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P.A. THOMAS — STUDIES ON SPONGES OF THE MOZAMBIQUE CHANNEL — I - II

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- I. - SPONGES OF INHACA ISLAND
- II. - SPONGES OF MAMBONE AND PARADISE ISLANDS

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CONTENTS

	Pages
I.- SPONGES OF INHACA ISLAND	1
Introduction	3
Material and method	4
The Inhaca Island	7
List of species	10
Zoogeography of species	13
Systematics	15
Acknowledgements	45
II.- SPONGES OF MAMBONE AND PARADISE ISLANDS	47
Introduction	49
List of species	50
Systematics	52
Acknowledgements	68
REFERENCES	69
PLATES	<i>in fine</i>

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I.- SPONGES OF INHACA ISLAND

INTRODUCTION

The present account is based on the material collected from three different centres along the coast of Mozambique during the year 1969 by Prof. J. Bouillon, Université Libre de Bruxelles, Belgium. Most of the specimens were from Inhaca Island but some from Mambone and Paradise Islands were also represented in the sample. Considering the geographical separation of Inhaca Island and the other two places mentioned above, this report is split up into two parts; the first part deals with the sponges of Inhaca Island and the second part, the sponges of Mambone and Paradise Islands.

MATERIAL AND METHOD

The specimens dealt with in this report were collected from the shallow areas of the sea. Since all were preserved in dry condition, the details of anatomy, especially the canal system, could not be studied. Spicule preparations were made according to the suggestion of earlier workers (Arndt, 1935; Burton, 1937; de Laubenfels, 1953; Little, 1963; Hartman, 1964). For the study of boring sponges the method adopted by Old (1941) was found quite useful. Sections, parallel and vertical to the surface, were taken from different morphozones and clearing was done by carbol-xylol (saturated solution of anhydrous crystals of pure phenol in xylol) and later by xylol. Since spongin is liable to go dissolved in xylol, such sections (for the details of fibres) were mounted in water or glycerine and studied. Teased preparations were also found useful. For mounting, Canada-balsom and Euparal were used.

The dimensions of spicules are based on the measurements of 10 spicules; and a pattern (lower - upper limit-mean) is followed throughout. For sigmas, chelas and birotulates the standard methods were followed while taking the measurements. Camera lucida drawings were made for spicules and sections and they were later transferred to tracing paper and photographed.

The general treatment of species is as follows :

In case where an exhaustive synonymy is given for any species in literature, such works are referred to and are indicated by the word "synonymy" in brackets. Geographic distribution, in a summarised form, is given along with each species.

The general classification adopted here is that of de Laubenfels (1936). Family Adocliidae is treated with the order Haplosclerida after Hechtel (1965). The classification adopted for the order Keratosida is that of de Laubenfels (1948).

All the specimens studied are deposited in the Musée royal de l'Afrique centrale, Belgium and the Registration Number is given along with the material examined.

The major works dealing with the east African sponge fauna are the following :

EAST AFRICA

- BAER, L., 1905.- Silicospongiën von Sansibar, Kapstadt und Papeete. *Arch. Naturgesch.*, 72 : 1-32, pls. 1-4.
- JENKIN, C.F., 1908.- The calcareous sponges (in) the marine fauna of Zanzibar and British East Africa, from collection made by Cyril Crossland, M.A., in the years 1901 and 1902. *Proc. zool. Soc. Lond.* : 434-456.
- LENDENFELD, R. von, 1897.- Spongiën von Sansibar. *Abhandl. Senckenb. Naturf. Ges.*, 21 : 93-133, pls. 9-10.
- SOLLAS, I.B.J., 1908.- The inclusion of foreign bodies by sponges, with a description of a new genus and species of Monoxonida. *Ann. Mag. nat. Hist.*, (8), 1 : 395-401.

MADAGASCAR

- BÖSRAUG, E., 1913.- Die Tetractinelliden. *Reise Ostafrika A. Voeltzkow*, 3 : 231-251, pl. 4.
- DECARY, R., 1946.- Animaux de Madagascar. *Ann. Mus. Colon. Marseilles*, 6, 4 : 197-228.
- LÉVI, C., 1956.- Spongiaires des côtes de Madagascar. *Mém. Inst. Sci. Madagascar*, (A), 10 : 1-23.
- LÉVI, C., 1964.- Spongiaires du Canal de Mozambique. *Bull. Mus. natn. Hist. nat. Paris*, (2), 36 (3) : 384-395.
- VACELET, J., 1967.- Descriptions d'éponges pharétronides actuelles des tunnels obscurs sous-récifaux de Tuléar (Madagascar). *Rec. Trav. St. Mar. End.*, n°6 : 37-62, pls. 1-2.
- VACELET, J., 1967.- Quelques éponges pharétronides et 'Silicocalcaires' de grottes sous-marines obscures. *Ibid.*, n°42 : 121-132, pl. 1.
- VACELET, J. et VASSEUR, P., 1965.- Spongiaires des grottes et surplombs des récifs de Tuléar (Madagascar). *Ibid.*, suppl. 4 : 71-123, pls. 1-10.
- VACELET, J. et VASSEUR, P., 1971.- Eponges des récifs coralliens de Tuléar (Madagascar). *Tethys*, suppl. : 51-126.

SOUTH AFRICA

- BURTON, M., 1926.- Descriptions of South African sponges collected in the South African Marine Survey. Pt. I, Myxospongiida and Astrotetraxonida. *Fish. Mar. Biol. Survey South Africa*, Spec. Rep., n°4 : 1-29, pls. 1-6.
- BURTON, M., 1929.- Descriptions of South African sponges collected in the South African Marine Survey. Pt. II, The 'Lithistidae'. *Ibid.*, n°7 : 1-12, pls. 1-2.

- BURTON, M., 1931.- On a collection of marine sponges mostly from the Natal Coast. *Ann. Natal Mus.*, 6, pt. 3 : 337-358, pl. 13.
- BURTON, M., 1932.- Sponges (in) 'Discovery'. Rep. 6 : 237-392, pls. 48-57.
- BURTON, M., 1933.- Report on a small collection of sponges from Still Bay, South Africa. *Ann. Mag. nat. Hist.*, (10), 11 : 235-244.
- BURTON, M., 1933.- Four new sponges from Natal. *Ann. Natal Mus.*, 7 : 249-254.
- BURTON, M., 1936.- Notes on sponges from South Africa, with descriptions of new species. *Ann. Mag. nat. Hist.*, (10), 17 : 141-147.
- CARTER, H.J., 1871.- Description and illustrations of a new species of *Tethya*, with observations on the nomenclature of the Tethyadae. *Ibid.*, (4), 8 : 99-105, pl. 4.
- GRAY, J.E., 1873.- Natal Sponges. *Ibid.*, (4), 12 : 264.
- KIRKPATRICK, R., 1901.- Description of a new Hexactinellid sponge from South Africa. *Ibid.*, (7), 7 : 457-459.
- KIRKPATRICK, R., 1902.- Descriptions of South African sponges. Pt. 1. *Mar. Invest. S. Afr.* : 219-232, pls. 1-3.
- KIRKPATRICK, R., 1903.- Descriptions of South African sponges. Pt. 2. *Ibid.*, 171-180, pl. 4.
- KIRKPATRICK, R., 1903.- Descriptions of South African sponges. Pt. 3. *Ibid.*, 2 : 233-264, pls. 5-6.
- KIRKPATRICK, R., 1913.- Note on the occurrence of the euplectellid sponge *Regadrella phoenix*, O. Schmidt, off the South African coast. *Ann. S. Afr. Mus.*, 13 : 64-64.
- LÉVI, C., 1963.- Spongiaires d'Afrique du Sud (I) Poecilosclérides. *Trans. R. Soc. S. Afr.*, 37, pt. 1, 1-72, pls. 1-10.

THE INHACA ISLAND

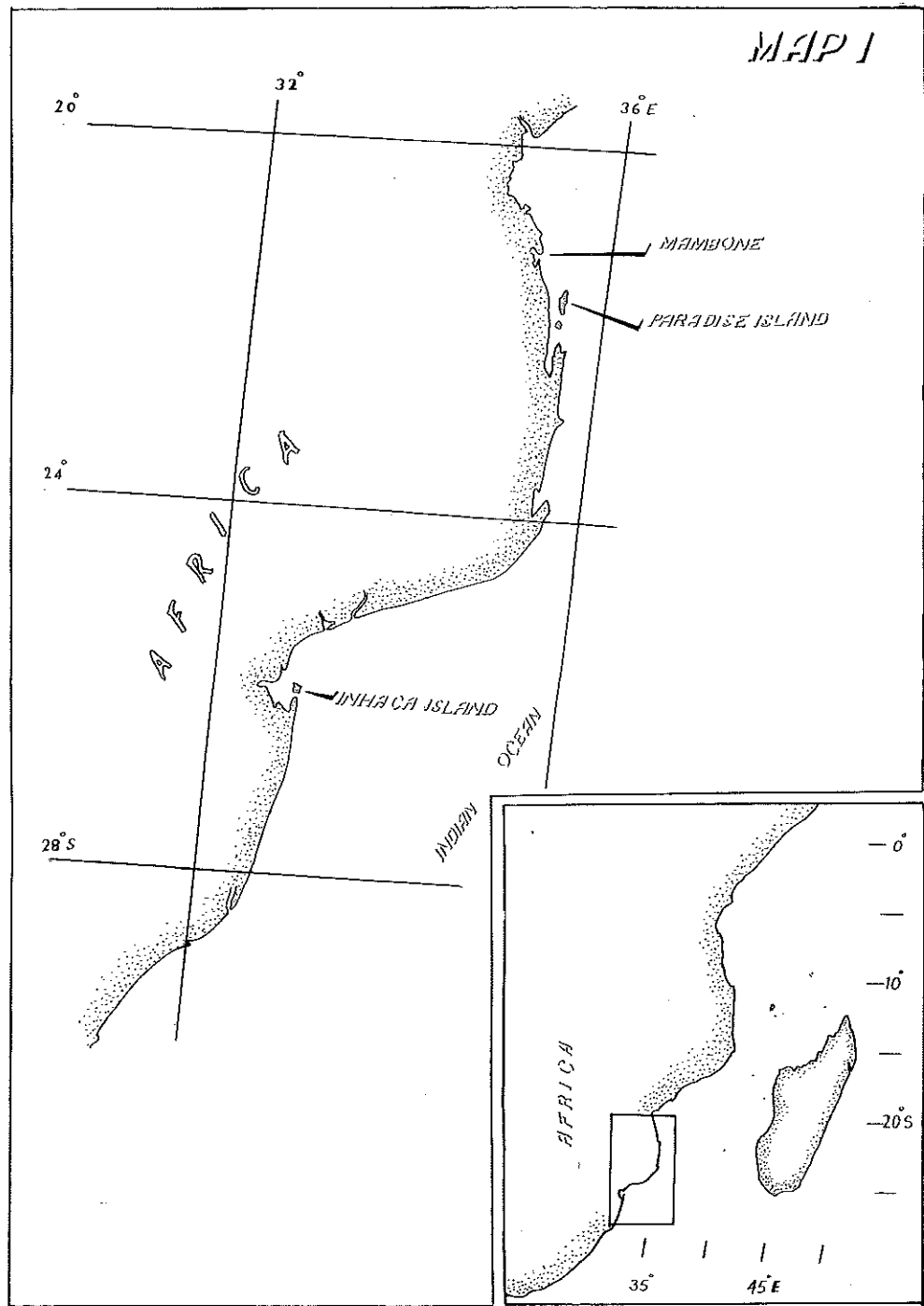
The Bay of Lourenço Marques, otherwise called the Delgoa Bay, is situated on the east coast of Africa at latitude 26° south (see map I). It is 32 kms broad and 40 kms long, and the depth for the most part of it is less than 10 metres; and is formed from the confluence of rivers like the Maputo, Umbeluzi, Tembu, Matola and Incomati. The northerly projecting peninsula of the province of Machangulo and the Inhaca Island cut off from the peninsula form the eastern boundary of this bay. This peninsula and Island together with several submerged banks extending north-westwards to a length of about 26 kms form an effective barrier between this bay and the Indian Ocean.

The east coast of the Island, which is exposed to the fury of the open ocean, is rather protected by rocks all throughout the shore. The coast line is highly retreated at the northern and southern parts of the Island due to the formation of two extensive bays. The southern bay is called 'Saco da Inhaca' and is quite extensive when compared to the one in the north. Extensive sand flats and mangrove swamps are seen in these two bays and the wave action is considerably feeble due to their protected nature. The west coast of the Island is wavy and curves gently into three shallow bays. Rocky habitat is present along the western shore line, eastern part of 'Saco da Inhaca' and also at the eastern exposed shore line. Coral formations are found along the edge of Inhaca channel just parallel to the western shore line, and also at the south eastern side of 'Saco da Inhaca' (see map II).

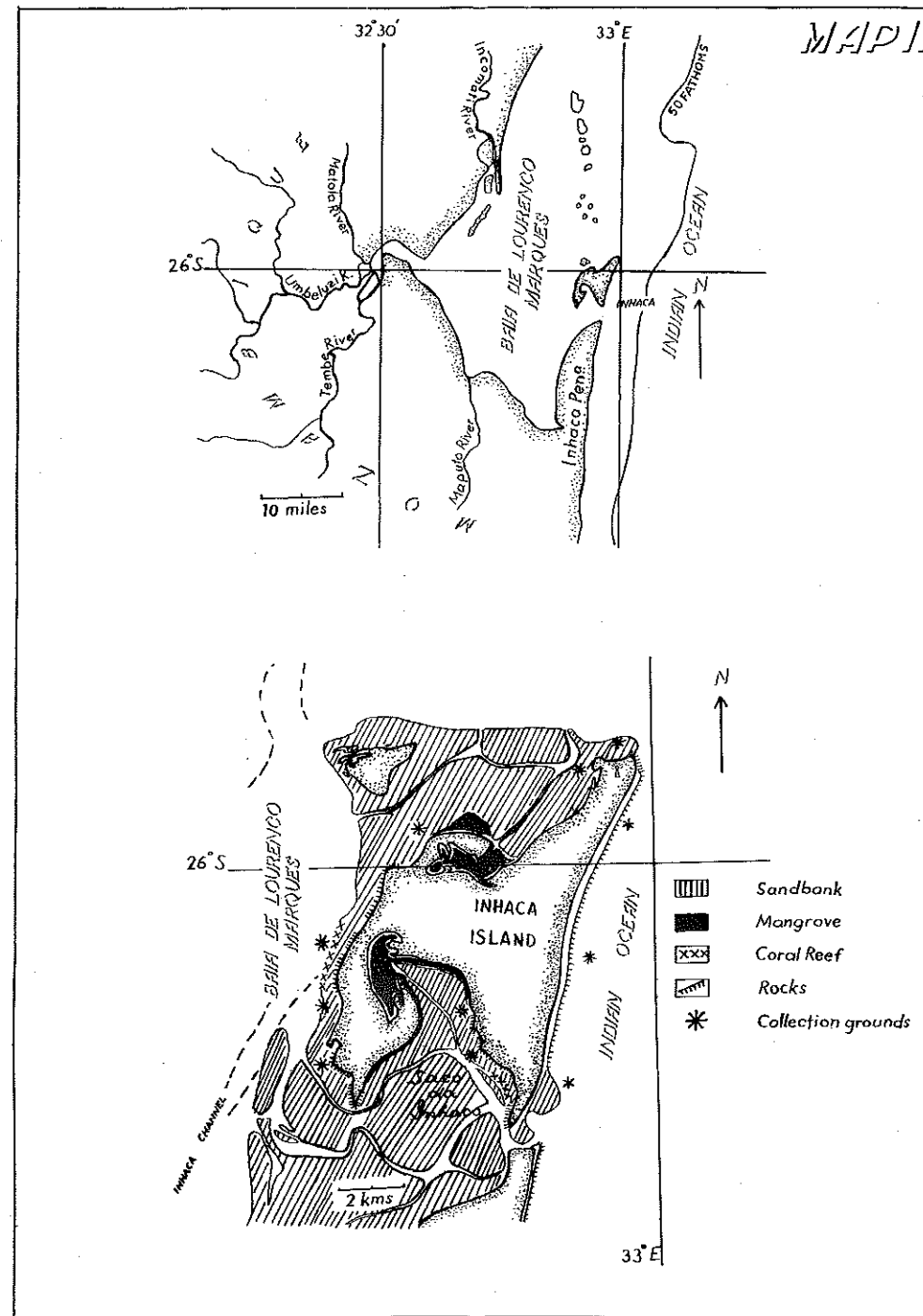
An exhaustive account of the climate, oceanographic setting, hydrological conditions, etc. of Inhaca Island is given in Macnae and Kalk (1958).

The various groups of marine animals of Inhaca Island are exhaustively dealt with in Macnae and Kalk (1958). But unfortunately detailed accounts of Porifera and Polyzoa have been omitted since the identification was not complete at the time of publishing the account (see p. 95, footnote).

The analysis of the present collection revealed the occurrence of 46 species of sponges in this Island. These 46 species are referable to 21 families and 36 genera. Some species in the collection could be identified only up to the generic level for want of sufficient material. Detailed descriptions and figures of such species are also appended here for the guidance of future workers. There is only one calcareous sponge in the collection and the rest are silicious in nature.



Map I.- Map showing the three collection grounds along the Mozambique channel. The specimens dealt with in this report are collected from Inhaca Island. Inset map shows the geographic position of the area enlarged above.



Map II.- Upper : Lourenco Marques Bay and the Inhaca spit. Lower : Inhaca Island and the collection grounds (marked *). Details of bottom are also given.

LIST OF SPECIES

Class DEMOSPONGIAE Sollas

Order KERATOSIDA Grant

Family SPONGIIDAE Gray

1. *Spongia officinalis* Linnaeus var. *ceylonensis* Dendy
2. *Heteronema erecta* Keller
3. *Phyllospongia foliascens* (Pallas)
4. *Ircinia* sp. 1
5. *Ircinia* sp. 2
6. *Thorectopsamma benoiti* n.sp.
7. *Fasciospongia cavernosa* (Schmidt)

Family DYSIDEIDAE Gray

8. *Dysidea fragilis* (Montagu)
9. *Dendrilla* sp.

Order HAPLOSCLERIDA Topsent

Family DESMACIDONIDAE Gray

10. *Iotrochota baculifera* Ridley

Family ADOCIIDAE de Laubenfels

11. *Sigmatocia fibulata* (Schmidt)

Family CALLYSPONGIIDAE de Laubenfels

12. *Callyspongia diffusa* (Ridley)
13. *C. fibrosa* (Ridley and Dendy)

Order POECILOSCLERIDA Topsent

Family PHORBASIDAE de Laubenfels

14. *Damiriana schmidti* (Ridley)

Family COELOSphaerIDAE Hentschel

15. *Siderodermella navicelligera* (Ridley and Dendy)

Family MYXILLIDAE Hentschel

16. *Hymedesmia* sp. 1
17. *Hymedesmia* sp. 2

Family TEDANIIDAE Ridley and Dendy

18. *Tedania anhelans* (Lieberkuhn)
19. *Rhabderemia prolifera* Annandale

Family OPHLITASPONGIIDAE de Laubenfels

20. *Clathria frondifera* (Böwerbank)
21. *C. inhacensis* n.sp.

Order HALICHONDRIDA Vosmaer

Family AXINELLIDAE Schmidt

22. *Axinella donnani* (Böwerbank)
23. *A. agariciiformis* (Dendy)
24. *Axinella* sp.
25. *Higginsia robusta* Burton

Family HYMENIACIDONIDAE de Laubenfels

26. *Acanthella elongata* (Dendy)

Order HADROMERIDA Topsent

Family SPIRASTRELLIDAE Hentschel

27. *Spirastrella inconstans* (Dendy)

Family SUBERITIDAE Schmidt

28. *Suberites carnosus* (Johnston)
29. *Laxosuberites cruciatus* (Dendy)
30. *Pseudosuberites andrewsi* Kirkpatrick
31. *Aaptos aaptos* (Schmidt)

Family CLIONIDAE Gray

32. *Aka minuta* Thomas
33. *Cliona celata* Grant
34. *C. vastifica* Hancock
35. *C. mucronata* Sollas

36. *C. margaritifera* Dendy
37. *Thoosa hancocki* Topsent

Order EPIPOLASIDA Sollas
Family JASPIDAE de Laubenfels

38. *Prostylyssa foetida* (Dendy)

Family TETHYIDAE Gray

39. *Tethya diploderma* Schmidt
40. *T. robusta* Böwerbank

Order CHORISTIDA Sollas
Family ANCORINIDAE Gray

41. *Myriastris purpurea* (Ridley)
42. *Aurora rowi* Dendy
43. *Stelletta herdmanni* Dendy ssp. *robusta* new

Family CRANIELLIDAE de Laubenfels

44. *Cinachyra cavernosa* (Lamarck)

Order CARNOSIDA Carter
Family CHONDRILLIDAE Gray

45. *Chondrilla australiensis* Carter

Order CALCAREA Dendy and Row
Family HOMOCOELIDAE Dendy

46. *Clathrina coriacea* (Montagu)

ZOOGEOGRAPHY OF THE SPONGES IN THE PRESENT COLLECTION

Sl. n°	A.O.	M.S.	R.S.	I.O.	A.R.	P.O.	E. (**)
1. <i>Spongia officinalis</i> var. <i>ceylonensis</i>	-	-	x	x	-	-	-
2. <i>Heteronema erecta</i>	-	-	x	x	-	x	-
3. <i>Phyllospongia foliascens</i>	-	-	x	x	x	x	-
4. <i>Ircinia</i> sp. 1	-	-	-	x	-	-	-
5. <i>Ircinia</i> sp. 2	-	-	-	x	-	-	-
6. <i>Thorectopsamma benoiti</i> n.sp.	-	-	-	x	-	-	-
7. <i>Fasciospongia cavernosa</i>	-	x	x	x	x	-	-
8. <i>Dysidea fragilis</i>	x	x	x	x	x	x	-
9. <i>Dendrilla</i> sp.	-	-	-	x	-	-	-
10. <i>Iotrochota baculifera</i>	-	-	x	x	x	x	-
11. <i>Sigmadocia fibulata</i>	x	x	-	x	x	-	-
12. <i>Callyspongia diffusa</i>	-	-	-	x	x	-	-
13. <i>C. fibrosa</i>	x(?)	-	-	x	x	x	-
14. <i>Damiriana schmidti</i>	-	-	x	x	x	x	-
15. <i>Siderodermella navicelligera</i>	-	-	-	x	x	-	-
16. <i>Hymedesmia</i> sp. 1	-	-	-	x	-	-	-
17. <i>Hymedesmia</i> sp. 2	-	-	-	x	-	-	-
18. <i>Tedania anhelans</i>	x	x	x	x	x	x	-
19. <i>Rhabderemia prolifera</i>	-	x	-	x	-	-	-
20. <i>Clathria frondifera</i>	-	-	x	x	x	-	-
21. <i>C. inhaensis</i> n.sp.	-	-	-	x	-	-	-
22. <i>Axinella donnani</i>	x	-	x	x	-	-	-
23. <i>A. agariciformis</i>	-	-	-	x	-	-	-
24. <i>Axinella</i> sp.	-	-	-	x	-	-	-
25. <i>Higginsia robusta</i>	-	-	-	x	-	-	-
26. <i>Acanthella elongata</i>	-	-	-	x	-	-	-
27. <i>Spirastrella inconstans</i>	-	-	x	x	x	x	-
28. <i>Suberites carnosus</i>	x	x	x	x	x	x	Arc.
29. <i>Laxosuberites cruciatus</i>	-	-	-	x	-	-	-
30. <i>Pseudosuberites andrewsi</i>	-	-	-	x	x	-	-
31. <i>Aaptos aaptos</i>	x	x	x	x	x	x	-
32. <i>Aka minuta</i>	-	-	-	x	-	-	-
33. <i>Cliona celata</i>	x	x	x	x	x	x	Arc.
34. <i>C. vastifica</i>	x	x	x	x	x	x	-
35. <i>C. mucronata</i>	-	-	-	x	x	-	-
36. <i>C. margaritifera</i>	-	-	-	x	x	-	-

Sl. n°	A.O.	M.S.	R.S.	I.O.	A.R.	P.O.	E. (**)
37. <i>Thoosa hancocki</i>	-	x	x	x	x	-	-
38. <i>Prostylyssa foetida</i>	-	-	-	x	x	-	-
39. <i>Tethya diploderma</i>	x	-	x	x	x	x	-
40. <i>T. robusta</i>	-	-	x	x	x	x	-
41. <i>Myriastria purpurea</i>	-	-	x	x	x	x	Ant.
42. <i>Aurora rowi</i>	-	-	-	x	x	-	-
43. <i>Stelletta herdmanni</i> ssp. <i>robusta</i> new	-	-	-	x	-	-	-
44. <i>Cinachyra cavernosa</i>	x	-	x	x	x	x	-
45. <i>Chondrilla australiensis</i>	-	-	-	x	x	x	-
46. <i>Clathrina coriacea</i>	x	x	x	x	x	x	Arc.

In the above table the general distribution of the species collected from Inhaca Island is tabulated, in 8 widely separated zoogeographical areas, such as, Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean, Australian Region (same as Indo-Australian Region of Challenger Report), Pacific Ocean, Arctic Ocean and Antarctic Ocean. Out of the 46 species represented, 7 are identified only up to generic level; and from the rest (39 species) 6 are rather cosmopolitan in their distribution. Of these 39 species, 28 are common to Inhaca and Australian Region. Affinity with Red Sea fauna is also well pronounced, and about 21 species are common to these two regions. 18 species are common to Inhaca Island and Pacific Ocean. Atlantic and Mediterranean faunas have very little in common with that of Inhaca fauna, and this fact is well seen from the low number of species distributed in common (12 and 11 respectively). 3 species are common to Inhaca and Arctic and 1 to Antarctic.

(**) A.O. Atlantic Ocean; M.S. Mediterranean Sea; R.S. Red Sea; I.O. Indian Ocean; A.R. Australian Region; P.O. Pacific Ocean; Arc. Arctic; Ant. Antarctic; E. elsewhere; x = present, - = absent.

SYSTEMATICS

Genus *Spongia* Linnaeus

1. *Spongia officinalis* Lin. var. *ceylonensis* Dendy

(pl. 1, fig. 1)

Euspongia officinalis Dendy, 1905, p. 211, fig. 3; pl. 16, fig. 5. Row, 1911, p. 380.

Spongia officinalis var. *ceylonensis* Burton, 1937, p. 39. Thomas, 1968.

Material : One specimen.

Reg. n° : M.R.A.C. n°507 M.

Description : Sponge irregularly massive with tubular projections. Size, 60 x 40 mm.

Colour : Deep purple externally and pale white internally.

Consistency : Soft with good resiliency.

Surface conulose, conules 0.5-1 mm high and 0.8-1 mm apart.

Oscules on tubular projections, compound, with 2 mm diameter. Conical projections, bearing oscules at the extremities are seen only at places where silt is settled heavily.

Skeleton is reticulated with fine meshes. Main fibres are cored with foreign objects. Meshes polygonal, and mesh size, 0.1 mm average; the fibres are about 0.025 mm in diameter.

Remarks : In view of its resiliency it is often used as "bath sponge".

Distribution : Red Sea, Indian Ocean.

Genus *Heteronema* Keller

2. *Heteronema erecta* Keller

(pl. 1, fig. 2)

Heteronema erecta Keller, 1889, p. 340, pl. 20, figs. 4, 7, 8. Bergquist, 1965, p. 129, fig. 2 (synonymy). Thomas, 1973, p. 12, pl. 1, figs. 1, 1A; pl. 6, fig. 3 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°509 B.

Description : Body lamellar; thickness of the lamella, 7 mm and height 20 mm.

Colour : Dark brown.

Consistency : Hard and incompressible.

Surface conulose, conules 1-2 mm high and 1-1.5 mm apart; tips blunt and ridges interconnect the adjacent conules.

The skeleton is typical of the species. Main fibres have a diameter varying between 0.2-0.3 mm and connectives, 0.07-0.11 mm. Both primaries and secondaries are cored by foreign objects.

Distribution : Red Sea, Indian Ocean, Pacific Ocean.

Genus *Phyllospongia* Ehlers

3. *Phyllospongia foliascens* (Pallas)

(pl. 1, fig. 3)

Phyllospongia foliascens Lendenfeld, 1889, p. 196. Bergquist, 1965, p. 131, figs. 3, 3A, 3B (synonymy). Thomas, 1973, p. 14, pl. 1, fig. 4; pl. 6, figs. 1, 2, 4 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°504.

Description : Sponge made of 2 concentric conical lamellae, varying in thickness from 2-4 mm. Total diameter of specimen, 120 mm. The specimen was attached to the substratum by a short stalk.

Colour : Pale gray.

Consistency : Leathery.

Oscules are seen only in the inner surface of the lamella, and the diameter is about 1 mm. Pores, 0.021 mm, and are situated on the membrane roofing the extensive subdermal canals. Dermal membrane is heavily charged with sand grains.

Skeletal arrangement tallies well with the description given by Lendenfeld (1888) and de Laubenfels (1954).

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Ircinia* Nardo

4. *Ircinia* sp. 1

(pl. 1, fig. 5)

Material : Two specimens.

Reg. n° : M.R.A.C. n°509 C.

Description : Sponge massively encrusting, thickness 20-30 mm.

Surface conulose, sometimes conules form ridges. Height of the conules, 1-2 mm, and 1-3 mm apart. Colour, dark gray externally; interior pale white.

Oscules and pores not traceable.

Skeleton composed of main fibres and connectives. Main fibres are fasciculated and contain sand grains inside; and have a diameter of 0.132 mm. Connectives are devoid of any foreign matter; diameter 0.094 mm. The "filaments" are extremely minute, with a thickness of 0.0008 mm; head of the "filament" swollen irregularly or end bluntly.

5. *Ircinia* sp. 2

(pl. 1, fig. 4)

Material : One specimen.

Reg. n° : M.R.A.C. n°509 D.

Description : Body encrusting with rounded branches arising from the basal encrustation. Branches pointed at tip; sometimes divide dichotomously. Both branches and basal part conulose, conules 1-1.5 mm high and 1-1.5 mm apart. Colour, dark brown and consistency fibrous.

The skeleton composed of main fibres, cored by foreign sponge spicule, etc., and interconnected by secondaries in a scalariform pattern. The main fibres have an average diameter of 0.18 mm and secondaries, 0.09 mm. There is no foreign inclusion in secondaries. The 'filaments' have a diameter of 0.002 mm and the head is rounded or globular in shape.

Genus *Thorectopsamma* Burton

6. *Thorectopsamma benoiti* n.sp.

(pl. 1, figs. 6, 6A)

Material : One specimen.

Reg. n° : M.R.A.C. n°509 E (type).

Description : Body massive, with flat conical branches arising from two places. Specimens of bivalve (*Vulsella* sp.) are seen partly buried in the sponge enjoying a symbiotic life.

Colour : Black.

Consistency : Hard, and incompressible when dry.

Oscules and pores are not traceable.

Surface conulose, conules 1-3 mm high, and 1-4 mm apart; sometimes form ridges.

Ectosome is thin, unarmoured and easily detachable. Brown pigment granules of about 0.008 mm diameter are seen in plenty. Endosome cavernous. Details of endosome could not be studied due to the dry nature of the specimen.

The skeleton is reticulate, and the mesh size is about 1-2 mm. Main fibres branch and the resulting branches grow apart in wide angles suggesting a dendritic pattern of arrangement. Both primaries and connectives are cored by sand grains, and in primaries the number is more when compared with those in the connectives. Fibres are laminated more markedly in connectives. The coring material may be absent from the connectives, but this is not a rule and only an exception. Main fibres have a diameter varying between 0.352-0.603 mm; and connectives, 0.21-0.35 mm. Spongin is pale brown, and fibres are brittle when dry.

Remarks : de Laubenfels (1948), while discussing the genus *Thorectopsamma* Burton, stated that laminated fibres cored by foreign objects in primaries and secondaries, are not common in Spongiidae. This genus is also comparable with the genus *Fasciospongia* Burton in the possession of concentric fibres. But the main fibres in *Fasciospongia* are trellised or fascicular, and the connectives are devoid of any coring material.

A similar sponge was collected and described from Seychelles Bank (Thomas, 1972) under the name *T. seychellensis*. The specimens were tubular and the primaries measured 0.18-0.56 mm and secondaries, 0.18-0.28 mm. The present specimen, the third species to be referred under this genus (the first was the type *T. irregularis* Burton (1934) from Australia) is also typical of the genus; and I have great pleasure in naming this species after Professor P.L.G. Benoit of Musée royal de l'Afrique centrale, Tervuren, Belgium.

Genus *Fasciospongia* Burton

7. *Fasciospongia cavernosa* (Schmidt)

(pl. 1, fig. 7)

Cacospongia cavernosa Schmidt, 1862, p. 28.

Fasciospongia cavernosa de Laubenfels, 1948, pp. 119, 120-123 (synonymy). Thomas, 1973, p. 17, pl. 1, fig. 5.

Material : Two specimens.

Reg. n° : M.R.A.C. n°509 A.

Description : Both are massive, attached to the substratum by broad base. One specimen was lamellar at its growing tip. Height of the largest specimen, 30 mm.

Colour : Dark brown externally and pale brown internally.

Consistency : Hard and fibrous. Oscules and pores are not traceable.

Surface conulose, conules about 2 mm high in one specimen whereas in the other, 0.5-1 mm. They are situated at a distance of 0.5-2 mm, and are supported by the terminal portion of main fibres.

Skeleton is typical, consisting of stratified fibres. The primaries contain fragments of spicules and sand grains; and measure 0.18-0.34 mm. The secondaries are devoid of any foreign matter, and measure 0.03-0.15 mm. The meshes are polygonal towards the outer part, whereas irregular in the interior.

Distribution : Mediterranean Sea, Red Sea, Indian Ocean, Australian Region.

Genus *Dysidea* Johnston

8. *Dysidea fragilis* (Montagu)

(pl. 1, fig. 8)

Spongelia fragilis Montagu, 1818, p. 114, pl. 16, figs. 1, 2.

Dysidea fragilis Burton, 1934, p. 583, pl. 2, figs. 2-11 (synonymy). Burton, 1959, p. 272. Thomas, 1968.

Material : One specimen.

Reg. n° : M.R.A.C. n°505 A.

Description : Sponge thickly encrusting on Barnacle shell; height 4 mm. Surface conulose, conules 0.5-1 mm high and 0.2-1 mm apart.

Colour : Sandy gray.

Consistency : Friable.

Skeleton of arenaceous objects bound together by spongin. Primaries and secondaries are clearly separable in the peripheral parts whereas in deeper parts they may not. Average diameter of fibre is 0.22 mm.

Distribution : Circum-equatorial.

Genus *Dendrilla* Lendenfeld

9. *Dendrilla* sp.

(pl. 1, fig. 9)

Material : One specimen.

Reg. n° : M.R.A.C. n°507 Q.

Description : Body rather finger shaped; height 30 mm, and diameter 6 mm.

Colour : Pale brown.

Consistency : Compressible with somewhat good resiliency.

Oscules and pores are not traceable.

Surface conulose, conules 0.5-1 mm high, and 1-1.5 mm apart.

Skeleton is in a dendritic pattern and where the fibres are in contact with the substratum form extensive films on the substratum. The fibres have a maximum diameter of 0.15 mm, and is lamellated without pith. These fibres

branch and form smaller fibres; which when coming into contact with another fibre may partly fuse with it by secreting spongin at the corners. In the surface these fibres end in conules. Colour of the spongin is pale brown.

Genus *Iotrochota* Ridley

10. *Iotrochota baculifera* Ridley

(pl. 1, fig. 10)

Iotrochota baculifera Ridley, 1884, p. 435, pl. 39, fig. M; pl. 42, fig. F. Rao, 1941, p. 450. Bergquist, 1965, p. 163 (synonymy). Vacelet and Vasseur, 1965, p. 104. Thomas, 1973, p. 20, pl. 1, fig. 7 (synonymy).

Material : One specimen attached to *Siderodermella navicelligera* (Ridley).

Reg. n° : M.R.A.C. n°507 B.

Description : Sponge encrusting, thickness, 2-5 mm; and irregularly spreading.

Colour : Dark purple.

Consistency : Friable when dry.

Oscules are not seen, pores minute.

Surface conulose, conules, 0.5-1 mm high and 0.5-1 mm apart.

A well developed dermal skeleton is present, the tornotes are arranged irregularly in the surface.

Main skeleton consists of a well developed reticulation of horny fibres cored by styles. The connectives are slender and connected in a scalariform pattern. The diameter of the former is about 0.1 mm and of the latter, 0.05-0.08 mm.

Spicules : 1) Styles. Size, 0.121-0.179 (0.163 mm) x 0.004-0.008 (0.006 mm).

2) Tornotes. Straight, head slightly prominent; size, 0.181-0.237 (0.212 mm) x 0.002-0.006 (0.004 mm).

3) Borotulates. With 4 teeth on either end; chord, 0.009-0.016 (0.015 mm).

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Sigmatocia* de Laubenfels

11. *Sigmatocia fibulata* (Schmidt)

(pl. 1, fig. 11)

Sigmatocia fibulata Thomas, 1968 (synonymy). Thomas, 1973, p. 21, pl. 1, fig. 9 (synonymy).

Material : Several branches.

Reg. n° : M.R.A.C. n°510.

Description : Sponge bushy, branches 5-8 mm in diameter and 30-80 mm high.

Oscules marginal; arranged serially. Growing parts ornamented with filaments of symbiotic alga.

Ectosome detachable easily, and supported by algal filaments. Main skeleton consists of illdefined fibres filling the interstices of algal filaments, and secondary net work of triangular meshes. Spongin usually seen at the corners only.

Spicules : 1) Oxeas. Sharply pointed and curved at the centre. Size, 0.121-0.181 (0.152 mm) x 0.004-0.005 (0.0042 mm).

2) Sigmas. 'C' or 'S' shaped with a notch at the centre. Chord length, 0.018-0.022 mm.

Remarks : This sponge is usually associated with the alga *Ceratodictyon spongiosum* (Zanard).

Distribution : Atlantic Ocean, Mediterranean Sea, Indian Ocean, Australian Region.

Genus *Callyspongia* Duchassaing and Michelotti

12. *Callyspongia diffusa* (Ridley)

(pl. 1, figs. 13, 13A)

Callyspongia diffusa Burton, 1934, p. 541, fig. 6 (synonymy). Burton, 1959, p. 224. Thomas, 1968 (synonymy).

Material : Two specimens.

Reg. nos : M.R.A.C. n°502, 516 B.

Description : Body lamellar consisting of two lamellae united basally forming a small stalk of 5 mm diameter. Height of the largest specimen 110 mm and width, 80 mm. Thickness of lamella, 3-5 mm; and cut up into conical projections (branches) at the growing tips.

Colour : Sandy gray.

Consistency : Tough with some resiliency.

Oscules are situated in the inner surface of the lamella and the outer surface free from oscules; diameter 2-5 mm; compound and elliptical in outline. Pores are situated at the outer surface, one per mesh, and contractile.

Surface reticulated and minutely hispid due to the presence of vertically arranged oxeas.

Dermal skeleton is a well developed reticulation of small fibres, uni- or multispicular and echinated by vertically arranged oxeas. Main skeleton consists of well developed reticulation of primaries (0.08 mm diameter) and connectives (0.020 mm); and the spongin is colourless.

Spicules : Oxeas. Slightly curved and sharply pointed. Size, 0.063-0.116 (0.09 mm) x 0.002-0.005 (0.004 mm).

Distribution : Indian Ocean, Australian Region.

13. *Callyspongia fibrosa* (Ridley and Dendy)
(pl. 1, figs. 12, 12A)

Dasychalina fibrosa Ridley and Dendy, 1886, p. 330.

Pachychalina fibrosa Ridley and Dendy, 1887, p. 21, pl. 4, figs. 3-4.

Callyspongia fibrosa Burton, 1934, p. 540 (synonymy). Burton, 1959, p. 224.
Thomas, 1968 (synonymy).

Material : Twelve bits.

Reg. nos : M.R.A.C. n°513 (one specimen), n°503 (11 bits).

Description : Body erect or repent, branches 5-10 mm in diameter; surface conu-lose or not; conules when present, 0.5-2 mm high. Oscules on tubular projections, marginal, serial or irregularly distributed, diameter 2-5 mm and compound.

Colour : Pale gray.

Consistency : Hard but compressible.

Skeletal arrangement of this species has been well described by previous workers.

Spicules : Oxeas. Uniformly curved or crooked. Size, 0.08-0.101 mm x 0.002-0.004 mm.

Distribution : Indian Ocean, Australian Region, Atlantic Ocean (?), Pacific Ocean.

Genus *Damiriana* de Laubenfels
14. *Damiriana schmidti* (Ridley)
(pl. 1, fig. 14)

Crella schmidti Ridley, 1884, p. 432, pl. 41, fig. aa.

Damiria schmidti Topsent, 1897, p. 455.

Damiriana schmidti Lévi, 1958, p. 30, fig. 25. Thomas, 1968 (synonymy). Thomas, 1973, p. 25, pl. 1, fig. 13 (synonymy).

Material : One encrusting specimen on *Siderodermella navicelligera* (Ridley) and several bits.

Reg. n° : M.R.A.C. n°507 C.

Description : Sponge encrusting, thickness 2-5 mm; spreading irregularly.

Colour : Pale yellow (certain parts are stained purple due to its association with *Iotrochota baculifera* Ridley).

Consistency : Friable.

Surface highly pitted, this character is attained by the sinking of dermal skeleton.

The tylotes are arranged in the dermal part tangentially. The main skeleton is a reticulation of oxeas in triangular meshes. Spongin is present at the corners only. Spicular bands, arising from deeper part and merging with the dermal skeleton, are also noted.

Spicules : 1) Tylotes. Straight, head oblong. Size, 0.168-0.223 (0.218 mm) x 0.002-0.004 (0.003 mm).

2) Oxeas. Size, 0.182-0.233 (0.198 mm) x 0.004-0.013 (0.008 mm).

3) Arcuate isochelas. Chord, 0.018-0.032 (0.024 mm).

4) Sigmas : 'C' or 'S' shaped. Chord, 0.009-0.016 (0.012 mm). Sigmas are not divisible into different sets. Larger sigmas, measuring up to 0.04 mm, are noted by some previous workers (Lindgren, 1897, 1898; Ridley, 1884; Thomas, 1973).

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Siderodermella* Dendy

15. *Siderodermella navicelligera* (Ridley and Dendy)
(pl. 1, fig. 15)

Crella navicelligera Ridley, 1885, p. 571.

Siderodermella navicelligera Ridley and Dendy, 1886, p. 348. Ridley and Dendy, 1887, p. 115, pl. 8, fig. 9; pl. 9, figs. 5, 8, 9. Lindgren, 1898, p. 22 (synonymy). Thomas, 1968 (synonymy).

Material : Several complete specimens and bits.

Reg. nos : M.R.A.C. n°507 A, 518, 521 A.

Description : Body spherical, tuberculate or papillate and attached to the substratum by many points. Diameter of papillae from 2-3 mm and height 3-10 mm.

Colour : Ectosome ("skin") pale white and interior gray.

Consistency : "Skin" is leathery and endosome rather pulpy.

Oscule at the tip of papillae, 1-2 mm in diameter, and protected by contractile sphincter. The endosome, when dry, is drawn away from the "skin".

Skeletal arrangement : In the "skin", the tylotes are arranged horizontally in different layers; and at the outermost part an aspiculous zone is noted. Thickness of the skin may vary from 0.75-1.5 mm.

The endosomal skeleton is confused. Sand grains are seen in the interior either singly or in groups.

Spicules : 1) Tylotes. Straight or slightly curved. Thickest portion is the central part, where, in well developed forms, the diameter comes up to that of the head. Size, 0.242-0.522 (0.431 mm) x 0.007-0.016 (0.012 mm).

2) Tridentate isochelas. Teeth sharp, shaft curved. Chord, 0.021-0.026 (0.024 mm).

3) Navicelliform isochelas. This spicule is not at all present in some specimens examined. Chord, 0.008-0.010 mm.

4) Sigmas (large). 'C' or 'S' shaped. Chord up to 0.040 mm.

5) Sigmas (small). Chord, 0.016 mm average.

6) Raphides. In bundles, size of individual raphide, 0.182 mm. This spicule is absent in some specimens examined.

Remark : It seems from the collection that this sponge is quite abundant in Inhaca Island.

Distribution : Indian Ocean, Australian Region.

16. *Hymedesmia* sp. 1
(pl. I, fig. 17)

Material : One specimen encrusting on a coral.

Reg. n° : M.R.A.C. n°507 O.

Description : Sponge thinly encrusting, thickness 0.3-0.6 mm. Surface smooth and the consistency is like that of the egg membrane.

Colour : Pale yellow.

The skeleton composed of acanthostyles erect on the substratum with their heads buried deep in spongin. The oxeas or tornotoxeas are seen in the surface arranged tangentially.

Spicules : 1) Acanthostyles. Head densely spined and shaft, up to the middle, less densely spined, tips sharply pointed. Size, 0.162-0.242 (0.212 mm) x 0.008-0.012 (0.011 mm).

2) Acanthostyles. Entirely spined, 0.050-0.080 (0.073 mm) x 0.004 mm average.

3) Oxeas or tornotoxeas. Straight, size 0.16-0.211 x 0.002-0.004 mm.

4) Isochelas. Arcuate, chord length varies from 0.012-0.025 mm and inseparable into different sets.

Remarks : There is considerable similarity between the spicules for this specimen and those of *Hymedesmia pansa* Bowerbank, reported by Lévi (1959) from the Gulf of Guinea.

17. *Hymedesmia* sp. 2
(pl. I, figs. 16, 16A)

Material : A colony of Barnacles encrusted with this specimen.

Reg. n° : M.R.A.C. n°514 C.

Description : Sponge thinly encrusting, or growing into flat vertical columns at places. Thickness of the encrusting part, 1-2 mm.

Colour : Dark gray.

Consistency : Friable.

Surface conulose, conules, 0.2-0.5 mm high.

Oscules and pores are not seen.

Skeleton is in typical *Hymedesmia* pattern. Acanthostyles are usually at right angles to the surfaces with heads buried in a basal coating of spongin. Occasionally spicular columns comprising of 2-4 spicules are also seen.

Spicules : 1) Acanthostyles. Entirely spined with more spines at the head. Size, 0.126-0.189 (0.162 mm) x 0.002-0.005 (0.004 mm).

2) Tornotoxeas. Straight, ends abruptly pointed; size, 0.132-0.194 (0.167 mm) x 0.002-0.003 mm.

3) Isochelas. Teeth narrow, chord length, 0.009-0.018 mm.

4) Sigmas. 'C' or 'S' shaped, chord length 0.012-0.038 mm. Inseparable into different sets.

Genus *Tedania* Gray

18. *Tedania anhelans* (Lieberkuhn)
(pl. I, fig. 18)

Halichondria anhelans Lieberkuhn, 1859.

Tedania anhelans Lévi, 1963, p. 32, fig. 33, pls. 5D, E. Thomas, 1973, p. 29, pl. 1, fig. 15.

Material : One specimen.

Reg. n° : M.R.A.C. n°521 C.

Description : Sponge massively conical, surface conulose. Another sponge, *Damiriana schmidtii* (Ridley) is seen in association with this specimen.

Colour : Gray.

Consistency : Friable.

Oscules and pores not seen.

Spicules : 1) Styles. Size, 0.211-0.242 (0.235 mm) x 0.004-0.008 (0.006 mm).

2) Tornotes. Head minutely spined; size, 0.202-0.248 (0.233 mm) x 0.004 mm.

3) Onychaetas. Size, 0.044-0.148 mm.

Distribution : Cosmopolitan.

Genus *Rhabderemia* Topsent

19. *Rhabderemia prolifera* Annandale
(pl. I, fig. 19)

Rhabderemia prolifera Annandale, 1915b, p. 464, pl. 34, fig. 3.

Material : One thin encrustation on a shell infested with *Thoosa hancocki*.

Reg. n° : M.R.A.C. n°514.

Description : Sponge thinly encrusting, thickness about 0.75 mm and irregularly spreading. Oscules and pores are not traceable.

Rhabdostyles are arranged vertically on the substratum singly or in groups. Tylostyles are dermal and sigmas are distributed irregularly in the interior.

Spicules : 1) Rhabdostyles. Size, 0.105-0.210 (0.162 mm) x 0.004-0.008 (0.007 mm).

2) Tylostyles. Head elongated or oval; thin and rarely sinuous. Size, 0.082-0.142 (0.112 mm) x 0.001-0.002 mm.

3) Sigmas. Contorted, size, 0.012 mm.

Distribution : Indian Ocean (this species is previously known only from Andamans).

Genus *Clathria* Schmidt

20. *Clathria frondifera* (Böwerbank)
(pl. II, figs. 1, 1A)

Halichondria frondifera Böwerbank, 1875, p. 288.

Clathria frondifera Ridley, 1884, pp. 448, 612, pl. 42, fig. 1; pl. 53, fig. J.
Thomas, 1968 (synonymy). Thomas, 1973, p. 33, pl. 2, fig. 6;
pl. 8, fig. 4 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°1441.

Description : Sponge sessile, consisting of flattened trabeculae anastomosing in the interior and ornamented at the surface with blunt conules often arranged serially. Height of the specimen 65 mm and width, 35 mm.

Colour : Pale gray.

Consistency : Hard, slightly compressible.

Surface conulose, conules 2-5 mm high. Dermal membrane, when dry, white and peel off easily. This part is often reinforced by dermal tylostyles in brushes, and interstitial subtylostyles.

Spicules : 1) Main styles. Slightly curved and sharply pointed. Basal portion less wider than the centre. Size, 0.125-0.232 (0.175 mm) x 0.004-0.009 (0.007 mm).

2) Acanthostyles. Size, 0.062 x 0.006 mm. Rarely smooth spicules are also noted.

3) Interstitial subtylostyles. Head slightly developed; straight. Size up to 0.338 x 0.005 mm.

4) Dermal subtylostyles. Slightly curved and sharply pointed, head spined minutely. Size up to 0.126 x 0.004 mm.

5) Texas. Irregularly curved and hair like. Size, 0.112 mm.

6) Isochelas. Not seen.

Distribution : Red Sea, Indian Ocean, Australian Region.

21. *Clathria inhacensis* n.sp.
(pl. II, figs. 2, 2A, 2B)

Material : One colony of Barnacles encrusted with this sponge.

Reg. n° : M.R.A.C. n°511 (type).

Description : Sponge encrusting, thickness 1-8 mm. Surface conulose, conules 0.5-1.5 mm high, and 1-1.5 mm apart. The connective fibres of the surface uniting the tips of adjacent conules, give a characteristic appearance to the surface.

Colour : Pale gray.

Consistency : Friable.

Oscules and pores are not present.

Ectosome is reduced and a true dermal membrane is wanting.

Skeleton composed of a well developed reticulation of spicular fibres of diameter varying between 0.04-0.06 mm. These fibres are interconnected by slender fibres in a scalariform pattern. Both primaries and secondaries are echinated by acanthostyles. Spongin is pale yellow in colour. The number of coring spicules in main fibres varies from 6-12 and are plumosely arranged. In secondaries the number of spicules varies from 1-5 and are buried fully in spongin. The fibres are cored by main styles; and accessory subtylostyles are seen interstitially and also in brushes arising from the tips of main fibres.

Spicules : 1) Styles. Slightly curved and sharply pointed. Thickest part of the spicule is the central portion. Size, 0.121-0.172 (0.142 mm) x 0.004-0.005 (0.004 mm).

2) Subtylostyles or styles. Slightly curved; head prominent and oblong. Size, 0.124-0.181 (0.144 mm) x 0.002-0.004 (0.003 mm).

3) Acanthostyles. Head prominently spined, and shaft uniformly spined or smooth. Size, 0.041-0.058 (0.050 mm) x 0.003-0.005 mm. Younger forms are minutely granulated.

4) Isochelas. Chord length 0.008-0.010 mm.

5) Toxas. Length 0.12 mm and hair like.

Genus *Axinella* Schmidt

22. *Axinella donnani* (Böwerbank)

(pl. 11, fig. 3)

Isodictya donnani Böwerbank, 1873, p. 28, pl. 6.

Axinella donnani Dendy, 1887, p. 158, pl. 11, fig. 1. Thomas, 1968 (synonymy).

Material : 4 small bits ranging in size from 10-13 mm x 3-5 mm.

Reg. n° : M.R.A.C. n°507 K.

Description : Specimens probably bits of a lamellar specimen. Surface conulose, conules covered externally by a thin dermal membrane.

Colour : Pale gray.

Consistency : Hard and incompressible.

Spicules : 1) Styles, Usually in dermal brushes. Curved towards the basal one third. Size, 0.15-0.471 (0.32 mm) x 0.003-0.016 (0.013 mm).

2) Oxeas. Curved uniformly or angulated in the middle. Size as in the former type of spicule.

Distribution : Red Sea, Indian Ocean, Atlantic Ocean.

23. *Axinella agariciformis* (Dendy)

(pl. 11, fig. 4)

Thrinacophora agariciformis Dendy, 1905, p. 186, pl. 12, fig. 6.

Dragnacidon agariciformis Hallmann, 1917, p. 639.

Axinella agariciformis Burton, 1959, p. 259. Thomas, 1968.

Material : One bit.

Reg. n° : M.R.A.C. n°507 L.

Description : Sponge probably a bit of a lamellar specimen. Thickness 3-4 mm. Barnacles are seen engulfed in the specimen.

Colour : Pale gray.

Consistency : Hard and incompressible.

Surface conulose, conules closely set. Oscules and pores are not traceable.

Skeleton is in typical *Axinella* pattern.

Spicules : 1) Long styles. These spicules are seen in extra-axial part; size, 0.511-0.923 (0.611 mm) x 0.004-0.008 (0.005 mm).

2) Oxeas. Uniformly or irregularly curved, size, 0.212-0.428 (0.323 mm) x 0.011-0.021 (0.016 mm).

3) Styles. Size as in the former.

4) Raphides. Hair-like, length up to 0.050 mm.

Distribution : This species is originally recorded from Ceylon, and subsequently from South Arabian Coast (Burton, 1959).

24. *Axinella* sp.

(pl. 11, fig. 5)

Material : One specimen.

Reg. n° : M.R.A.C. n°5071.

Description : Body conical, with a basal diameter of 20 mm. Total height 60 mm; and the diameter at the central part, 25 mm. The entire specimen looks like a cluster of elongated branches fused together at irregular intervals.

Surface hispid and this hispidity is brought by spicules arranged in brushes.

Skeleton is in *Axinella* pattern. Spongin is scarcely visible.

Spicules : 1) Styles. Long styles are usually seen in dermal brushes. Size up to 1.20 x 0.008 mm.

2) Styles. Small, size up to 0.6 x 0.012 mm. Gradual transition from style to oxea is also noted.

Remarks : This specimen, in general shape and spiculation, comes close to *Axinella* sp. B reported from Mozambique (see the second part dealing with the sponges of Paradise Islands).

Genus *Higginsia* Higgin

25. *Higginsia robusta* Burton

(pl. 11, fig. 6)

Higginsia robusta Burton, 1959, p. 255, fig. 32.

Material : One specimen.

Reg. n° : M.R.A.C. n°507 P.

Description : Body flat, with ridges arising from the base and ending at the growing tips. Conules, 0.5 to 0.1 mm high and often with a tuft of styles extending from the interior as continuation of main fibres. Conules are serially arranged to form continuous ridge. Rest of the body papillate. Height of the specimen 20 mm and width, 12 mm.

Colour : Pale yellow.

Consistency : Hard and incompressible.

Oscules and pores are not traceable.

Skeleton is in typical *Higginsia* pattern; and it tallies well with that of the type.

Spicules : 1) Long styles. Form dermal brushes; and also associated with extra-axial skeleton. Size, when well developed, 1.4 x 0.020 mm.

2) Oxeas. Mainly seen in axial skeleton, uniformly curved, and sharply pointed; stair stepped and blunt forms are also rarely noted. Size, when well formed, up to 0.7 x 0.028 mm.

3) Styles. Distribution and measurements are as in the former type of spicules.

4) Acanthoxeas. Ectosomal, younger forms are often angulated slightly at the centre. Size, 0.040-0.081 mm x 0.003 mm (maximum).

Remarks : The type specimen was collected at a depth of 32 m from Gulf of Aden and in the type the long styles measured 2.0 mm. Styloides with bidentate ends were also reported.

Distribution : Indian Ocean.

Genus *Acanthella* Schmidt
26. *Acanthella elongata* (Dendy)
(pl. II, fig. 7)

Auletta elongata Dendy, 1905, p. 195, pl. 13, fig. 7. Dendy, 1921, p. 121.

Burton, 1928, p. 128.

Acanthella elongata Burton, 1937, p. 37, pl. 7, fig. 42. Thomas, 1968 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°516 A.

Description : Body lamellar, thickness 2-5 mm and is formed by the fusion of up-right tubular branches. Height of the specimen 45 mm.

Colour : Pale gray.

Consistency : Leathery.

Surface smooth, and oscules marginal. Pores, not traceable.

Stout spicular fibres are noted deep inside the specimen. Extra-axial fibres originate from these spicular fibres, and run to the surface. Spongin is scarcely visible.

Spicules : 1) Styles. Slightly curved; tips may show considerable modifications. Size, 0.782 x 0.019 mm.

2) Oxeas. Straight, slightly curved or crooked. Tips gradually pointed, stair stepped or strongylote. Size, as in the former type of spicule.

3) Strongyles. Long and crooked; size, 1.8 x 0.004-0.017 (0.009 mm).

Distribution : Indian Ocean.

Genus *Spirastrella* Schmidt
27. *Spirastrella inconstans* (Dendy)
(pl. II, fig. 8)

Suberites inconstans var. *globosa*, var. *moeandrina*, var. *digitata* Dendy, 1887, pp. 154-157, pls. 9, 10.

Spirastrella inconstans Thiele, 1899, p. 10, pl. 1, fig. 3; pl. 5, fig. 4.

Thomas, 1973, p. 49, pl. 2, fig. 21; pl. 8, fig. 6 (synonymy).

Material : Three specimens.

Reg. n° : M.R.A.C. n°517.

Description : All the specimens represented in the present collection resemble var. *moeandrina* in growth form. The basal part was rooted in sand and shells are heavily incorporated. Largest specimen has a height of 90 mm and width of 150 mm.

Colour : Light brown.

Consistency: Hard and incompressible.

Oscules confined to the upper parts only where conical to rounded protuberances ornament the surface. Oscules oval or elliptical in outline and protected by sphincter; diameter 2-5 mm, and compound.

There is nothing to mention about the skeletal arrangement and it tallies well with that of the type.

Spicules : 1) Tylostyles. Head spherical or trilobed; shaft slightly curved. Small spicules ornament the surface in brushes. Size, 0.212-0.589 (0.541 mm) x 0.004-0.015 (0.010 mm).

2) Spirasters. With 2-5 bends; smaller forms are often straight. Size, 0.011-0.038 x 0.001-0.002 mm.

Remarks : *Balanus longirostum* Hoek is associated with all these specimens examined.

Genus *Suberites* Nardo
28. *Suberites carnosus* (Johnston)
(pl. II, fig. 9)

Halichondria carnosa Johnston, 1842, p. 146, pl. 13, figs. 7, 8.

Suberites carnosa Gray, 1867, p. 523.

Suberites carnosus Ridley, 1884, p. 465. Thomas, 1973, p. 55, pl. 3, fig. 5 (synonymy).

Material : Three specimens.

Reg. n° : M.R.A.C. n°515.

Description : Specimens lamellar with club shaped projections arising from the growing tips; and attached to the substratum by short peduncle. The largest specimen has a height of 75 mm and width of 80 mm.

Colour : Pale blue.

Consistency : Hard when dry.

Oscules and pores are not traceable.

Skeletal arrangement is typical of the genus.

Spicules : Tylostyles. Size up to 0.8 x 0.015 mm. Smaller forms are seen in dermal brushes.

Distribution : Arctic Ocean, Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean and Pacific Ocean, Australian Region.

Genus *Laxosuberites* Topsent

29. *Laxosuberites cruciatus* (Dendy)

(pl. II, fig. 10)

Suberites cruciatus Dendy, 1905, p. 131, pl. 5, fig. 10. Lévi, 1961, p. 11, fig. 11.

Laxosuberites cruciatus Burton, 1937, p. 14, pl. 8, fig. 47. Rao, 1941, p. 425. Thomas, 1968 (synonymy).

Material : One encrusting specimen.

Reg. n° : M.R.A.C. n°514 A.

Description : Spreading thinly on a colony of Barnacles. Thickness, 0.5-0.8 mm.

Colour : Pale yellow.

Oscules and pores are not traceable.

The skeleton composed of megascleres erect on the substratum. At the surface they may project out of the surface in a brush like pattern. This specimen is only in its early stage of development and as growth proceeds, may attain massive form.

Spicules : Tylostyles. Slightly curved and sharply pointed. Head, bi-, tri- or tetralobate. Size, 0.18-0.412 (0.311 mm) x 0.003-0.009 (0.005 mm). Head, when well developed, 0.013 mm.

Remarks : *Thoosa hancocki* is found boring into the shell of Barnacle.

Distribution : Indian Ocean.

Genus *Pseudosuberites* Topsent

30. *Pseudosuberites andrewsi* (Kirkpatrick)

(pl. II, fig. 11)

Pseudosuberites andrewsi Kirkpatrick, 1900, p. 135, pl. 12, fig. 12; pl. 13, fig. 7. Thomas, 1968 (synonymy). Thomas, 1973, p. 56, pl. 3, fig. 6 (synonymy).

Material : Several bits.

Reg. n° : M.R.A.C. n°507 F.

Description : Sponge obviously parts of a crushed tubular specimen. Thickness of tube 1-2 mm.

Colour : Pale white.

Consistency : Friable.

Surface conulose or smooth. There is a thin, easily detachable dermal membrane roofing the subdermal cavities beneath.

The dermal skeleton is supported by ill defined bands of tylostyles of main skeleton. These bands of tylostyles are interconnected by spicules either singly or in groups. Spongin sparsely present.

Spicules : Tylostyles. Shaft slightly curved. Head oval or trilobed. Size, 0.17-0.25 (0.24 mm) x 0.004-0.006 (0.005 mm).

Distribution : Indian Ocean, Australian Region.

Genus *Aaptos* Gray

31. *Aaptos aaptos* (Schmidt)

(pl. II, fig. 12)

Aaptos aaptos Dendy and Frederick, 1924, p. 508 (synonymy). Thomas, 1973, p. 57, pl. 3, fig. 7; pl. 8, fig. 5 (synonymy).

Material : Seven specimens.

Reg. n° : M.R.A.C. n°506.

Description : Body encrusting irregularly or massive. Two specimens represented in the collection are massive and the rest are encrusting on coral rocks. Diameter of the longest massive specimen is 20 mm.

Colour : Encrusting specimens are pale white or dark brown. The colour of massive specimens is pale white internally and black externally.

Consistency : Hard and incompressible.

Oscules and pores are not seen.

The skeleton is conspicuously radial with a 'nuclear' specialization in the two massive forms; whereas in the encrusting specimens the radial nature is not so pronounced.

Spicules : 1) Strongyloxeas. Straight or slightly crooked; tips sharply pointed, blunt or stair stepped. Size, 1.8 x 0.040 mm.

2) Styles. Dermal, slightly curved and sharply pointed. Size, 0.211-0.328 (0.235 mm) x 0.004-0.008 (0.005 mm).

Distribution : Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus Aka de Laubenfels

32. *Aka minuta* Thomas

(pl. II, fig. 13)

Aka sp. Thomas, 1968.

Aka minuta Thomas, 1972, p. 343, pl. 2, figs. 4, 4A. Thomas, 1973, p. 59, pl. III, fig. 9.

Material : Two corals infested by this sponge.

Reg. n° : M.R.A.C. n°505 D.

Description : The coral (a branching species) is disintegrated to the maximum. The cavities formed inside are 2-5 mm in diameter, irregular in outline. Interchamberal connections reduced to mere pores. Papillae not seen on the surface of coral. Spicules oxeas only. Dimensions are given in the following table along with those of other specimens from various parts of Indian Ocean.

Table
Dimensions of oxeas in mm

Author/Locality	Oxeas (mm)(*)	Host
Thomas, 1968 (Gulf of Mannar)	1) 0.096-0.126 (0.119) x 0.002-0.007 (0.005)	<i>Pocillopora damicornis</i>
"	2) 0.109-0.130 (0.121) x 0.003-0.006 (0.005)	Coral Rock (Limestone)
"	3) 0.086-0.130 (0.118) x 0.001-0.007 (0.005)	Coral (<i>P. damicornis</i>)
Thomas, 1973 (Seychelles Bank)	0.1 -0.117 (0.116) x 0.003-0.004 (0.003)	Coral (<i>Pocillopora</i> sp.)
R. n° 505 D (Inhaca Is.)	0.105-0.126 (0.112) x 0.004-0.008 (0.006)	Coral (<i>Pocillopora</i> ?)

(*) Averages are given in parentheses

Distribution : Indian Ocean.

Genus Cliona Grant

33. *Cliona celata* Grant

(pl. II, fig. 14)

Cliona celata Topsent, 1900, p. 32, pl. 1, figs. 5, 6-9; pl. 2, fig. 1 (synonymy). Thomas, 1968 (synonymy). Thomas, 1972, p. 344, pl. 1, figs. 5, 5A, 5B, 5C. Thomas, 1973, p. 60, pl. 3, fig. 10 (synonymy).

Material : One calcareous rock.

Reg. n° : M.R.A.C. n°507 G.

Description : Rock disintegrated to the maximum, cavities formed inside, 1-2 mm in diameter; but often difficult to make out the boundaries since eroded heavily.

Colour : Papillae dark brown.

The morphology, anatomy and physiology of this species are extensively dealt with in the work of Topsent (1900).

Spicules : 1) Tylostyles. Slightly curved near the neck, head trilobed or oval. Size, 0.211-0.328 (0.244 mm) x 0.002-0.009 (0.006 mm).

2) Oxeas. Hair like. Size, 0.118 mm.

Spirasters are not seen.

Distribution : Cosmopolitan.

34. *Cliona vastifica* Hancock

(pl. II, fig. 15)

Cliona vastifica Hancock, 1849, p. 342, pl. 15, fig. 12. Thomas, 1972, p. 345, pl. 1, figs. 3, 3A, 3B. Thomas, 1973, p. 61, pl. 3, fig. 11 (synonymy).

Material : One shell of *Tridacna* sp. infested by this sponge.

Reg. n° : M.R.A.C. n°508.

Description : Cavities inside the shell are in different layers. Chambers 0.5-1 mm in diameter and are rounded in outline. Papillae are not traceable.

Spicules : 1) Tylostyles. Head spherical, shaft straight. Size, 0.162-0.283 (0.261 mm) x 0.002-0.007 (0.004 mm).

2) Oxeas. Microspined or not; usually with a central belt of larger spines. Size, 0.042-0.131 (0.112 mm) x 0.002-0.008 (0.006 mm).

3) Spirasters. With 3-5 angulations, and with spines at the angles, smooth or granulated. Rarely straight forms with granulated surface are also noted. Size, 0.004-0.016 mm x 0.002-0.004 mm.

Distribution : Cosmopolitan.

35. *Cliona mucronata* Sollas
(pl. II, fig. 16)

Cliona mucronata Sollas, 1878, p. 54, pl. 1, figs. 1, 2-7, 9, 10, 15, 17; pl. 2, figs. 1-9. Topsent, 1897, p. 440. Annandale, 1915b, p. 462. Annandale, 1915a, p. 12. Thomas, 1968 (synonymy). Vacelet and Vasseur, 1971, p. 76. Thomas, 1972, p. 347, pl. 1, figs. 8A-D.

Material : One coral rock infested by this sponge.

Reg. n° : M.R.A.C. n°505 C.

Description : Cavities irregular in outline, 2-4 mm in diameter, and are connected with slender inter connections which are protected with diaphragm. Oscule and pore bearing papillae are not traceable.

The skeletal arrangement falls well with that of the type.

Spicules : 1) Tylostyles. Straight or slightly curved. Head trilobed or spherical. Size, 0.128-0.182 (0.167 mm) x 0.003-0.007 (0.004 mm). Head, 0.008-0.016 mm.

2) Mucronate spicules. The conventional type of mucronate spicule ending blindly or in a mucrone, is not seen. Instead, its place in the diaphragm is taken up by larger spicules, sharply pointed, and measuring to 0.102-0.161 (0.122 mm) x 0.002-0.016 (0.012 mm).

3) Spherules. Size, 0.008 mm.

Remarks : Vacelet and Vasseur (1971) recorded *C. mucronata* from Madagascar and the mucronate spicules recorded by them (called tylostyle) show considerable similarity with those of the present specimen from Inhaca Island. The present specimen and that of Vacelet and Vasseur are, hence, quite different from *C.*

mucronata of Sollas and subsequent authors (Annandale, 1915a; Thomas, 1968, 1972) with regard to the structure and measurement of mucronate spicules.

Distribution : Indian Ocean, Australian Region.

36. *Cliona margaritifera* Dendy
(pl. II, fig. 17)

Cliona margaritiferae Dendy, 1905, p. 128, pl. 5, fig. 9. Annandale, 1915a, p. 9 (synonymy).

Cliona margaritifera Vacelet and Vasseur, 1971, p. 77, fig. 21.

Material : One shell, probably of *Crassostrea* and Barnacles attached to it.

Reg. n° : M.R.A.C. n°505 E.

Description : Cavities made are small, 0.5-1.5 mm in diameter, oval or elliptical in outline. Chambers are connected by narrow canals of 0.2 mm. The interior of the chamber and interconnecting canals has an etched out appearance; etchings

0.016 mm in size, but subject to considerable variations. Incurrent and excurrent papillae are not seen.

Spicules : 1) Tylostyles. Straight, younger forms undulating. Size, 0.121-0.293 (0.251 mm) x 0.003-0.005 (0.004 mm); head oval, cap shaped or globular, diameter, 0.008 mm (maximum).

2) Microxeas. Angulated in the middle and spiny all over, rarely smooth. Size, 0.048-0.060 mm x 0.003-0.004 mm.

3) Spirasters. With 3-5 angulations, spines blunt and robust. Size, 0.024 x 0.004 mm.

Remark : This species usually infests pearl oyster (Dendy, 1905) and coral (Annandale, 1915a). Now it is collected from the shells of *Crassostrea* sp. and Barnacles.

Distribution : Indian Ocean, Australian Region.

Genus *Thoosa* Hancock

37. *Thoosa hancocki* Topsent
(pl. II, fig. 18)

Thoosa hancocki Topsent, 1888, p. 81, pl. 7, fig. 12. Topsent, 1891, pp. 577, 580. Lindgren, 1898, p. 38.

Clionothosa hancocki Annandale, 1915a, p. 21. Lévi, 1965, p. 13, fig. 12.

Material : One shell bored by this sponge.

Reg. n° : M.R.A.C. n°514 B.

Description : This species is found in a semifossilised shell. Shell damaged to the maximum and may crumble at slightest pressure. Chambers formed inside the shell, 0.5-2 mm in diameter, and interchamberal connectives reduced to mere pores. Inner surface of these chambers has an etched out appearance. This is due to the presence of concave cavities of 0.04 mm diameter. Oscule and pore bearing papillae are not traceable.

Spicules : 1) Tylostyles. Shaft slightly curved. Size, 0.189-0.357 (0.336 mm) x 0.004-0.016 (0.010 mm); head, 0.006-0.021 mm.

2) Nodular amphistars. Rare, size, 0.012 mm x 0.012 mm. This spicule is usually rare or even absent.

3) Slender amphistars. Rays long and with recurved terminal hooks. Size, 0.028 x 0.024 mm; rays, 0.012 mm long.

Distribution : Mediterranean Sea, Red Sea, Indian Ocean, Australian Region.

Genus *Prostylyssa* Topsent
38. *Prostylyssa foetida* (Dendy)

Hymeniacidon foetida Dendy, 1889, p. 87, pl. 4, fig. 5.
Prostylyssa foetida Burton, 1937, p. 37, pl. 7. Vacelet and Vasseur, 1965, p. 118.

Material : 5 complete specimens and several bits.

Reg. n° : M.R.A.C. n°500.

Description : Body repent and attached to the substratum by many points. These repent branches fuse and form a clathrous mass. Later tubular branches bearing oscular openings arise and they grow up to a height of 24-40 mm. Size of the largest specimen is 180 x 130 x 60 mm.

Colour : Light gray.

Consistency : Hard but friable.

Oscules scattered irregularly on the surface or on tubular branches; diameter, 1-4 mm.

Surface minutely conulose and microscopically hispid.

Dermal skeleton composed of oxeas arranged in triangular or polygonal meshes ornamented at sides by small styles. Main skeleton composed of oxeas arranged in an irregular reticulation. Spongin is slightly noted. The oxeas may project beyond the surface giving much hispidity to the surface.

Spicules : 1) Oxeas. Size, 0.211-1.012 (0.628 mm) x 0.002-0.025 (0.012 mm).

2) Styles. Dermal, size, 0.11-0.212 (0.182 mm) x 0.002-0.006 (0.005 mm).

Remarks : The oscular tubes are considerably long in those growing in turbid waters.

Distribution : Indian Ocean, Australian Region.

Genus *Tethya* Lamarck
39. *Tethya diploderma* Schmidt
(pl. II, fig. 19)

Tethya diploderma Schmidt, 1870, p. 52, pl. 4, fig. 11. Lévi, 1956, p. 7, fig. 4.

Thomas, 1968 (synonymy). Thomas, 1973, p. 70, pl. 3, fig. 19.

Donatia seychellensis Dendy, 1916, p. 100. Dendy, 1916a, p. 265, pl. 48, fig. 4 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°505 B.

Description : Body spherical, diameter 20 mm and attached to the substratum by a broad base.

Colour : Cortex pale white and interior dark brown in dry state.

Cortex well developed, thickness 1-2 mm.

Radiating bands of strongyloxeas originate from a centrally located "nucleus".

Spicules : 1) Strongyloxeas. Straight and fusiform. Size, 0.16-1.31 (0.928 mm) x 0.006-0.016 mm. Small spicules are seen in between the radiating bands of strongyloxeas beneath the cortex.

2) Spherasters. Total diameter, when well developed, 0.062 mm.

3) Oxyasters. Choanosomal, with 6-8 rays. Rays spiny, tuberculate, or even branched. Diameter, 0.032 mm.

4) Tylasters. Cortical, with 6-8 rays. Diameter, 0.012 mm.

Distribution : Atlantic Ocean, Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

40. *Tethya robusta* Böwerbank
(pl. II, fig. 20)

Tethya robusta Böwerbank, 1873, p. 10, pl. 2, figs. 12-17. Burton, 1952, p. 165.

Thomas, 1973, p. 71, pl. 3, fig. 20 (synonymy).

Donatia robusta Burton, 1924, p. 1037 (synonymy).

Material : Four specimens.

Reg. n° : M.R.A.C. n°507 D.

Description : Body spherical or irregular, attached to the substratum by broad bases. Diameter of the largest specimen 25 mm.

Colour : Dull white (cortex) and gray in the interior.

Consistency : Hard.

Surface tuberculated. Cortex 1-2 mm thick.

Skeleton radial, with a central "nucleus".

Spicules : 1) Strongyloxeas. Straight, sharply pointed or blunt. Size, 0.413-1.825 (1.112 mm) x 0.008-0.018 (0.015 mm).

2) Spherasters. Rays conical or blunt. Two types of spherasters are noted. First type with diameter of 0.032-0.092 (0.072 mm). Rays 1/3 to 1/2 the diameter of centrum. The second type of spherasters with a total diameter of 0.024-0.048 (0.04 mm). Rays 1/5 the diameter of centrum and tent like.

3) Cortical chiasters. Centrum developed in varying degrees and with 6-10 apically spined rays. In some cases the centrum is well developed and the rays are rudimentary and few in number. Diameter up to 0.012 mm.

4) Choanosomal chiasters. Rays long and with spines at their tips. Total diameter, 0.014-0.025 mm.

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Myriastr*a Sollas

41. *Myriastr*a *purpurea* (Ridley)

(pl. II, fig. 21)

Stelletta purpurea Ridley, 1884, p. 473, pl. 40, fig. e; pl. 43, fig. j.

*Myriastr*a *purpurea* Lévl, 1958, p. 9, figs. 5a-d. Thomas, 1968 (synonymy). Thomas 1973, p. 75; pl. 3, fig. 23 (synonymy).

Material : One specimen

Reg. n° : M.R.A.C. n°507 N.

Description : Body spherical, surface hispid, oscules and pores closed. Total diameter, 18 mm.

Colour : Pale white.

Consistency : Hard and incompressible.

Spicules : 1) Orthotriaenes. Shaft, when well developed, 1.4 x 0.032 mm; chord, 0.29 mm.

2) Anatriaenes. Shaft abruptly pointed; length 1.3 mm and width 0.016 mm; chord, 0.082 mm.

3) Oxeas. Size, 1.4 x 0.023 mm when well developed.

4) Cortical oxeas. Sometimes undulating, size, 0.28 x 0.003 mm.

5) Tylasters. With 8-10 rays. Diameter up to 0.012 mm.

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean, Antarctic Ocean.

Genus *Aurora* Sollas

42. *Aurora rowi* Dendy

(pl. II, fig. 22)

Aurora rowi Dendy, 1916a, p. 249, pl. 44, fig. 5; pl. 46, fig. 4. Dendy and Frederick, 1924, p. 494. Burton and Rao, 1932, p. 317.

Material : Two specimens, one attached to the shell of *Crassostrea* sp. (now removed) and the other already removed from the substratum.

Reg. n°s : M.R.A.C. n°505 F, 521 B.

Description : Body thickly encrusting (505 F), or massive (521 B), height of the massive specimen 21 mm and area occupied, 46 x 25 mm. Foreign particles are incorporated heavily.

Colour : Surface white when dry, interior chocolate.

Consistency : Hard and incompressible.

Surface subglabrous and microscopically uneven.

Oscules and pores are not traceable.

Outer crust (of sterrospherasters and spherasters) 0.05-0.09 mm thick, and when dry may peel off. Skeleton is in radial pattern. Oxeas are arranged horizontally just beneath the outer crust and intersect it in a triangular pattern when viewed from the surface. Sterrospherasters are seen in the interior also. Cortical region highly packed with sand grains (521 B).

Spicules : 1) Orthotriaenes. Shaft 0.6 x 0.037 mm when well developed. Clad, up to 0.2 x 0.024 mm (absent in specimen n°521 B).

2) Oxeas. Size, 1 x 0.028 mm.

3) Sterrospherasters. Spherical or rounded with irregular protuberances. Younger forms have conical rays. Size up to 0.042 mm.

4) Spherasters. Irregular with imperfect rays. Diameter up to 0.010 mm.

5) Oxyasters. Centrum indistinct, rays 5-9; diameter up to 0.024 mm.

Distribution : Indian Ocean, Australian Region.

43. *Stelletta herdmani* Dendy ssp. *robusta* new

(pl. II, fig. 23)

Stelletta herdmani Dendy, 1905, p. 77, pl. 2, fig. 6.

Material : One specimen.

Reg. n° : M.R.A.C. n°507 J.

Description : The major portion of the specimen is lost while collecting and now only the basal part which is attached to the substratum is preserved. Size of the specimen, 30 x 30 mm.

Colour : Cortex pale white and interior pale gray.

Consistency : Tough.

The skeletal arrangement is typically radial. Cortex is well developed and the thickness may vary from 1-3 mm (it is also not known whether the thickness of the cortex is same for the rest of the specimen which is lost, and this thickness is only for the part which is attached to the substratum). The triaenes are usually seen in the cortical zone and the oxeas are in bands radiating towards the interior; and in this respect there is similarity with the skeletal arrangement of *Tethya* species.

Spicules : 1) Triaenes; mostly protriaenes. The clads are malformed or even suppressed and the tip, in some forms, may end blindly. Size up to 1.8 x 0.08 mm. The thickest part of the shaft is the middle portion.

2) Oxeas. Fusiform and sharply pointed. Size up to 3.01 x 0.049 mm.

3) Stronglyasters. Mainly cortical, centrum developed in varying degrees; some may look like spheraster. Size 0.008-0.010 mm.

4) Oxyasters. Centrum not prominent, rays conical and slightly roughened. Size up to 0.012 mm.

Remarks : *S. herdmanni* is originally recorded from the pearl banks of Ceylon (Dendy, 1905) and subsequently from South Arabian Coast and Zanzibar (Burton, 1959). Abnormality of protriaenes is present in varying degrees in all the specimens reported. The specimen collected from South Arabian Coast had anthasters of 0.02 mm diameter. The present specimen differs from the type in the presence of a thick cortex.

Genus *Cinachyra* Sollas

44. *Cinachyra cavernosa* (Lamarck)

Chrotella cavernosa Burton, 1959, p. 200 (synonymy).

Cinachyra cavernosa Thomas, 1973, p. 79, pl. 4, fig. 3.

Material : One specimen.

Reg. n° : M.R.A.C. n°507 H.

Description : Body hemispherical. (on drying the "nuclear" region of the specimen get pushed to the outside, thereby giving a flat nature to the originally rounded surface contour; this character is common to this family).

Surface hispid, and the colour is that of silt settled on the surface; interior pale white.

Spicules : 1) Protriaenes. Shaft 2.8 x 0.008 mm, clads up to 0.053 mm; suppression of clads is common.

2) Anatriaenes. Shaft hair like and undulating, size, 2.0 x 0.003 mm; clads 0.041 mm average and chord 0.068 mm.

3) Oxeas. Tips sharply pointed, stairstepped or even stylote. Size up to 3.00 x 0.052 mm.

4) Microxeas. Size, 0.118 x 0.002 mm.

5) Sigmaspines. Very rare, chord, 0.012 mm.

Distribution : Atlantic Ocean, Red Sea, Indian Ocean, Australian Region and Pacific Ocean.

Genus *Chondrilla* Schmidt

45. *Chondrilla australiensis* Carter

(pl. II, fig. 24)

Chondrilla australiensis Carter, 1873, p. 23, pl. 1, figs. 10-14, 16. Burton,

- 43 - *Natural History Museum Amsterdam*

1937, p. 10, pl. 1, fig. 4 (synonymy). de Laubenfels, 1954, p. 249, fig. 173. Burton, 1959, p. 197 (synonymy).

Chondrilla australiensis Vacelet and Vasseur, 1965, p. 96, pl. 6, fig. 17.

Material : One specimen attached to a bivalve shell.

Reg. n° : M.R.A.C. n°507 E.

Description : Sponge thickly encrusting, thickness 1-5 mm.

Colour : Black.

Consistency : Cartilaginous.

Surface smooth and glabrous. Ectosome, 0.15 mm thick and fleshy.

Skeleton composed mainly of spherasters in the ectosome, and oxyasters in the endosome. But these two forms may be distributed irregularly.

Spicules : 1) Spherasters. Centrum large and rays conical. Total diameter, 0.016-0.036 mm.

2) Oxyasters. Rays minutely spined and may be branching; Total diameter, 0.016-0.024 mm.

Distribution : Indian Ocean, Pacific Ocean, Australian Region.

Genus *Clathrina* Gray

46. *Clathrina coriacea* (Montagu)

(pl. II, fig. 25)

Clathrina coriacea Burton, 1963, p. 183 (synonymy).

Material : Ten specimens.

Reg. n° : M.R.A.C. n°512.

Description : Body made up of anastomosing tubes of 0.5-1.1 mm diameter. These tubes are intermingled in such a way that it is difficult to make out individual tube at a later stage. These tubes at the surface, unite together forming conical projections bearing vents at the tips.

Colour : Dark gray (this colour is due to the presence of silt accumulated at the surface).

Consistency : Friable.

The skeletal arrangement and the morphological variations are well described by Burton (1963).

Spicules : Triradiates. Rays regular, size of ray, 0.05-0.12 x 0.006-0.013 mm.

Remarks : It is seen from the collection that this species is very common in Mozambique channel.

Distribution : Cosmopolitan.

N.B. : While examining the spicule preparation of *Cliona* spp., three interesting spicules of an unknown sponge were also noted. These spicules are essentially mesotriaenes with dicho-modifications; and detailed drawings, in different views, are given in the plate II (fig. 26). Dimensions are as follows : shaft, 0.063 x 0.013 mm; chord, 0.15-0.21 mm.

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11.- SPONGES OF MAMBONE AND PARADISE ISLANDS

INTRODUCTION

The second part of this report deals with 26 species of marine sponges collected from Mambone and Paradise Islands (see map in part I of this report). These 26 species fall under 15 families and 22 genera. One species comes under Calcarea and the rest are Demospongiae. Three species could be identified only up to the generic level.

From the point of view of geographic distribution it may be stated that the sponge fauna of this locality shows considerable similarity with that of Australian region and 12 species are common to both these areas. The next area with which it has considerable affinity is the Red Sea; ten species are common to both these areas. Nine species are common to Atlantic Ocean and Pacific Ocean, and 7 to Mediterranean Sea. The greater affinity exhibited by the sponge fauna of this area to Australian region and Red Sea is nothing peculiar and is in full agreement with the broad affinity of Indian Ocean species as a whole.

The sponge fauna of Mozambique channel requires special mention in certain respects. The common 'bath sponge', *Spongia officinalis* var. *ceylonensis*, of Indian waters is quite well represented in both Inhaca Island and Mambone. These specimens, though very good in texture, are very small in size. Another peculiarity noted is the wide distribution of boring sponges in practically all calcareous matter available such as, lime stone, shell, barnacle test, coral, etc. Seven species of boring sponges are represented in Inhaca collection and 5 in Mambone. Species like *Spirastrella inconstans*, *Aka minuta* and *Thoosa hancocki* are common to both these centres. *Halina plicata* and *Samus anonyma* are represented only in Mambone. Four species of *Cliona* (viz. *celata*, *vastifica*, *mucronata* and *margaritifera*) are represented only in Inhaca collections; and none in Mambone.

It also appears from the number of specimens collected that the species like *Sigmadocia fibulata*, *Siderodermella navicelligera*, *Spirastrella inconstans*, *Prostylyssa foetida* and *Clathrina coriacea* are quite abundant and well distributed along the Mozambique channel.

LIST OF SPECIES

Class DEMOSPONGIAE Sollas
Order KERATOSIDA Grant
Family SPONGIIDAE Gray

1. *Spongia officinalis* Linnaeus var. *ceylonensis* Dendy
2. *Hyattella cribriformis* (Hyatt)

Order HAPLOSCLERIDA Topsent
Family DESMACIDONIDAE Gray

3. *Iotrochota baculifera* Ridley

Family ADOCIIDAE de Laubenfels

4. *Sigmadocia fibulata* (Schmidt)

Family CALLYSPONGIIDAE de Laubenfels

5. *Callyspongia diffusa* (Ridley)
6. *C. fibrosa* (Ridley and Dendy)

Order POECILOSCLERIDA Topsent
Family AGELASIDAE Verrill

7. *Agelas mauritiana* (Carter)

Family TEDANIIDAE Ridley and Dendy

8. *Tedania anhelans* (Lieberkuhn)
9. *Tedaniopsamma arenosa* Vacelet and Vasseur

Family OPHLITASPONGIIDAE de Laubenfels

10. *Clathria indica* Dendy
11. *Zygomycale parishii* (Böwerbank)

Order HALICHONDRIDA Vosmaer
Family AXINELLIDAE Schmidt

12. *Axinella donnani* (Böwerbank)
13. *A. tenuidigitata* ssp. *oxeata* new
14. *Axinella* sp. A
15. *Axinella* sp. B
16. *Phakettia ridleyi* (Dendy)

Order HADROMERIDA Topsent
Family SPIRASTRELLIDAE Hentschel

17. *Spirastrella inconstans* (Dendy)

Family SUBERITIDAE Schmidt

18. *Aaptos aaptos* (Schmidt)

Family CLIONIDAE Gray

19. *Aka minuta* Thomas
20. *Thoosa hancocki* Topsent

Order CHORISTIDA Sollas
Family GEODIIDAE Gray

21. *Geodia* sp.

Family TETILLIDAE Sollas

22. *Tetilla dactyloidea* (Carter)

Order CARNOSIDA Carter
Family HALINIDAE de Laubenfels

23. *Halina plicata* (Schmidt)
24. *Plakortis simplex* Schulze
25. *Scmus anonyma* Gray

Order CALCAREA Dendy and Row
Family HOMOCOELIDAE Dendy

26. *Clathrina coriacea* (Montagu)

SYSTEMATICS

Genus *Spongia* Linnaeus

1. *Spongia officinalis* Linnaeus var. *ceylonensis* Dendy
(pl. III, fig. 1)

Euspongia officinalis var. *ceylonensis* Dendy, 1905, p. 211, pl. 14, fig. 3;
pl. 16, fig. 5.

Spongia officinalis var. *ceylonensis* Burton, 1937, p. 39. Thomas, 1968.

Material : One specimen.

Reg. n° : M.R.A.C. n°558.

Description : Body conical with a wide cavity inside. Height, 50 mm; diameter, 30 mm at the base; broadly attached to the substratum.

Colour : Pale yellow.

Consistency : Elastic.

Surface conulose, conules formed of outer extremities of fibres; sometimes compound.

Oscules scattered on the surface; diameter, 2-4 mm and compound. Pores small, 0.5 mm diameter and are situated in between conules.

The primaries and secondaries are clearly visible. Primaries run vertically to the surface, at a distance of 0.2-0.5 mm. In some places 2-3 primaries join together and form compound fibres ending at the surface in compound conules. Diameter of these primaries may vary between 0.04-0.05 mm and they contain foreign objects. The secondaries are uniform in shape, devoid of foreign objects and form fine meshes of polygonal shape. Diameter of secondaries may vary from 0.011-0.025 mm.

Remarks : This variety is considered to have economic importance in view of its resiliency, absorptiveness, and softness.

Distribution : Red Sea, Indian Ocean.

Genus *Hyattella* Lendenfeld

2. *Hyattella cribriformis* (Hyatt)
(pl. III, fig. 2)

Stelospongos cribriformis Hyatt, 1877, p. 531.

Hyattella cribriformis de Laubenfels, 1948, p. 39 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°557.

Description : Body cylindrical, attached to the substratum by a broad base. Height 50 mm, diameter 15 mm at the base; thickness of wall, 2 mm. Walls punctured here and there by rounded openings of 2-5 mm diameter; and at the growing tips these openings arrange in linear series.

Colour : Pale brown.

Consistency : Compressible with good resiliency.

Oscules confined to tympani, 3-6 mm diameter.

Surface conulose, conules 0.5-1 mm high and 0.5 mm apart.

The ectosome is semi-transparent and detachable; foreign particles are incorporated in varying degrees.

The fibres can be demarcated into primaries and secondaries. Primaries often contain arenaceous objects and secondaries are devoid of such inclusions. These primaries have a diameter of 0.13 mm and end in surface conules. Secondaries are 0.06 mm in diameter, and the mesh is polygonal. Spongin is pale amber coloured.

Distribution : Atlantic Ocean, Red Sea, Indian Ocean, Australian Region.

Genus *Iotrochota* Ridley

3. *Iotrochota baculifera* Ridley
(pl. III, fig. 3)

Iotrochota baculifera Ridley, 1884, p. 435, pl. 39, fig. M; pl. 42, fig. F. Bergquist, 1965, p. 163. Thomas, 1968 (synonymy). Thomas, 1973, p. 20, pl. 1, fig. 7 (synonymy).

Material : One small bit.

Reg. n° : M.R.A.C. n°556 A.

Description : Sponge part of a thickly encrusting specimen. Size, 10 x 5 x 5 mm.

Colour : Black.

Consistency : Hard and slightly compressible.

Oscules and pores are not seen. Surface conulose; conules, 0.5-1 mm high.

A well developed dermal skeleton of tangentially to radially placed strongyles is present. Main skeleton is composed of well developed fibres cored with styles. Main fibres are connected together by secondaries in a scalariform pattern. Diameter of main fibres is about 0.1 mm and that of connectives, 0.08 mm.

Spicules : 1) Styles. Slightly curved and sharply pointed, blunt or acute

terminations are also noted. Size, 0.121-0.182 (0.162 mm) x 0.004-0.007 (0.005 mm).

2) Tornotes. Straight, size, 0.172-0.245 (0.215 mm) x 0.002-0.005 (0.004 mm).

3) Birotulates. Slender with 4 teeth on either side. They are rarely seen. Chord length 0.009-0.016 (0.012 mm).

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

4. *Sigmatocia fibulata* (Schmidt)
(pl. III, figs. 4, 4A)

Sigmatocia fibulata Thomas, 1973, p. 21, pl. 1, fig. 9 (synonymy).

Material : Several branches; obviously different parts of the same specimen.

Reg. n° : M.R.A.C. n°532.

Description : Bushy with slender branches, often dividing dichotomously at the tip. Fusion of adjacent branches quite common. Symbiotic alga, *Ceratodictyon spongiosum* is present; and their filaments are seen jutting out to a length of 1-1.5 mm at the growing parts.

Colour : Sandy gray when dry.

Consistency : Hard, slightly compressible and with poor resiliency.

Oscules marginal and in linear series; diameter, 1-3 mm. Pores small, 0.021-0.048 mm.

Surface uniform except at the growing tips.

A tangential dermal skeleton of oxeas is present; thickness, 0.019 mm average. Spongin is seen binding the oxeas only at their tips.

Main skeleton composed of ill defined spicular fibres running towards the surface. Number of oxeas, in cross section, may vary from 3-5 and are cemented together by very little spongin. These fibres are interconnected by triangular secondary meshes each side of which is composed of one oxea.

Spicules : 1) Oxeas. Slightly curved and sharply pointed. Size, 0.121-0.211 (0.181 mm) x 0.003-0.007 (0.005 mm).

2) Sigmas. 'C' shaped, with a notch at the centre. Chord length, 0.011-0.021 (0.015 mm).

Distribution : North Atlantic Ocean, Mediterranean Sea, Indian Ocean, Australian Region.

Genus *Callyspongia* Duchassaing and Michelotti

5. *Callyspongia diffusa* (Ridley)
(pl. III, fig. 5)

Callyspongia diffusa Burton, 1934, p. 541, fig. 6 (synonymy). Burton, 1959,

p. 224 (synonymy). Thomas, 1968 (synonymy).

Material : Four specimens.

Reg. nos : M.R.A.C. nos 549 (2 specimens), 523, 531.

Description : The external shape shows considerable variation. One specimen (n°523) is repent with cylindrical body having oscular openings of 2 mm high. Two specimens are lamellar with compound oscules situated on one side of the body. Thickness of lamella in this case, 2-4 mm. The fourth specimen has several foliaceous branches arising from a peduncle, sand grains are heavily incorporated into the body.

Colour : Sandy gray when dry.

Consistency : Rough and slightly compressible.

Oscules on tubular projection or not, compound, 2-5 mm in diameter. Pores minute; one per mesh.

Surface reticulated and minutely hispid. This hispidity is brought by spicules arranged vertically both from the dermal fibres and from the tips of main fibres ending in the surface.

The dermal skeleton is a well developed reticulation of fibres subdivided into multi- or unispicular secondaries. The main skeleton is also composed of stout multispicular primaries of 0.1 mm diameter running to the surface and inter-connected by secondaries of 0.5 mm diameter. Tertiary reticulation also may be present.

Spicules : Oxeas. Sharply pointed. Size 0.062-0.121 (0.092 mm) x 0.002-0.006 (0.004 mm).

Distribution : Indian Ocean, Australian Region.

6. *Callyspongia fibrosa* (Ridley and Dendy)
(pl. III, fig. 6)

Dasychalina fibrosa Ridley and Dendy, 1886, p. 330.

Callyspongia fibrosa Burton, 1934, p. 540 (synonymy). Burton, 1959, p. 224.

Material : Five specimens.

Reg. nos : M.R.A.C. nos 520 (2 specimens), 522 A, 541, 544.

Description : Body erect or repent, diameter of the branch varies from 8-35 mm and often fuse laterally. Largest specimen is 80 mm high and made of 4 branches, all fused laterally and opening to outside by an apical oscule. In repent specimen (n°541) the oscules are arranged without any definite pattern.

Surface conulose, conules prominent and close together at the growing tips; height 1-4 mm.

Oscules large, 2-14 mm in diameter; oval or rounded and compound. Pores minute, 0.04 mm in diameter.

Dermal reticulation composed of stout spicular meshes of triangular nature, which are often sub-divided by irregular network of uni- or multispicular fibres.

The main fibres are multispicular with a diameter of 0.12 mm, and run towards the surface. They are inter-connected by connectives of 0.07 mm and are multispicular in nature. Adjacent main fibres unite at the surface and form compound conules.

Spicules : Oxea. Straight, slightly curved or crooked. Size 0.082-0.110 (0.098 mm) x 0.001-0.004 (0.002 mm).

Distribution : Indian Ocean, Australian Region, Atlantic (?), Pacific Ocean.

Genus *Agelas* Duchassaing and Michelotti

7. *Agelas mauritiana* (Carter)

(pl. III, figs. 7, 7A)

Ectyon mauritanus Carter, 1883, p. 310, pl. 12, fig. 3.

Agelas mauritiana de Laubenfels, 1954, p. 113, fig. 72.

Material : One specimen.

Reg. n° : M.R.A.C. n°524.

Description : Sponge thickly encrusting with cavernous interior. Morphology of this specimen is similar to that of *Hyattella cribriiformis* (Hyatt).

Colour : Pale yellow.

Consistency : Compressible with good resiliency. Surface distinctly conulose at growing parts; older parts smooth and glabrous.

The skeleton is composed of pale amber coloured fibres with diameter varying between 0.02-0.08 mm. These fibres are echinated by styles. The primaries and secondaries are not differentiated from each other.

Spicules : Styles. Slightly curved with 14-20 whorls of spines. Younger forms smooth or partly annulated. Size, 0.112-0.212 (0.161 mm) x 0.006-0.008 (0.007 mm).

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Tedania* Gray

8. *Tedania anhelans* (Lieberkuhn)

(pl. III, fig. 8)

Halichondria anhelans Lieberkuhn, 1859 (vide Lévi, 1963).

Tedania anhelans Lévi, 1963, p. 32, fig. 33, pls. 5D and E. Thomas, 1973, p. 29,

pl. 1, fig. 15 (synonymy).

Tedania nigrescens Burton, 1959, p. 241 (synonymy).

Material : Four specimens.

Reg. n°s : M.R.A.C. n°536, 539 (three specimens).

Description : Body thickly encrusting or massive; one specimen looks exactly like the specimen photographed by Lévi (1963, pl. 5D); others are irregularly encrusting. Largest specimen has a height of 40 mm.

Colour : Pale gray when dry.

Consistency : Friable.

Oscules on ridges or on conical projections; 1-2 mm diameter, compound in nature and often protected by a rim.

Spicules : 1) Styles. Slightly curved; size, 0.201-0.243 (0.231 mm) x 0.004-0.006 (0.005 mm).

2) Tornotes. Head well developed and spiny. Size, 0.18-0.231 (0.212 mm) x 0.002-0.004 (0.003 mm).

3) Onychaetas. Size 0.15 mm.

Distribution : Cosmopolitan.

9. *Tedaniopsamma arenosa* Vacelet and Vasseur

(pl. III, fig. 9)

Tedaniopsamma arenosa Vacelet and Vasseur, 1971, p. 93, fig. 47, pl. 4, fig. 4.

Material : One specimen.

Reg. n° : M.R.A.C. n°522 B.

Description : Sponge massive, 30 x 20 mm.

Colour : Sandy gray due to the presence of sand grains inside.

Consistency : Friable.

Oscules and pores are not seen. Surface has an etched out appearance.

Skeleton composed of ill defined bands of fibres embracing good amount of sand grains. Towards the surface the strongyles dominate. Onychaetas are irregularly distributed both in the interior and in the dermal parts.

Spicules : 1) Styles. Slightly curved; size 0.19-0.252 (0.235 mm) x 0.003-0.005 (0.004 mm).

2) Strongyles. Slightly curved. Size, 0.252-0.384 (0.353 mm) x 0.003-0.005 mm.

3) Onychaetas. Inflammation at one end may or may not be present. These spicules are not divisible into 2 sets. Size, 0.060-0.200 (0.135 mm).

Distribution : Indian Ocean.

Genus *Clathria* Schmidt
10. *Clathria indica* Dendy
(pl. III, figs. 10, 10A)

Clathria indica Dendy, 1889, p. 84, pl. 4, fig. 10. Thomas, 1968 (synonymy).

Material : One small branch.

Reg. n° : M.R.A.C. n°536 B.

Description : The specimen represented in the present collection can only be the terminal part of a branch. Specimen is 'V' shaped with one branch longer than the other, diameter 2 mm and total height 24 mm.

Colour : Pale yellow.

Consistency : Compressible with good resiliency.

Oscules and pores are not traceable.

Surface conulose, conules 0.3-0.8 mm high.

The primary fibres run through the middle part and curve out towards the surface and end in conules. These primary fibres are connected by secondaries in an irregular scalariform pattern. Both primaries and connectives are echinated by acanthostyles. Average diameter of primaries is 0.08 mm and that of secondaries, 0.04 mm.

Spicules : 1) Styles. Oxeote, stylote or even strongylote. Size, 0.11-0.134 (0.121 mm) x 0.001-0.004 (0.003 mm).

2) Acanthostyles. Entirely spined; head well developed. Average size, 0.071 x 0.005 mm.

Distribution : Indian Ocean.

Genus *Zygomycale* Topsent
11. *Zygomycale parishii* (Böwerbank)
(pl. III, fig. 11)

Zygomycale parishii Topsent, 1930, p. 431. Thomas, 1968. Thomas, 1973, p. 38, pl. 2, fig. 10 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°560.

Description : Body with stout branches arising from the base, branches fused forming a lamellar structure. Height, 50 mm, width of lamella, 5 mm.

Colour : Pale white.

Consistency : Hard with poor resiliency.

Oscules and pores are not traceable in dry state.

Surface conulose at growing tips, conules 1-2 mm high and 1-1.5 mm apart. Older parts corrugated in appearance.

Dermal skeleton composed of spicular fibres arranged in a polygonal pattern.

Main skeleton is closely reticulated; primaries end in surface conules, and support the dermal skeleton. The diameter of fibres varies from 0.05-0.25 mm and the spongin content is rather high.

Spicules : 1) Subtylostyles or styles. Shaft slightly curved or undulated. Size, 0.201-0.382 (0.292 mm) x 0.002-0.012 (0.006 mm).

2) Large anisochelas. Dermal usually; size, 0.032-0.049 (0.042 mm).

3) Small anisochelas. Chord length up to 0.021 mm.

4) Isochelas. Chord length, 0.011 mm.

5) Large sigmas. Chord up to 0.085 mm.

6) Slender sigmas. Chord up to 0.038 mm.

7) Texas. With shallow curve at the centre. Length up to 0.085 mm.

8) Raphides. Very rare.

Genus *Axinella* Schmidt
12. *Axinella donnani* (Böwerbank)
(pl. III, fig. 12)

Axinella donnani Dendy, 1887, p. 158, pl. 11, fig. 1. Thomas, 1968 (synonymy).

Material : One specimen.

Reg. n° : M.R.A.C. n°548.

Description : Sponge only a small part of a lamellar specimen, size 20 mm and thickness 5 mm.

Colour : Sandy gray when dry.

Consistency : Hard and incompressible.

Surface conulose, conules in linear pattern or irregular; 0.5-1 mm high and 1 mm apart.

Oscules and pores are not seen.

Axial skeleton is well developed and due to the presence of extra amount of spongin the individual fibres are not well demarcated. The extra-axial fibres arise from the axial part and run vertically to the surface. The extra-axial fibres are interconnected by bands of spicules in an irregular manner. The spicules are arranged in plumose pattern and the hispidity of the surface is due to the presence of surface brushes.

Spicules : 1) Styles. Usually curved towards the base and sharply pointed. Size, 0.148-0.467 (0.354 mm) x 0.003-0.020 (0.016 mm).

2) Oxeas. Uniformly curved or distinctly angulated. Size, as in the former.
Distribution : Indian Ocean, Red Sea, Atlantic Ocean.

13. *Axinella tenuidigitata* ssp. *oxeata* new
(pl. III, figs. 13, 13A)

Axinella tenuidigitata Dendy, 1905, p. 189, pl. 13, fig. 4.

Material : One specimen.

Reg. n° : M.R.A.C. n°527 (type).

Description : Body irregularly massive and hispid. Height 30 mm. Skeleton separable into axial and extra-axial types. The extra-axial fibres partly fuse and end in surface brushes. Adjacent dermal brushes fuse together and form flattened structures in the surface. The dermal membrane stretches across the conule leaving 1-2 mm of conule outside the membrane.

Colour : Pale yellow.

Consistency : Compressible.

Oscules and pores are not traceable due to the presence of large conules. Skeletal arrangement resembles that of *A. tenuidigitata*.

Spicules : 1) Styles. Long and slender; associated with conules. Size, 0.377-1.13 (0.538 mm) x 0.002-0.012 (0.008 mm).

2) Oxea. Slightly curved and sharply pointed; sometimes crooked. Size, as in the former.

Remarks : This subspecies differs from *A. tenuidigitata* Dendy, 1905, in the respect that oxea is also added in the spiculation.

Genus *Axinella* Schmidt

14. *Axinella* sp. A
(pl. III, figs. 14, 14A)

Material : One specimen.

Reg. n° : M.R.A.C. n°551.

Description : Sponge massively conical, height 38 mm, diameter (maximum) 20 mm; and probably attached to the substratum by a short peduncle.

Colour: Sandy gray.

Consistency : Incompressible with poor resiliency.

Surface velvety due to the presence of dermal brushes.

Oscules and pores are not seen.

The skeletal arrangement is in typical *Axinella* pattern. In the axial part the fibres fuse together and form a dense condensation. The individual

fibre of the axial part is made of 6-8 spicules in cross section, and is cemented together by spongin. At the surface these fibres are well separated and end in surface conules. Spicules are arranged in a brush like pattern at the surface.

Spicules : Styles. Slightly curved and sharply pointed. Crooked forms are also seen (8 %). Base, uniformly rounded but rarely swellings are also noted (12 %). Size, 0.41-0.56 (0.48 mm) x 0.002-0.016 (0.011 mm).

15. *Axinella* sp. B
(pl. III, fig. 15)

Material : One specimen.

Reg. n° : M.R.A.C. n°546.

Description : This specimen resembles the former one in the growth form and surface texture. Size, 100 x 40 mm and was growing attached to the substratum by a peduncle of 30 mm.

Colour : Sandy gray.

Consistency : Incompressible.

Surface conulose, conules close, and give a velvety appearance to the surface. The conules are free at the surface for about a distance of 15 mm and hence when the specimen is torn longitudinally attains a peculiar striated appearance at the extra-axial part.

Oscules and pores are not traceable.

Skeleton is in typical *Axinella* pattern. The axial skeleton is more compact when compared with that of the previous specimen.

Spicules : 1) Long styles. Size up to 1.037 x 0.010 mm, often in the dermal brushed, oxeote modifications are also noted.

2) Styles. Slightly curved and sharply pointed. Head uniformly rounded or abruptly pointed (oxeote). This character is very prominent in this case. Size up to 0.58 x 0.016 mm.

Genus *Phakettia* de Laubenfels

16. *Phakettia ridleyi* (Dendy)
(pl. III, fig. 16)

Phakettia ridleyi Dendy, 1887, p. 159, pl. 11, figs. 2, 2A.

Phakettia ridleyi Thomas, 1968.

Material : One specimen.

Reg. n° : M.R.A.C. n°541 A.

Description : Body lamellar, attached to the bottom by a peduncle. Lamella 2 mm thick and 20 mm wide, ridges are present on both surfaces of the lamella.

Colour : Pale gray.

Consistency : Hard, leathery and incompressible.

Surface corrugated, ridges start from peduncle and run towards the margin. Oscules and pores are not traceable.

Skeleton is divisible into axial and extra-axial parts. In the axial part, due to fusion, the fibres are difficult to make out. Extra-axial fibres start from the axial part and run towards the surface at right angles to the former. Spongin content is very high and the spicules are plumosely arranged.

Spicules : Styles. Slight curved and sharply pointed. Base evenly rounded and with swellings. Size, 0.311-0.511 (0.448 mm) x 0.006-0.024 (0.018 mm).

Distribution : Indian Ocean.

Genus *Spirastrella* Schmidt

17. *Spirastrella inconstans* (Dendy)

(pl. III, fig. 17)

Spirastrella inconstans Dendy, 1887, p. 154, pl. 9, fig. 10.

Spirastrella inconstans var. *globosa*, var. *moendrina*, var. *digitata* Dendy, 1887, pp. 155-157.

Spirastrella inconstans Thiele, 1899, p. 10, pl. 1, fig. 3; pl. 5, fig. 4. Thomas, 1968 (synonymy). Thomas, 1973, p. 49, pl. 2, fig. 21; pl. 8, fig. 6.

Material : Twelve specimens.

Reg. nos : M.R.A.C. n°559 (2 specimens), 554 (2 specimens), 552, 564 B (2 specimens), 550 (5 specimens).

Description : Body massive or tubular and deeply buried in sand. Arenaceous objects are incorporated heavily into the body. Largest specimen has a height of 90 mm and a diameter of 50 mm.

Colour : Light brown above and pale yellow below (at buried part).

Consistency : Hard and incompressible.

Oscules, slit like and contractile, 2-8 mm in maximum diameter. Pores minute, 0.2 mm in diameter, and rarely located in specialized areas.

Surface microscopically hispid.

A definite cortex is absent, spirasters are scattered in the cortical zone.

The skeletal details are as in the type.

Spicules : 1) Tylostyles. Slightly curved and sharply pointed. Small spicules

are located in surface brushes. Size, 0.128-0.628 (0.522 mm) x 0.002-0.021 (0.016 mm).

2) Spirasters. Slender, with 2-5 bands; spines sharply pointed or blunt, size up to 0.032 mm.

Distribution : Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Aptos* Gray

18. *Aptos aptos* (Schmidt)

(pl. III, fig. 18)

Aptos aptos Dendy and Frederick, 1924, p. 508 (synonymy). Burton, 1937, p. 13 (synonymy). Thomas, 1968. Thomas, 1973, p. 57, pl. 3, fig. 7; pl. 8, fig. 5.

Material : One specimen.

Reg. n° : M.R.A.C. n°550 A.

Description : Body tuberous, with three irregular hemispherical swellings arising from the upper surface. Size, 40 x 6 x 20 mm.

Colour : Pale gray, when dry.

Consistency : Hard and incompressible.

Oscules and pores are not traceable in dry state.

Skeletal arrangement is typically radial. Small styles are arranged at the dermal part and large strongyloxeas often radiate towards the surface in ill defined bands. Spongin is not present.

Spicules : 1) Strongyloxeas. Head prominent in some (8 %), body straight and sharply pointed; strongylote forms are also noted (11 %). Size, 0.511-1.011 (0.93 mm) x 0.011-0.031 (0.025 mm).

2) Styles. Dermal, slightly curved and sharply pointed. Size, 0.211-0.255 (0.241 mm) x 0.002-0.004 (0.003 mm).

Distribution : Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Aka* de Laubenfels

19. *Aka minuta* Thomas

(pl. III, fig. 19)

Aka minuta Thomas, 1972, p. 343, pl. 2, figs. 4, 4A. Thomas, 1973, p. 59, pl. 3, fig. 9.

Material : Three corals infested with this sponge.

Reg. n° : M.R.A.C. n°542.

Description : Sponge boring, cavities made inside the coral extensive, 1-4 mm in diameter and irregular in fashion. The wall between adjacent cavities thin, and the interchamberal canals are funnel shaped. Papillae are not seen.

Oxeas are irregularly arranged. Microscleres are not present.

Spicules : Oxeas. Sharply pointed. Size, 0.082-0.126 (0.118 mm) x 0.003-0.008 (0.005 mm).

Distribution : Indian Ocean.

Genus *Thoosa* Hancock

20. *Thoosa hancocki* Topsent
(pl. III, fig. 20)

Thoosa hancocki Topsent, 1888, p. 81, pl. 7, fig. 12. Topsent, 1891, pp. 577, 580. Lindgren, 1898, p. 38.

Cliothosa hancocki Annandale, 1915a, p. 21. Lévi, 1965, p. 13, fig. 12.

Material : Coral rock infested with *Halina plicata* (Schmidt).

Reg. n° : M.R.A.C. n°556.

Spicules : Spicules of this species were seen intermingled with those of *H. plicata* and no specimen was found *in situ*. Spicules were :

- 1) Tylostyles, 0.33 x 0.016 mm.
- 2) Slender amphlasters, with long and distally hooked rays. Size, 0.028 mm.
- 3) Nodular amphlasters, rarely noted.

Distribution : Mediterranean Sea, Red Sea, Indian Ocean, Australian Region.

Genus *Geodia* Lamarck

21. *Geodia* sp.
(pl. III, figs. 21, 21A)

Material : One specimen.

Reg. n° : M.R.A.C. n°522 C.

Description : Body globular, diameter 11 mm; attached to the substratum by a broad base.

Colour : Pale gray.

Consistency : Hard.

Oscules and pores are not present. Surface microscopically hispid.

Skeleton composed of an outer crust (0.18-0.2 mm thick) and magascleres arranged radially. Outside the sterraster crust small corical oxeas are seen

arranged vertically. Protriaenes project out of the surface whereas the dichotriaenes have their clads beneath the sterraster crest.

Spicules : 1) Dichotriaenes. Shaft 1-1.8 x 0.03-0.063 mm; chord up to 0.46 mm.

2) Orthotriaenes. Shaft, 1-1.3 x 0.02-0.042 mm; chord up to 0.378 mm.

3) Protriaenes. Shaft 3.01 x 0.016-0.028 mm, clads up to 0.126 mm. Clads may show different degrees of suppression; diaene or even monaene.

4) Anatriaenes. Shaft up to 3.5 x 0.016 mm, chord 0.195 mm, clad 0.060 mm.

5) Oxea. Size 2 x 0.020 mm.

6) Cortical oxeas. Size, 0.252 x 0.008 mm.

7) Sterraster. Size 0.067 x 0.063 mm. Sometimes the surface corrugated and irregular in outline.

8) Oxyasters (choanosomal). Rays roughened, centrum small, diameter up to 0.025 mm.

9) Strongylasters. Cortical, diameter up to 0.010 mm.

Genus *Tetilla* Schmidt

22. *Tetilla dactyloidea* (Carter)
(pl. III, fig. 22)

Tethya dactyloidea Carter, 1869, p. 15.

Tetilla dactyloidea Dendy, 1916, p. 102, pl. 2, fig. 10 (synonymy) (non *Tethya dactyloidea* Ridley, 1884, p. 625).

Material : One specimen.

Reg. n° : M.R.A.C. n°564 A.

Description : Sponge ligulate, height 25 mm, diameter 5-6 mm, remnants of rooting tufts are present at the basal part.

Colour : Dirty gray due to the presence of silt in the surface.

Consistency : Hard and leathery.

Surface pilose, growing tips hispid.

Oscules and pores are not seen ; probably contracted.

In the surface oxeas are arranged in brushes, and in deeper parts they form radiating bands arising from the base of the sponge.

Spicules : 1) Oxeas. Slightly curved or crooked. Size 1.9-0.006 mm.

2) Protriaenes. Clads subequal; shaft 1.4 x 0.004 mm.

3) Anatriaenes. Shaft up to 2 x 0.004 mm, chord 0.035 mm.

4) Sigmastyles. Size 0.008 mm.

Distribution : Indian Ocean, Pacific Ocean.

Genus *Halina* Böwerbank
23. *Halina plicata* (Schmidt)
(pl. III, fig. 23)

Corticium plicatum Schmidt, 1868, p. 2, pl. 2, fig. 11.

Halina plicata Thomas, 1973, p. 83, pl. 4, fig. 10; pl. 5, fig. 10 (synonymy).

Material : One coral rock infested with this sponge.

Reg. n° : M.R.A.C. n°556.

Description : The coral rock is completely destroyed, cavities made inside, 1-2 mm and circular or oval in outline, and are connected by slender canals.

Spicules : 1) Dichotriaenes. Shaft conical and size up to 0.6 x 0.014 mm. Clads usually bifid and rarely malformed. Protoclad, 0.035 x 0.022 mm; deuteroclad, 0.07 x 0.015 mm; and chord, 0.22 mm.

2) Streptasters. Size, 0.007-0.016 x 0.002 mm.

Distribution : Mediterranean Sea, Indian Ocean, Australian Region.

Genus *Plakortis* Schulze
24. *Plakortis simplex* Schulze
(pl. III, fig. 24)

Plakortis simplex Schulze, 1880, pp. 430, 449, pl. 21, figs. 14-16. Thomas, 1968 (synonymy).

Plakortis simplex Topsent, 1896, p. 556, pl. 21, fig. 7. Babić, 1922, p. 292; fig. Z.

Material : One specimen.

Reg. n° : M.R.A.C. n°523 A.

Description : Body irregularly elongate, attached to the substratum by one side. Size 20 x 10 mm.

Colour : Pale brown.

Consistency : Hard and incompressible.

Oscules and pores are not traceable in dry condition.

Surface microscopically uneven.

Skeletal arrangement tallies well with that of the type.

Spicules : 1) Oxeas. Central portion slightly swollen, often bearing rudimentary rays. Size, 0.071-0.128 (0.102 mm) x 0.002-0.003 mm.

2) Triods. Rays unequal, size about 0.03 x 0.003 mm.

Distribution : Circum equatorial.

Genus *Samus* Gray
25. *Samus anonyma* Gray
(pl. III, fig. 25)

Samus anonyma Gray, 1867, p. 526. Thomas, 1973, p. 85, pl. 4, fig. 9 (synonymy).

Material : Coral rock.

Reg. n° : M.R.A.C. n°556.

Spicules : Spicules of this species were found in stray numbers in the spicule preparation for *Halina plicata*. Spicules were: amphitriaenes, 0.053-0.14 mm (total length) and sigmas of chord length 0.009 mm.

Distribution : Atlantic Ocean, Indian Ocean, Australian Region, Pacific Ocean.

Genus *Clathrina* Gray
26. *Clathrina coriacea* (Montagu)

Clathrina coriacea Burton, 1963, p. 183 (synonymy).

Material : Three specimens.

Reg. n° : M.R.A.C. n°540.

Description : Body composed of anastomosing tubes of 0.5-1 mm diameter, occasionally giving rise to conical structures bearing vents (?). The diameter of tubes at such conical projections is often greater than that of the tube elsewhere. The body of the sponge, in all cases, is attached to the substratum by many points. Largest specimen has a height of 20 mm and width of 40 mm.

Colour : Pale white.

Consistency : Hard but friable.

Skeleton composed of triradiates with regular rays.

Size of ray, 0.04-0.11 x 0.006-0.012 mm.

Distribution : Cosmopolitan.

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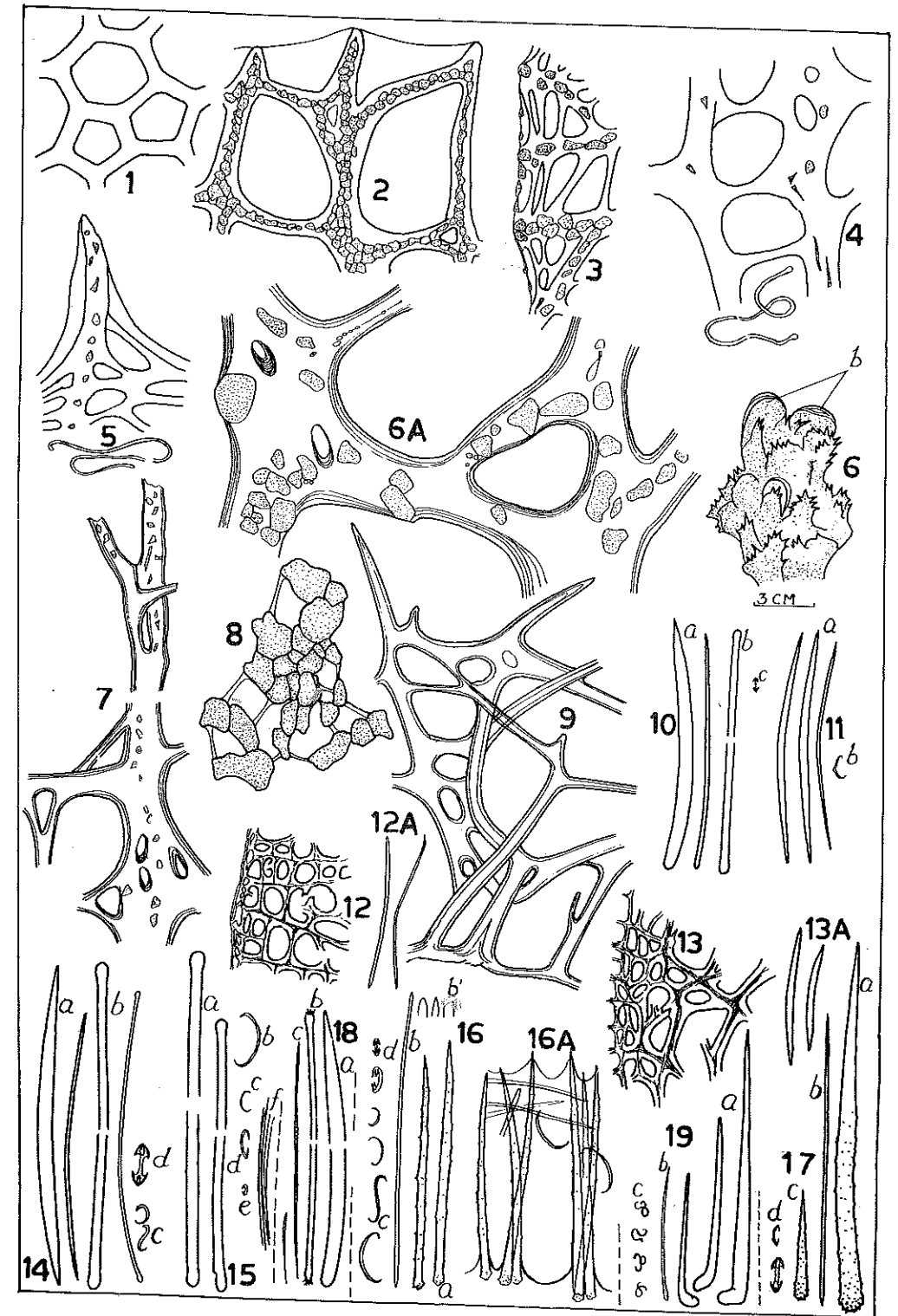
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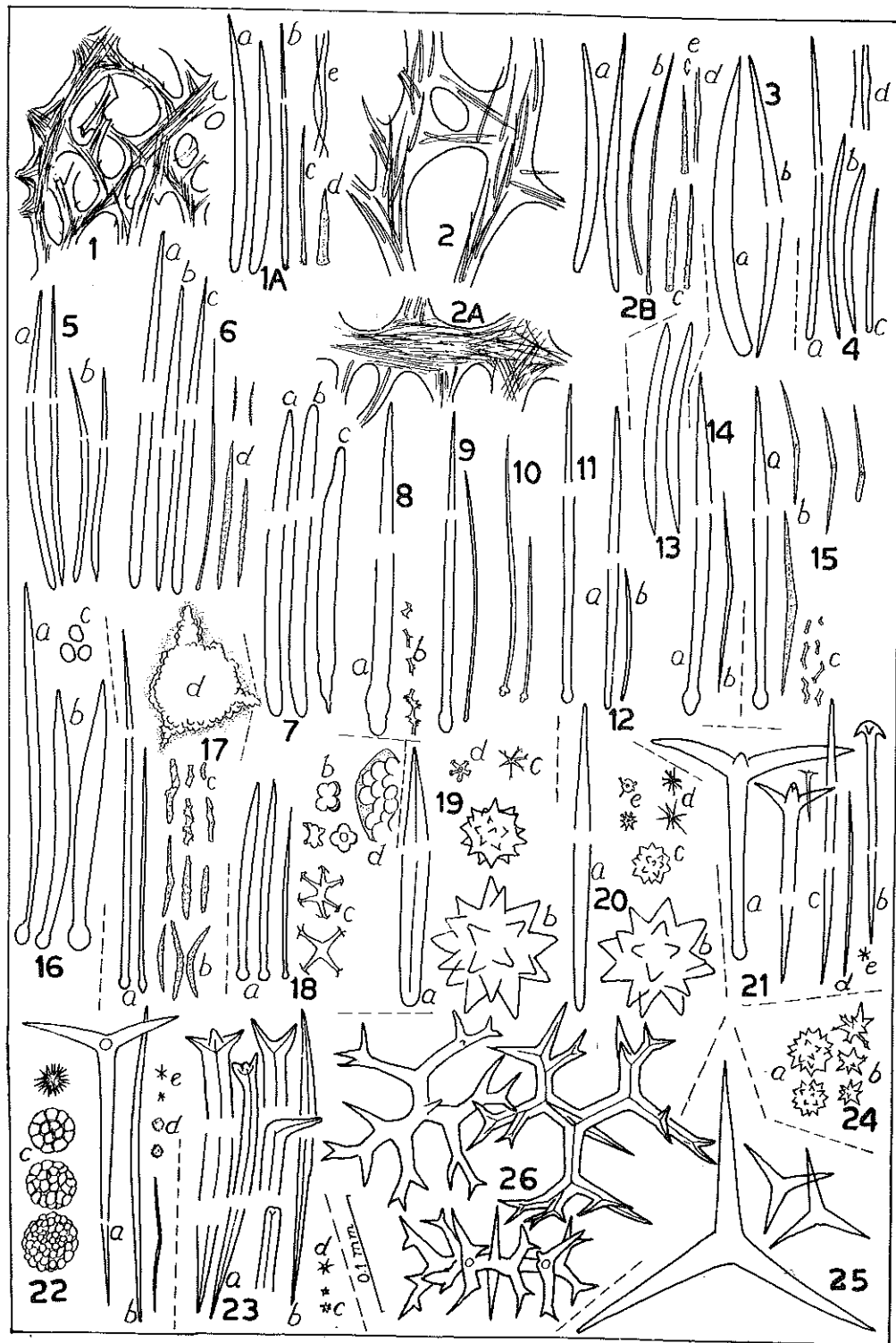
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PLATES

PLATE I

- Fig. 1.- *Spongia officinalis* var. *ceylonensis*. Secondary meshes.
- Fig. 2.- *Heteronema erecta*. Section showing the primaries and secondaries.
- Fig. 3.- *Phyllospongia foliascens*. Section showing the primaries, secondaries and dermal region.
- Fig. 4.- *Ircinia* sp. 2. Skeletal arrangement and "filament".
- Fig. 5.- *Ircinia* sp. 1. Skeletal arrangement and "filament".
- Fig. 6.- *Thorectopsamma benoiti*. Entire specimen, b. bivalve.
- Fig. 6A.- *T. benoiti*. Skeletal arrangement.
- Fig. 7.- *Fasciospongia cavernosa*. Skeletal arrangement; part of conule.
- Fig. 8.- *Dysidea fragilis*. Skeletal arrangement.
- Fig. 9.- *Dendrilla* sp. Skeletal arrangement.
- Fig. 10.- *Iotrochota baculifera*. Spicules : a. styles, b. tornote, c. birotulate.
- Fig. 11.- *Sigmadocia fibulata*. Spicules : a. oxeas, b. sigma.
- Fig. 12.- *Callyspongia fibrosa*. Skeletal arrangement.
- Fig. 12A.- *C. fibrosa*. Oxeas.
- Fig. 13.- *C. diffusa*. Skeletal arrangement.
- Fig. 13A.- *C. diffusa*. Oxeas.
- Fig. 14.- *Damiriana schmidti*. Spicules : a. oxeas, b. tylotes, c. sigmas, d. chelas.
- Fig. 15.- *Siderodermella navicelligera*. Spicules : a. tylotes, b. sigma (large), c. sigma (small), d. chela, e. navicelliform isochelas, f. raphides.
- Fig. 16.- *Hymedesmia* sp. 2. Spicules : a. acanthostyles, b. tornotoxeas, b'. tips of tornotoxeas, c. sigmas, d. isochelas.
- Fig. 16A.- *Hymedesmia* sp. 2. Skeletal arrangement.
- Fig. 17.- *Hymedesmia* sp. 1. Spicules : a. acanthostyles, b. tornotoxea, c. acanthostyle (small), d. isochelas.
- Fig. 18.- *Tedania anhelans*. Spicules : a. styles, b. tornote, c. onychaeta.
- Fig. 19.- *Rhabderemia prolifera*. Spicules : a. rhabdostyles, b. tylostyle, c. sigmas.





- Fig. 1.- *Clathria frondifera*. Skeletal arrangement.
 Fig. 1A.- *C. frondifera*. Spicules : a. main styles, b. interstitial subtylostyle, c. dermal subtylostyle, d. acanthostyle, e. toxas.
 Fig. 2.- *Clathria inhacensis*. Skeletal arrangement.
 Fig. 2A.- *C. inhacensis*. Dermal skeleton.
 Fig. 2B.- *C. inhacensis*. Spicules : a. styles, b. subtylostyles, c. acanthostyles, d. toxas, e. isochela.
 Fig. 3.- *Axinella donnani*. Spicules : a. styles, b. oxea.
 Fig. 4.- *A. agariciiformis*. Spicules : a. style, b. oxeas, c. small style, d. raphide.
 Fig. 5.- *Axinella* sp. Spicules : a. styles (long), b. styles (small).
 Fig. 6.- *Higginsia robusta*. Spicules : a. long style, b. oxea, c. small styles, d. acanthoxeas.
 Fig. 7.- *Acanthella elongata*. Spicules : a. style, b. strongyle, c. oxea.
 Fig. 8.- *Spirastrella inconstans*. Spicules : a. tylostyle, b. spirasters.
 Fig. 9.- *Suberites carnosus*. Spicules : tylostyles.
 Fig. 10.- *Iaxosuberites cruciatus*. Spicules : tylostyles.
 Fig. 11.- *Pseudosuberites andrewsi*. Spicules : tylostyles.
 Fig. 12.- *Aaptos aaptos*. Spicules : a. strongyloxea, b. style.
 Fig. 13.- *Aka minuta*. Spicules : oxeas.
 Fig. 14.- *Cliona celata*. Spicules : a. tylostyle, b. oxeas.
 Fig. 15.- *C. vastifica*. Spicules : a. tylostyle, b. acanthoxeas, c. spirasters.
 Fig. 16.- *C. mucronata*. Spicules : a. tylostyle, b. mucronate spicule, c. spherules.
 Fig. 17.- *C. margaritifera*. Spicules : a. tylostyles, b. microxeas, c. spirasters, d. boring pattern.
 Fig. 18.- *Thoosa hancocki*. Spicules : a. tylostyles, b. nodular amphisters, c. slender amphisters, d. boring pattern.
 Fig. 19.- *Tethya diploderma*. Spicules : a. strongyloxea, b. spheraster, c. oxyaster, d. tylaster.
 Fig. 20.- *T. robusta*. Spicules : a. strongyloxea, b. spheraster (large), c. spheraster (small), d. chiasters (choanosomal), e. chiasters (cortical).
 Fig. 21.- *Myriastria purpurea*. Spicules : a. orthotriaenes, b. anatriaenes, c. oxea, d. cortical oxea, e. tylaster.
 Fig. 22.- *Aurora rowi*. Spicules : a. orthotriaenes, b. oxea, c. sterrospherasters, d. spheraster, e. oxyasters.
 Fig. 23.- *Stelletta herdmanni* ssp. *robusta*. Spicules : a. triaenes, b. oxea, c. strongylaster, d. oxyaster.
 Fig. 24.- *Chondrilla australiensis*. Spicules : a. spheraster, b. oxyasters.
 Fig. 25.- *Clathrina coriacea*. Spicules : triradiates.
 Fig. 26.- Spicules of an unknown sponge.

- Fig. 1.- *Spongia officinalis* var. *ceylonensis*. A compound conule.
 Fig. 2.- *Hyattella cribriformis*. Main fibres and connectives.
 Fig. 3.- *Iotrochota baculifera*. Spicules : a. style, b. tornote, c. birotulate.
 Fig. 4.- *Sigmadocia fibulata*. Section showing the symbiotic alga (marked a) and the primary and secondary meshes of skeleton.
 Fig. 4A.- *S. fibulata*. Spicules : a. oxea, b. sigma.
 Fig. 5.- *Callyspongia diffusa*. Spicules.
 Fig. 6.- *C. fibrosa*. Spicules.
 Fig. 7.- *Agelas mauritiana*. Spicules : styles annulated in varying degrees.
 Fig. 7A.- *A. mauritiana*. Skeletal net work.
 Fig. 8.- *Tedania anhelans*. Spicules : a. style, b. tornote, c. onychaetas.
 Fig. 9.- *Tedaniopsamma arenosa*. Spicules : a. style, b. strongyle, c. onychaetas.
 Fig. 10.- *Clathria indica*. Spicules : a. styles, b. acanthostyle.
 Fig. 10A.- *C. indica*. Skeletal arrangement.
 Fig. 11.- *Zygomysale parishi*. Spicules : a. subtylostyle, b. large sigma, c. slender sigma, d. large anisochela, e. small anisochela, f. isochela, g. raphides, h. toxas.
 Fig. 12.- *Axinella domani*. Spicules : styles and oxea.
 Fig. 13.- *Axinella tenuidigitata* ssp. *oxeata*. Spicules : styles and oxea.
 Fig. 13A.- *A. tenuidigitata* ssp. *oxeata*. Skeletal arrangement.
 Fig. 14.- *Axinella* sp. A. Spicules : styles.
 Fig. 14A.- *Axinella* sp. A. Skeletal arrangement.
 Fig. 15.- *Axinella* sp. B. Spicules : a. styles (long), b. styles (small), c. basal part of style showing oxeote modifications.
 Fig. 16.- *Phakettia ridleyi*. Spicules : styles.
 Fig. 17.- *Spirastrella inconstans*. Spicules : a. tylostyles, b. spirasters.
 Fig. 18.- *Aaptos aaptos*. Spicules : a. strongyloxea, b. style.
 Fig. 19.- *Aka minuta*. Spicules : oxeas.
 Fig. 20.- *Thoosa hancocki*. Spicules : a. tylostyle, b. amphiasters with slender rays, c. amphiasters with nodular rays.
 Fig. 21.- *Geodia* sp. Section showing the skeletal arrangement.
 Fig. 21A.- *Geodia* sp. Spicules : a. dichotriaenes, b. orthotriaene, c. anatriaene, d. protriaene, e. oxea, f. sterrasters, g. oxyasters (choanosomal), h. strongylasters, i. cortical oxea.
 Fig. 22.- *Tetilla dactyloidea*. Spicules : a. oxea, b. anatriaene, c. protriaene, d. sigmaspires.
 Fig. 23.- *Halina plicata*. Spicules : a. dichotriaenes, b. streptasters.
 Fig. 24.- *Plakortis simplex*. Spicules : a. oxeas, b. triods.
 Fig. 25.- *Samus anonyma*. Spicules : a. amphitriaene, b. sigmas.

