—— 1913. Report on the calcareous sponges collected by H.M.S. "Scalark" in the Indian Ocean. *Trans. linn. Soc. London*, **16** (1): 1–29, 5 pls.

—— 1916. Report on the non-calcareous sponges collected by Mr. James Hornell at Okhamandal in Kattiawar in 1905–06. *Rep. Govt. Baroda Marine Zool. Okhamandal*, **2**: 96–146, 4 pls.

—— 1916. Report on the Hexactinellid sponges (Triaxonida) collected by H.M.S. "Scalark" in the Indian Ocean. *Trans. linn. Soc. Lond.*, Zool. **17**: 211–224, 4 pls.

—— 1916. Report on the Homosclerophora and Astrotetraxonida collected by H.M.S. "Scalark" in the Indian Ocean. *Trans. linn. Soc. Lond.*, Zool, **17**: 225–271, 4 pls.

—— 1921. Report on the Sigmatotetraxonida collected by H.M.S. "Scalark" in the Indian Ocean. *Trans. linn. Soc. Lond.*, Zool. **18**: 1–164, 18 pls.

—— 1924. Porifera. Part I. Non-Antarctic Sponges. *British Antarctic ("Terra Nova") Expedition* 1910. *Natural History Report Zool.* **6** (3): 269–392, 15 pls.

DENDY, A. and BURTON, M. 1926. Report on some deep-sea sponges from the Indian Museum collected by R.I.M.S. "Investigator". Part I. Hexactinellida and Tetraxonida (pars). *Rec. Ind. Mus. Calcutta*, **28**: 225–248, 7 figs.

DENDY, A. and FREDERICK, L. M. 1924. On a Collection of sponges from Abrolhos Islands, Western Australia. *J. linn. Soc. Lond.*, Zool. **35**: 477–519, 2 pls.

DENDY, A. and ROW, R. W. H. 1913. The classification and phylogeny of the calcareous sponges. *Proc. zool. Soc. Lond.* **1913**: 704–813, 1 fig.

DRAGNEWITSCH, P. 1905. Spongien von Singapore. *Inaug. Dissert. Bern*, 36 pp.

DUCHASSAING DE FONBRESSIN, P. and MICHELOTTI, G. 1864. Spongiaires de la Mer Caraïbe. *Natuurk. Verh. Holland. Maatsch. Wet.* **21**: 1–124, 25 pls.

FERRER HERNANDEZ, F. 1912. Notas sobre algunas esponjas de Santander. *Bol. Soc. esp. Hist. nat.* **12**: 573–590 (sep. pag. 1–18).

—— 1914. Esponjas del Cantabrico. I. Calcarea. II. Euceratosa. *Trab. Mus. Cienc. nat. Madr. Zool.* **14**: 1–36.

—— 1914. Esponjas del Cantabrico. Part. Segunda. III. Myxospongida. IV. Tetraxonida. V. Triaxonida. *Trab. Mus. Cienc. nat. Madr. Zool.* 17: 46 pp.

—— 1922. Mas datos para el conocimiento de las esponjas de las costas espanolas. *Bol. Oceanogr. Pesc. Madr.* **7**: 247–272, 2 pls.

FLEMING, J. 1828. *A History of British Animals*. Edinburgh, London, XXIII + 565 pp.

FRISTEDT, K. 1887. Sponges from the Atlantic and Arctic Oceans and the Behring Sea. *Vega-Exped. Vetensk. Iakttl.* **4**: 401–471, 10 pls.

GRAEFFE, E. 1882. Uebersicht der Seethierfauna des Golfes von Triest. *Arb. zool. Inst. Univ. Wien*, **4**: 313–321.

GRAVIER, CH. 1918. Note sur une Actinie (*Thoracactis* n.g. *topsenti* n.sp.) et un Annelide Polychète (*Hermadion fauveli* n. sp.) commensaux d'une éponge silicieuse (*Sarostegia oculata* Topsent). *Bull. Inst. océanogr. Monaco*, **344**: 1–20.

GRAY, J. E. 1858. On Aphrocallistes, a new genus of Spongiadæ from Malacca. *Proc. zool. Soc. Lond.* 114–115, 1 pl. [Also: *Ann. Mag. nat. Hist.* **2**: 224–225.]

—— 1867. Notes on the arrangement of sponges, with the descriptions of some new genera. *Proc. zool. Soc. Lond.*: 492–558.

HALLMANN, E. F. 1912. Report on the sponges obtained by the F.I.S. "Endeavour" on the coasts of New South Wales, Victoria, South Australia, Queensland and Tasmania. Part I. *Zool. Res. Fish. Exped. "Endeavour"*, **2**: 117–300, 16 pls.

—— 1914. A Revision of the Monaxonid Species described as new in Lendenfeld's 'Catalogue of the Sponges in the Australian Museum'. Part I. *Proc. linn. Soc. N.S.W.* **39**: 263–315, 327–376, 398–446, 10 pls.

HALLMAN, E. F. 1917. A revision of the genera with microscleres included, or provisionally included, in the family Axinellidæ. *Proc. linn. Soc. N.S.W.* **41**: 634–675, 5 pls., 20 text-figs.

HANSEN, G. A. 1885. *Den Norske Nordhavs-Expedition* 1876–1878. 13. Zoologi, Spongiadæ. Christiania, 4to, 25 pp. 7 pls.

HENTSCHEL, E. 1909. Tetraxonida, I. *Fauna S.W.-Australiens, Michaelsen und Hartmeyer, Jena* **2** (21): 347–402, 2 pls. 29 figs.

—— 1911. Tetraxonida, II. *Fauna S.W.-Australiens, Michaelsen and Hartmeyer, Jena*, **3** (10): 279–393, 54 figs.

—— 1912. Kiesel- und Hornschwämme der Aru- und Kei-Inseln. *Abh. senckenb. naturf. Ges.* **34**: 291–448, 9 pls.

—— 1914. Monaxone Kieselschwämme und Hornschwämme der Deutschen Südpolar-Expedition 1901–1903. *Deutsch. Sudpol. Exped.* (Zool. 7) **15**: 37–141, 5 pls.

—— 1929. Die Kiesel- und Hornschwämme des Nördlichen Meeres. *Fauna arct. Jena*, **5** (4): 859–1042, 4 pls.

Ijima, I. 1898. The genera and species of Rossellidæ. *Annot. zool. jap.* **2**: 41–55.

—— 1916. Notes on *Aphrocallistes beatrix* Gray, particularly with reference to the form occurring in East Asiatic seas. *Annot. zool. jap.* **9**: 173–183.

—— 1927. The Hexactinellida of the Siboga Expedition. *Siboga Exped. Rep. Leiden*, **40** (6): 383 pp., 26 pls.

JENKIN, C. F. 1908. The marine fauna of Zanzibar and British East Africa. The Calcareous Sponges. *Proc. zool. Soc. Lond.* 434–456, 1 pl., figs.

JOHNSTON, G. 1842. *A History of British Sponges and Lithophytes*. London, Edinburgh, Dublin, 264 pp., 25 pls.

JOHNSON, J. Y. 1863. Description of a new siliceous sponge from the Coast of Madeira. *Proc. zool. Soc. Lond.*: 257–259.

KELLER, C. 1880. Neue Coelenteraten aus dem Golf von Neapel. *Arch. mikr. Anat.* **18**: 271–280, 2 pls.

—— 1889. Die Spongienfauna des rothen Meeres. *Z. wiss. Zool. Leipzig*, **48**: 311–405, 5 pls.

—— 1891. Die Spongienfauna des rothen Meeres. *Z. wiss. Zool. Leipzig*, **52**: 294–368, 5 pls.

KENT, W. S. 1870. On the Hexactinellidæ, or hexradiate spiculed siliceous sponges, taken in the "Norma" expedition off the coast of Spain and Portugal. *Monthly micr. J.* **4**: 241–252, 3 pls.

—— 1870. On a new anchoring sponge, *Dorvillia agariciformis*. *Monthly micr. J.* **4**: 293–295, 1 pl.

—— 1871. Note on *Dorvillia agariciformis*. *Ann. Mag. nat. Hist.* (4) **7**: 37–38.

KIESCHNICK, O. 1896. Silicispongiæ von Ternate. *Zool. Anz.* **19**: 526–534.

—— 1898. Die Kieselschwämme von Amboina. *Inaug. Dissert. Jena*: 66 pp.

—— 1900. Kieselschwämme von Amboina. *Denkschr. med.-naturw. Ges. Jena*, **8**: 545–582, 2 pls.

KIRKPATRICK, R. 1889. Report of a deep sea trawling cruise off the south-west coast of Ireland. *Ann. Mag. nat. Hist.* (6) **4**: 446.

—— 1900. On the sponges of Christmas Island. *Proc. zool. Soc. Lond.*: 127–141, 2 pls.

—— 1902. Descriptions of South African sponges. *Marine Invest. S. Africa Dept. Agric.* **1**: 219–232, 3 pls.

—— 1903. Descriptions of South African sponges. Part II. *Marine Invest. S. Africa Dept. Agric.* **2**: 171–180, 1 pl.

—— 1903. Descriptions of South African sponges. Part III. *Marine Invest. S. Africa Dept. Agric.* **2**: 233–264, 2 pls.

—— 1908. *Porifera (Sponges). II. Tetraxonida. National Antarctic Exped. (Nat. Hist.), London*, **4**: 1–56, 19 pls.

—— 1908. Description of a new Dictyonine sponge from the Indian Ocean. *Rec. Ind. Mus. Calcutta*, **2**: 21–24, 1 pl.

KÖLLIKER, A. 1864. *Icones histologicæ, oder Atlas der vergleichenden Gewebelehre*. Abt. I. Leipzig: 46–74, 2 pls. 7 figs.

KUMAR, A. 1924. A New Variety of *Leucosolenia Gardineri* (Dendy) *Leucosolenia Gardineri* var. *vergensis*. *Proc. Lahore Phil. Soc.* **3**: 21–22.

LAMARCK, J. B. P. DE M. 1813. Sur les Polypiers empâtés. *Ann. Mus. Paris*, **20**: 294–312, 370–386, 432–458.

—— 1815. Suite des Polypiers empâtés. *Mém. Mus. Paris*, **1**: 69–80, 162–168, 331–340.

—— 1816. *Histoire naturelle des animaux sans vertèbres*. Tome 2, Paris, 568 pp.

—— 1836. *Historie naturelle des animaux sans vertèbres*. (*Revised by Deshayes, G. P., and Milne Edwards, H.*) Tome deuxieme. Paris.

LAMBE, L. M. 1894. Sponges from the Pacific coast of Canada. *Proc. roy. Soc. Can.* **11** (4) : 25–43, 3 pls.
—— 1896. Sponges from the Atlantic Coast of Canada. *Trans. roy. Soc. Can.* **2** : 181–211, 3 pls.
—— 1900. Sponges from the coasts of North-eastern Canada and Greenland. *Trans. roy. Soc. Can.* **6** : 19–49, 6 pls.
—— 1900. Catalogue of the Recent marine sponges of Canada and Alaska. *Ottawa Nat.* **14** (9) : 153–172.
—— 1900. Notes on Hudson Bay sponges. *Ottawa Nat.* **13** (12) : 277–279.
LEBWOHL, F. 1914. Japanische Tetraxonida. I. Sigmatophora und II. Astrophora metastrosa. *J. Coll. Sci. Tokyo*, **35** (2) : 1–116, 9 pls.
LENDENFELD, R. VON. 1885–86. A Monograph of the Australian sponges, Parts iv–vi. *Proc. linn. Soc. N.S.W.* **10** : 139–158, 282–325, 481–553, 19 pls.
—— 1887. Die Chalineen des australischen Gebietes. *Zool. Jb.* (*Syst.*) **2** : 723–828, 10 pls.
—— 1887. Der gegenwartige Stand unser Kenntniss der Spongien. *Zool. Jb.* **2** : 511–574.
—— 1888. *Descriptive Catalogue of the Sponges in the Australian Museum, Sydney.* London 8vo, 260 pp., 12 pls.
—— 1889. *A Monograph of the Horny Sponges.* London, 936 pp., 50 pls.
—— 1889. Experimentelle Untersuchungen über die Physiologie der Spongien. *Zeitschr. wiss. Zool.* **48** : 406–700, 15 pls.
—— 1890. Das System der Spongien. *Abh. senckenb. Naturf. Ges.* **16** : 361–439.
—— 1894. Eine neue Pachastrella. *SitzBer. Akad. Wiss. Wien* **103** (1) : 439–442 1 pl.
—— 1896. Die Clavulina der Adria. *Nova Acta Leop. Carol.* **69** : 1–251, 12 pls.
—— 1897. On the Spongida [in] Notes on Rockall Island and Bank. *Trans. roy. Irish Acad.* **36** : 82–88, 4 figs.
—— 1897. Spongien von Sansibar. *Abh. Senckenb. naturf. Ges.* **21** : 93–133, 2 pls.
—— 1903. *Tetraxonida* [in] *Das Tierreich*, **19** : 1–168, 44 figs.
—— 1906. Tetraxonida. *Wiss. Ergebn.* "*Valdivia*" **11** (2) : 59–373, 46 pls.
LEVINSEN, G. M. R. 1886. Kara-Havets Svampe. "*Dymphna*"-*Togt. zool.-bot. Udb. Kjobenhavn* : 339–372, 3 pls.
—— 1887. Un coup d'œil sur la faune de la mer Kara. "*Dymphna*"-*Togt. zool.-bot. Udb. Kjobenhavn* : 512–513.
LIEBERKÜHN, N. 1859. Neue Beitrage zur Anatomie der Spongien. *Arch. Anat. Physiol. Lpz.* **30** (3) : 293–420, 515–529, 6 pls.
LINDGREN, N. G. 1897. Beitrag zur Kenntniss der Spongienfauna des Malaüschen Archipels und der Chinesischen Meere. *Zool. Anz.* **20** : 480–487.
—— 1898. Beitrag zur Kenntniss der Spongienfauna des Malayischen Archipels und der Chinesischen Meere. *Zool. Jahrb.* (*Abt. Syst.*) **11** : pp. 283–378, 4 pls.
—— 1899. Einige Bemerkungen zu meinem Aufstaz "Beitrag zur Kenntniss der Spongienfauna des Malayischen Archipels und der Chinesischen Meere". *Zool. Anz.* **22** : 87–89.
LUNDBECK, W. 1902. Porifera. Part I. Homorrhaphidæ and Heterorrhaphidæ. *Danish Ingolf-Exped.* **6** (1) : 108 pp. 19 pls.
—— 1907. Porifera [in] *Duc d'Orleans, Croisière Océanographique, accomplie a bord de la* "*Belgique*", *dans la Mer du Grönland, in* 1905. Brussels : 558–559.
—— 1909. The Porifera of East Greenland. *Medd. Grönland*, **29** : 423–464, 1 pl.
MARENZELLER, E. VON. 1877. Die Coelenteraten, Echinodermen und Würmen der k.k. Oester.-Ungar. Nordpol. Expedition. *Denkschr. Akad. Wiss. Wien*, **35** : 357–398, 4 pls.
MARSHALL, W. 1875. Untersuchungen über Hexactinelliden. *Z. wiss. Zool. Leipzig*, **25** (Suppl.) : 142–243, 7 pls.
—— 1876. Ideen über die Verwandschaftsverhältnisse der Hexactinelliden. *Z. wiss. Zool. Leipzig*, **27** : pp. 113–136.
—— 1892. *Spongiologische Beiträge. Festschrift* 70. *Wiederk, Geburtst. Leuckart, Leipzig*, 4to, viii + 36 pp.
MÜLLER, O. F. 1776. *Zoologiæ Danicæ prodromus. Havniæ.*
—— 1789. *Zoologia danica. 2nd Ed. Havniæ*, vol. II:
NARDO, G. D. 1847. *Prospetto della Fauna marina volgare del Veneto estuario. Estratto dall'opera : Venezia e le sue Lagune :* 1–45.
NORMAN, A. M. 1878. On the Genus Haliphysema. *Ann. Mag. nat. Hist.* **1** : 265–284, 1 pl.
OKADA, Y. 1932. Report on the Hexactinellid sponges collected by the United States Fisheries steamer "Albatross" in the North-western Pacific during the summer of 1906. *Proc. U.S. nat. Mus. Washington*, **81** (12) : 1–118, 6 pls., 16 figs.
OLIVI, G. 1792. *Zoologia Adriatica. Bassano*, xxxi + 334 pp., 9 pls.

PAWSEY, E. L. and DAVIS, F. M. 1924. Report on exploratory voyages to Lousy Bank and adjacent areas. *Fish. Invest.* (II) **7** (2) : 14.
POČTA, P. 1883. Ueber isolirte Kieselspongiennadeln aus der Böhmische Kreideformation. *Sitz Ber. böhm. Ges. Wiss.*: 371–384, 1 pl.
PRIEST, B. W. 1884. On the Hexactinellidæ. *J. Quekett micr. Club*, **2** : 8–15.
REZVOJ, P. 1928. Contributions to the fauna of Porifera in the Barents Sea. *Trans. Inst. Sci. Explor. North Moscow*, **37** : 67–95, 11 figs.
RIDLEY, S. O. 1881. On the Genus *Plocamia* Schmidt, and on some other sponges of the Order Echinonemata. *J. linn. Soc. Lond.*, **15** : 476–497, 2 pls.
—— 1881. Spongida collected during the Expedition of H.M.S. "Alert" in the Straits of Magellan and on the coast of Patagonia. *Proc. zool. Soc. Lond.* : 107–139, pls. x–xi.
—— 1884. *Report on the Zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S.* "*Alert*". *London.* (Sponges, pp. 366–482, 582–630, 7 pls.)
RIDLEY, S. O. and DENDY, A. 1886. Preliminary Report on the Monaxonida collected by H.M.S. "Challenger". *Ann. Mag. nat. Hist.* **18** : 325–351.
—— —— 1887. Monaxonida. *Rep. scient. Res.* "*Challenger*", *Zool.* **20** : 275 pp., 51 pls.
ROW, R. W. H. 1911. Report on the sponges collected by Mr. Cyril Crossland in 1904–05. Part II : Non-Calcarea. *J. linn. Soc. Lond. Zool.* **31** : 287–400, 7 pls, 26 figs.
SARS, G. O. 1872. *On some remarkable forms of animal life from the great deeps of the Norwegian Coast. Partly from the posthumous papers of Michael Sars. Christiania*, 1 : viii + 82 pp., 6 pls.
SCHMIDT, E. O. 1862. *Die Spongien des adriatischen Meeres.* Leipzig, 88 pp., 7 pls.
—— 1864. *Supplement der Spongien des adriatischen Meeres.* Leipzig, iv + 48 pp., 4 pls.
—— 1866. *Zweites Supplement der Spongien des adriatischen Meeres.* Leipzig, iv + 24 pp., 1 pl.
—— 1868. *Die Spongien der Küste von Algier.* (*Drittes Supplement.*) Leipzig, iv + 44 pp., 5 pls.
—— 1870. *Grundzüge einer Spongien-Fauna des atlantischen Gebietes.* Leipzig, 88 pp., 6 pls.
—— 1880. *Die Spongien des Meerbusens von Mexico und des Caraïbischen Meeres, Heft II.* Jena, 33–90 pp., 6 pls.
SCHUFFNER, O. 1877. Beschreibung einiger neuer Kalkschwämme. *Jena Z. Naturw.* **11** (2) 4 : 403–433, 3 pls.
SCHULTZE, M. J. S. 1860. *Die Hyalonemen.* Bonn (Marcus), 4°, pp. iii + 46, 5 pls.
SCHULZE, F. E. 1877. Untersuchungen über den Bau und die Entwicklung der Spongien. II. Die Familie der Chondrosidæ. *Z. wiss. Zool.* **29** : 87–122, 2 pls.
—— 1886. Ueber den Bau und das System der Hexactinelliden. *Abh. preuss. Akad. Wiss.* : 1–97.
—— 1887. Hexactinellida [in] *Rep. scient. Res.* "*Challenger*", *Zool.* **21** (53) : 514 pp., 104 pls.
—— 1893. Revision des Systems der Hyalonematiden. *SitzBer. preuss. Akad. Wiss.* **30** : 541–589.
—— 1893. Ueber die Ableitung der Hexactinelliden-Nadeln vom regulären Hexactine. *SitzBer. preuss. Akad. Wiss*, **46** : 991–997.
—— 1895. Hexactinelliden des Indischen Oceans. I. Theil. Die Hyalonematiden. *Abh. preuss. Akad. Wiss.* 1894 (1895) : 1–60, 9 pls.
—— 1896. Hexactinelliden des indischen Oceans. II. Theil. Die Hexasterophora. *Abh. preuss. Akad. Wiss.* : 1–92, 8 pls.
—— 1897. Revision des Systemes der Asconematiden und Rosselliden. *SitzBer. Akad. Wiss. Berlin* : 520–558.
—— 1899. *Amerikanische Hexactinelliden nach dem Materiale der Albatross-Expedition.* Jena, 4°, 126 pp., 19 pls.
—— 1900. Hexactinelliden des indischen Oceans. III. Theil. *Abh. preuss. Akad. Wiss.* : 1–46, 7 pls.
—— 1902. *An account of the Indian Triaxonia collected by the Royal Indian Marine Survey Ship* "*Investigator*". (*Transl. by R. von Lendenfeld.*) Calcutta, 4°, 113 pp., 13 pls.
—— 1904. Hexactinellida [in] *Wiss. Ergebn. deutsch. Tiefsee-Exped.* "*Valdivia*", **4** (8) : 266 pp., 52 pls.
SELENKA, E. 1867. Ueber einige neue Schwämme aus der Südsee. *Z. wiss. Zool. Leipzig*, **17** : 565–571, 1 pl.
SEWELL, R. B. S. 1913. Notes on the biological work of the R.I.M.S.S. "Investigator" during survey seasons, 1910–11 and 1911–12. *J. Asiat. Soc. Bengal.* [Sponges pp. 340–341, 346.]
SHAW, M. 1927. On a collection of sponges from Maria Island, Tasmania. *Proc. zool. Soc. Lond.* : 419–439, 1 pl., 4 figs.
SOLLAS, I. B. J. 1902. On the sponges collected during the "Skeat Expedition" to the Malay Peninsula, 1899–1900. *Proc. zool. Soc. Lond.* : 210–221, 2 pls.

SOLLAS, I. B. J. 1908. The inclusion of foreign bodies by sponges, with a description of a new genus and species of Monaxonida. *Ann. Mag. nat. Hist.* **1** : 395–401, 5 figs.
—— 1886. Preliminary account of the Tetractinellid sponges dredged by H.M.S. " Challenger ", 1872–76. Part I. The Choristida. *Sci. Proc. roy. Dublin Soc.* **5** : 177–199.
—— 1888. Report on the Tetractinellida [in] *Rep. scient. Res.* " *Challenger* ", *Zool.* **25**, clxvi + 458 pp., 54 pls.
STEPHENS, J. 1915. Atlantic sponges collected by the Scottish Antarctic Expedition. *Trans. roy. Soc. Edinb.* **50** (2) : 423–467, 3 pls.
—— 1921. Sponges of the coast of Ireland. II. The Tetraxonida (concluded). *Sci. Invest. Fish. Br. Ire.* **11** : 1–75, 6 pls.
THIELE, J. 1898. Studien über pazifischen Spongien. *Zoologica*, **24** : 1–72, 8 pls.
—— 1899. Studien über pazifische Spongien. *Zoologica*, **24** : 1–33, 5 pls.
—— 1900. Kieselschwämme von Ternate. I. *Abh. Senckenb. naturf. Ges.* **25** : 17–80, 2 pls.
—— 1903. Kieselschwämme von Ternate. *Abh. Senckenb. naturf. Ges.* **25** : 933–968, 1 pl.
THOMSON, C. W. 1868. On the " Vitreous " sponges. *Ann. Mag. nat. Hist.* **1** : 114–132, 1 pl.
—— 1869. On *Hollenia*, a genus of Vitreous sponges. *Philos. Trans. Lond.* **69** : 701–720, 5 pls.
—— 1873. *The Depths of the Sea.* London, 8vo, xx + 527 pp., 7 pls., 84 figs.
THURSTON, F. 1895. *Porifera* [in] *Rámésvaram Island and fauna of the Gulf of Manaar. Bull. 3 Madras Gov. Mus.* 102–105.
TOPSENT, E. 1888. Contribution à l'étude des Clionides. *Arch. Zool. expér. gén.* 5 (bis) : 1–165, 7 pls.
—— 1892. Contribution à l'étude des Spongiaires de l'Atlantique Nord. *Rés. Camp. Sci. Albert de Monaco*, **2**, 165 pp., 11 pls.
—— 1893. Note sur quelques Éponges du Golfe de Tadjoura. *Bull. Soc. zool. Fr.* **18** : 177–182.
—— 1893. Mission scientifique de M. Ch. Alluaud aux Iles Séchelles (Mars-Mai 1892), Spongiaires. *Bull. Soc. zool. Fr.* **18** : 172–175.
—— 1894. Campagne de la " Melita ", 1892. Éponges du Golfe de Gabes. *Mém Soc. zool. Fr.* **7** : 37–45, 1 pl.
—— 1894. Etude monographique des Spongiaires de France. I. Tetractinellida. *Arch. Zool. expér. gén.* **2** (3) : 259–400, 6 pls.
—— 1896. Etude monographique des Spongiaires de France. II. Carnosa. *Arch. Zool. expér. gén.* **3** (4) : 493–590, 3 pls.
—— 1897. Spongiaires de la Baie d'Amboine. *Rev. suisse Zool.* **4** : 421–487, 4 pls.
—— 1898. Introduction à l'étude monographique des Monaxonides de France. Classification des Hadromerina. *Arch. Zool. expér. gén.* **6** : 91–113.
—— 1900. Étude monographique des Spongiaires de France. III. Monaxonida. *Arch. Zool. expér. gén.* **8** : 1–331, 8 pls.
—— 1902. Considérations sur la faune des Spongiaires des Côtes d'Algérie. Éponges de la Calle. *Arch. Zool. expér. gén.* (3) **9** : 327–370, 2 pls.
—— 1904. *Sarostegia oculata.* Hexactinellide nouvelle des îles du Cap-Vert. *Bull. Mus. océanogr. Monaco*, **10** : 1–8, 3 figs.
—— 1904. Spongiaires des Açores. *Rés. Camp. Sci. Albert de Monaco*, **25**, 280 pp., 18 pls.
—— 1906. Éponges recueillies par M. Ch. Gravier dans la mer Rouge. *Bull. Mus. Hist. nat. Paris* : 557–570.
—— 1913. Spongiaires de l'Expédition antarctique national écossaise. *Trans. roy. Soc. Edinb.* **49** (3) : 579–643, 6 pls.
—— 1913. Spongiaires provenant des campagnes scientifiques de la " Princess Alice " dans les Mers du Nord. *Rés. Camp. Sci. Albert de Monaco*, **45** : 1–67, 5 pls.
—— 1917. *Spongiaires* [in] *2me Expéd. Antarctique française* (1908–1910) : 1–88, 6 pls.
—— 1918. Éponges de San Thomé. *Arch. Zool. expér. gén.* **57** : 535–613, 28 figs.
—— 1918. Notes sur les genres *Semisuberites et Hemiasterella. Bull. Inst. océanogr. Monaco*, **359** : 1–11, 5 figs.
—— 1920. Spongiaires du Musée Zoologique de Strasbourg. *Bull. Inst. océanogr. Monaco*, **381**, pp. 1–34, 5 figs.
—— 1921. Sur les Ciocalypta Bow. *C.R. Ass. franç. Av. Sci.* : 687–692.
—— 1923. Spongiaires du Musée zoologique de Strasbourg. Choristides. *Bull. Inst. océanogr. Monaco*, **435** : 1–16.
—— 1924. Révision des Mycales de l'Europe Occidentale. *Ann. Inst. océanogr. Monaco*, **1** : 77–118, 16 figs.

TOPSENT, E. 1925. Étude de Spongiaires du Golfe de Naples. *Arch. Zool. expér. gén.* **61** : 623–725, 1 pl., 27 figs.
—— 1928. Spongiaires de l'Atlantique et de la Méditerranée. *Rés. Camp. Sci. Albert de Monaco*, **74** : 376 pp., 11 pls.
—— 1930. Éponges de Lamarck conservées au Muséum de Paris. *Arch. Mus. Paris*, **5** : 1–56, 4 pls., 4 figs.
—— 1932. Éponges de Lamarck conservées au Muséum de Paris. *Arch. Mus. Paris*, **8** : 61–124, 6 pls. 2 figs.
—— 1933. Éponges de Lamarck conservées au Muséum de Paris. *Arch. Mus. Paris*, **10** : 1–60, 3 pls., 5 figs.
VERRILL, A. E. 1907. Porifera of the Bermuda Islands. *Trans. Acad. Arts. Sci. New Haven* (*Conn.*), **12** : 330–340.
VOSMAER, G. C. J. 1880. The sponges of the Leyden Museum, i. The Family of the Desmacidinæ. *Notes Leyden Mus.* **2** : 99–164.
—— 1885. The Sponges of the "William Barents " Expedition. *Bijdr. Dierk. Amsterdam*, **12** : 1–47, 5 pls.
—— 1887. Porifera [in] *Bronn's Klassen und Ordnungen des Thierreichs* : 320–483.
—— 1911. *The Porifera of the " Siboga " Expedition. II. The Genus Spirastrella.* " *Siboga* " *Expeditie*, **6** (A¹) : 1–69, 14 pls.
VOSMAER, G. C. J. and VERNHOUT, J. H. 1902. *The Porifera of the Siboga-Expedition. I. The Genus Placospongia. Siboga-Expeditie*, **6** A : 1–17, 5 pls.
WHITELEGGE, TH. 1901. Report on sponges from the Coastal Beaches of New South Wales. *Rec. Aust. Mus. Sydney*, **4** : 55–118, 6 pls.
WILSON, H. V. 1894. Observations on the gemmule and egg development of Marine Sponges. *J. Morph. Philadelphia*, **9** : 277–406, 12 pls.
—— 1902. The sponges collected in Porto Rico in 1899 by the U.S. Fish Commission Steamer " Fish Hawk ". *Bull. U.S. Fish. Comm.* **2** : 375–411, 30 figs.
—— 1904. The Sponges. *Mem. Mus. comp. Zool. Harvard*, **30** (1) : 164 pp., 26 pls.
—— 1925. Siliceous and horny sponges collected by the U.S. Fisheries Steamer " Albatross " during the Philippines Expedition. *Bull. U.S. Nat. Mus.* **100** : 532 pp., 59 pls.
WRIGHT, E. P. 1870. Notes on sponges. 1. On *Hyalonema mirabilis*, Gray. 2. On *Aphrocallistes bocagei*, sp. nov. 3. On a new genus and species of deep-sea sponge (*Wyvillethomsonia wallichii*). *Quart. J. micr. Sci.* **10** : 73–82, 3 pls.
ZITTEL, K. A. 1878. Studien über fossile Spongien. 2e Abt. Lithistidæ. *Abh. bayer. Akad. Wiss.* **13** : 65–154, 10 pls.