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Marine Sponges of Andaman & Nicobar Island, India

J.G. PATTANAYAK

ZOOLOGICAL SURVEY OF INDIA

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CONTENTS

INTRODUCTION

The peninsular and insular coastlines of the Indian subcontinent provide a veritable habitat for a large number of sponges. The 6090 km coastline (CMFRI, 1978) provides varied topographic conditions for the survival and reproduction of the sponge species. A review of literature indicates paucity of taxonomic information of the sponges of the Indian coastline.

Although initial studies of this fauna were made over a century ago by Bowerbank (1873), subsequent studies have been limited and consists the work of Ali (1956), Annandale (1911, 1915 a,b,c) Burton (1928, 1930, 1937, 1959), Burton and Rao 1932), Carter (1880, 1881, 1887), Dendy (1887, 1889, 1905, 1916, 1916 a, 1916 b, 1921), Dendy and Burton (1926), Kumar (1924, 1925), Levi (1964), Pattanayak (1995), Rao (1941), Schulze (1894, 1895, 1900, 1902, 1904), Thomas (1968, 1968 a, 1968 b, 1968 c, 1968 d, 1968 e, 1969, 1969 a, 1970, 1970 a, 1970 b, 1972, 1973, 1973 a, 1974, 1975, 1976, 1976 a, 1976 b, 1977, 1979, 1979a, 1980, 1980 a, 1983,1984, 1985), Thomas, Ramadoss and Vincent (1993). The taxonomic treatments have been very few, widely distributed and far between.

Most of the studies done on the marine sponges of India are from the Southern India, Lakshadweep and Minicoy Islands, North West India from Gulf of Kutch and Cambay. Taxonomic information on the sponges of Andaman and Nicobar Islands is far from complete and prompted the necessity of this work.

The fauna of Andaman and Nicobar Island is remarkable for its high biological diversity and affinities to Indo-Malayan and Indo-Chinese regions (Smith, 1930). Tikadar, Daniel and Subba Rao (1986) gave a comprehensive list of sea shore fauna of Andaman and Nicobar Islands. This list comprises of sponges belonging to 1 Species of Calcarea, 16 species of Hexactinellida and 63 species of Demospongiae.

For reasons unknown, taxonomic studies on sponges of the Bay Islands have been minimal, having ample scope for the present study. Schulze (1894-1904) provided good descriptions of 16 species including description of 11 new species of Hexactinellida of this region collected by R.I.M.S. "Investigtor" from 1884 to 1900. Annandale (1915b) described two species of Demospongiae, out of which one has been described as new species. Dendy and Burton (1926) described 13 species of Demospongiae and Hexactinellida, out of which 5 are new species. Burton (1928) described 14 species of Demospongiae, out of which 8 have been described as new species. Burton and Rao (1932) described 26 species of Demospongiae, 1 species of Calcarea, 3 species of Hexactinellida from Andaman and Nicobar region, out of which 2 are new species. Thomas (1977 & 1979) reported only two species of Demospongiae from this region. Tikader, Daniel and Subba Rao, (1986) listed seventy

sponge species of Andaman and Nicobar Islands. Van Soest & Hooper (1993) described one species and Hooper (1996) described one species from this region.

On an analysis of the Zoogeographical patterns of distribution of sponges in Andaman and Nicobar region with reference to the adjacent regions (Burma, Sumatra, Indonesia and Gulf of Mannar) it appears that more searches are to be made in A & N region. The Burma region (Cocos Islands, Mergui Archipelago, coasts of Burma and Western Thailand) is known to harbour 107 species of sponges (Hooper, Kennedy and van Soest, 2000) and 16 species of Demospongiae of this region are found in Andaman & Nicobar region too. The Sumatra region (Western Malay Peninsula, Singapore, Straits of Malacca, Northern Sumatra and Northern Java) with a richer component when compared to Burma region indicates the presence of 151 species of sponges and 7 of its demospongiae are found in A & N region. The South-eastern Indonesian Archipelago by far the richest region possesses 786 species (Hooper, Kennedy and van Soest, 2000) and 29 species of it occur in the Andaman and Nicobar region. The coastal areas in the Gulf of Mannar and Palk Bay provide asylum to 321 species (Ali, 1956; Burton 1930, 1937; Burton and Rao, 1932; Kumar, 1925; Rao, 1941; Schulze, 1902; Thomas, 1979, 1985) and 35 species of it are recorded in the A & N region.

The holdings of the Zoological Survey of India at Calcutta consist of collections made over a period of 100 years with major sponge contributions from the R.I.M.S. "Investigator" (1884-1913), Dr. S.W. Kemp (1915-1930) and various other scientists of the Zoological Survey of India, in more recent years. Though the samples have been maintained carefully few samples of Andaman and Nicobar islands have yet been identified, leading to the present work.

This work describes 75 species, 48 genera, 35 families from the Andaman and Nicobar Islands. These include 4 new species records, 18 new locality records and 15 species endemic to the Andaman & Nicobar Islands.

The higher classification of sponges used here follows Hooper and Van Soest, 2002.

TOPOGRAPHY OF ANDAMAN AND NICOBAR ISLANDS

The Andaman and Nicobar Islands lie between 6°45' N and 13°30' N latitudes and 90°20' E and 93°56' E longitudes. A total area of landmass of these islands is approximately 8249 sq km and coastline is about 2000 km. (Tikader and Das, 1985). These Islands constitute the physiographic continuation of the mountain ranges of Naga and Lushai Hills and Arakan Yoma of Burma through Cape Negrais to the Andaman and Nicobar Islands and South-east of Sumatra (Achin Head). The chains of these islands are in fact the camel backs of the submerged mountain ranges projecting above the sea level running north to south.

The Andaman and Nicobar Islands are broadly divided into two groups, separated by the Ten Degree Channel, about 150 km wide and 732 meters deep.

The Andaman group consists of 324 islands of which 20 are inhabited. The Main part of the group is collectively known as the Great Andamans comprising of five closely adjoining Islands, North Andaman, Middle Andaman, South Andaman, Baratang and Rutland Island, all separated by narrow channels. Total land area of the Great Andaman group is 6408 sq. km. The southern most island of the Andaman group is the Little Andaman which is separated by a strait called Duncan passage. This island is 48 km long and 27 km wide and its land area is about 960 sq. km.

The Nicobar group comprises 24 islands of which 13 are inhabited. The total land area of this group is 1841 sq. km. The distance between Car Nicobar and southern most tip of Great Nicobar (Pygmalion Point) is 310 km. The Pygmalion Point is in fact the southern most boundary of India and is about 144 km from Achin Head of Sumatra. Great Nicobar is the longest of the Nicobar group. Its area is about 1045 sq. km with a length of 55 km, between Murray Point in the north and Pygmalion Point in the south. Other notable islands of the group are Car Nicobar, Choura, Camorta, Trinket, Nancowry and Little Nicobar. Car Nicobar is the capital of the Nicobar group of islands. It is a coral island and has a shape more or less like that of Australia with a land area of 127 sq. km. Large portions of the coastline of the Andaman and Nicobar Islands are stony and full of coral; the coastal flats are admixture of sand, silty clay and alluvial material together with fine fragments of coral lime. The soil, in general, is mild to moderately acidic with appreciably high humus on top.

These islands are tropical with a warm, moist and equable climate. The influence of sea and abundant rainfall prevent extremes of heat and temperature remains within 23°c to 31°c. Except for three months (December to February) there is rainfall throughout the year.

Mangroves line the shores, creeks mouth and island channels, covering an area of about 100,000 hectares (Blasco, 1978). The species of mangrove forests of these islands are *Rhizophora mucronata, R. apiculata, R. stylosa, Bruguiera parviflora, B. gymnorrhiza, Sonneratia* sp., *Avicennia officinalis, H.eritiera littoralis* and *Scyphiphora hydrophyllacea.*

MATERIAL AND METHOD

Most material studied in this work consists of preserved museum specimens, deposited in the Zoological Survey of India. Specimens were collected during the period from 1884-1913 by Royal Indian Marine Ship "Investigator", S.W. Kemp from 1915 to 1930, and more recently by Marine Survey units and different scientists of Zoological Survey of India. For some species, due to insufficient description of some type specimens and non-availability of the other material, type specimens were restudied and re-description of the same is incorporated. Instead of writing Holotype, Paratype and etc. only type is written as the same is written in the original label.

For the study of the skeletal architecture two microscopical sections were prepared from the specimens preserved in 70% ethanol or dry specimens. One section was of the surface

to obtain a tangential view of the ectosomal skeleton and the other section was perpendicular to the surface to examine the choanosomal skeleton. The sections were dried and mounted in Canada balsam on a microscopical slide.

For the study of different categories of spicules fragments of both ectosomal and choanosomal regions were boiled directly on a glass slide in concentrated nitric acid, mounted in Canada balsam and examined under light microscope.

For the study of spongin fibres thick hand cut sections were made perpendicular to the surface, soaked in saturated solution of phenol and xylene, mounted either in water or in glycerine and studied under light microscope.

While studying the spicules, measurements were made with the aid of micrometer and are given in mm. Figures were drawn with the aid of a camera lucida, Photographs of the specimens are given in the plates. All scales in photographs are in millimeter.

SYSTEMATIC LIST OF SPONGES OF ANDAMAN AND NICOBAR SLANDS

Phylum PORIFERA Grant,1836
Class DEMOSPONGIAE Sollas, 1885
Subclass TETRACTINOMORPHA Levi, 1953
Order SPIROPHORIDA Bergquist and Hogg, 1969
Family TETILLIDAE Sollas, 1886
Genus ***Cinachyra*** Sollas, 1886

1 *Cinachyra arabica* (Carter, 1869)
2. *Cinachyra australiensis* (Carter, 1886)

Genus ***Paratetilla*** Dendy, 1905

3. *Paratetilla bucca* (Selenka, 1867)

Genus ***Tetilla*** Schmidt, 1868

4. *Tetilla dactyloidea* (Carter, 1869)

Order ASTROPHORIDA Sollas, 1888
Family ANCORINIDAE Schmidt, 1870
Genus ***Ecionemia*** Bowerbank, 1864

5. *Ecionemia acervus* Bowerbank, 1864

Genus ***Rhabdastrella*** Thiele, 1903

6. *Rhabdastrella globostellata* (Carter, 1883) n. Comb.

Genus ***Stelletta*** Schmidt, 1862

7. *Stelletta clavosa* Ridley, 1884
8. *Stelletta purpurea* (Ridley, 1884)
9. *Stelletta validissima,* Thiele, 1898

Family GEODIIDAE Gray, 1867
Genus ***Erylus*** Gray, 1867

10. *Erylus lendenfeldi* Sollas, 1888

Family PACHASTRELLIDAE Carter, 1875
Genus ***Poecillastra*** Sollas, 1888

*11. *Poecillastra eccentrica* Dendy and Burton, 1926
12. *Poecillastra tenuilaminaris* Sollas, 1888

Genus ***Thenea*** Gray, 1867

*13. *Thenea andamanensis* Dendy and Burton, 1926

Order HADROMERIDA Topsent, 1894
Family CLIONIDAE D'Orbigny, 1851
Genus ***Cliona*** Grant, 1826

**14. *Cliona ensifera* Sollas, 1878
*15. *Cliona kempi* Annandale, 1915
**16. *Cliona lobata* Hancock, 1849
**17. *Cliona mucronata* Sollas, 1878
**18. *Cliona quadrata* Hancock, 1849
**19. *Cliona vastifica* Hancock, 1849

Genus ***Cliothosa*** Topsent, 1905

**20. *Cliothosa hancocki* (Topsent, 1888)

Family SPIRASTRELLIDAE Ridley & Dendy, 1886
Genus ***Spirastrella*** Schmidt, 1868

**21 *Spirastrella inconstans* (Dendy, 1887)
***22. *Spirastrella andamanensis* sp. nov.

Family TETHYIDAE Gray, 1848

Genus ***Tethya*** Lamarck, 1814

**23. *Tethya diploderma* (Schmidt, 1870)

24. *Tethya repens* (Schmidt, 1870)

**25. *Tethya robusta* (Bowerbank, 1858)

Order LITHISTIDA Schmidt, 1870

Family THEONELLIDAE Lendenfeld, 1903

Genus ***Discodermia*** du Bocage, 1870

*26. *Discodermia gorgonoides* Burton, 1928

27. *Discodermia papillata* Carter, 1880

Genus ***Theonella*** Gray, 1868

28. *Theonella swinhoei* Gray, 1868

Family DESMANTHIDAE Topsent, 1893

Genus ***Petromica*** Topsent, 1898

29. *Petromica massalis* Dendy, 1905

Subclass CERACTINOMORPHA Levi, 1953

Order POECILOSCLERIDA Topsent, 1928

Suborder MICROCIONINA Hajdu, van Soest & Hooper, 1994

Family MICROCIONIDAE Carter, 1875

Genus ***Clathria*** Schmidt, 1862

Subgenus ***Clathria (Microciona)*** Bowerbank, 1862

30. *Clathria (Microciona) atrasanguinea* (Bowerbank, 1862)

Subgenus ***Clathria (Thalysias)*** Duchassaing & Michelotti, 1864

31. *Clathria (Thalysias) vulpina* (Lamarck, 1814)

Family RASPAILIIDAE Hentschel, 1923

Subfamily ECHINODICTYINAE Hooper and Van Soest, 2002

Genus ***Echinodictyum*** Ridley, 1881

32. *Echinodictyum asperum* Ridley & Dendy, 1886

Subfamily RASPAILIINIAE Nardo, 1833

Genus ***Raspailia*** Nardo, 1833

Subgenus ***Raspailia (Raspailia)*** Nardo, 1833

33. *Raspailia (Raspailia) typica* Nardo, 1833

Family RHABDEREMIIDAE Topsent, 1928
Genus ***Rhabderemia*** Topsent, 1890

34. *Rhabderemia prolifera* Annandale, 1915

Suborder MYXILLINA Hajdu, van Soest & Hooper, 1994
Family HYMEDESMIIDAE Topsent, 1928
Genus ***Kirkpatrickia*** Topsent, 1912

*35. *Kirkpatrickia spiculophila* Burton and Rao, 1932

Family MYXILLIDAE Dendy,1922
Genus ***Psammochela*** Dendy, 1916

36. *Psammochela elegans* Dendy, 1916

Genus ***Damiriopsis*** Burton, 1928

*37. *Damiriopsis brondstedi* Burton, 1928

Family IOTROCHOTIDAE Dendy, 1922
Genus ***Iotrochota*** Ridley, 1884

38. *Iotrochota baculifera* Ridley, 1884

Family CRAMBEIDAE Levi, 1963
Genus ***Monanchora*** Carter, 1883

*39. *Monanchora enigmatica* Burton & Rao, 1932 n.comb.

Family TEDANIIDAE Ridley & Dendy, 1886
Genus ***Tedania*** Gray, 1867
Subgenus ***Tedania (Tedania)*** Gray, 1867

40. *Tedania (Tedania) anhelans* (Lieberkuhn, 1859)

Suborder MYCALINA Hajdu, van Soest & Hooper, 1994
Family DESMACELLIDAE Ridley & Dendy, 1886
Genus ***Biemna*** Gray, 1867

41. *Biemna liposigma* Burton, 1928

Family MYCALIDAE Lundbeck, 1905
Genus ***Mycale*** Gray, 1867

**42. *Mycale (Mycale) crassissima* Dendy, 1905
43. *Mycale (Mycale) indica* (Carter, 1887)

Order HALICHONDRIDA Gray,1867
Family AXINELLIDAE Carter, 1875
Genus ***Auletta*** Schmidt, 1870

***44. *Auletta andamanensis* sp. nov.

Genus ***Axinella*** Schmidt, 1862

**45. *Axinella tenuidigitata* Dendy, 1905
***46. *Axinella acanthelloides* sp. nov.

Family Bubaridae Topsent, 1894
Genus ***Bubaris*** Gray, 1867

*47. *Bubaris columnata* Burton, 1928

Family HALICHONDRIIDAE Gray, 1867
Genus ***Amorphinopsis*** Carter, 1886

**48. *Amorphinopsis foetida* (Dendy, 1889) n. comb.

Genus ***Spongosorites*** Topsent, 1896

49. *Spongosorites halichondrioides* (Dendy, 1905) n. comb.
***50. *Spongosorites andamanensis* sp. nov.

Order HAPLOSCLERIDA Topsent, 1928
Suborder HAPLOSCLERINA Topsent, 1928
Family CHALINIDAE Gray, 1867
Genus ***Haliclona*** Grant, 1836
Subgenus ***Haliclona (Gellius)*** Gray, 1867

51. *Haliclona (Gellius) flagellifer* Ridley & Dendy, 1886 n.com
*52. *Haliclona (Gellius) megastoma* Burton, 1928 n.comb.

Family NIPHATIDAE van Soest, 1980
Genus ***Gelliodes*** Ridley, 1884

53. *Gelliodes fibulatus* (Carter, 1881)

Family PHLOEODICTYIDAE Carter, 1882
Genus ***Calyx*** Vosmaer, 1885

*54. *Calyx clavata* Burton, 1928

Family PETROSIIDAE van Soest, 1980
Genus *Xestospongia* de Laubenfels, 1932

**55. *Xestospongia testudinaria* (Lamarck, 1815)

Order DICTYOCERATIDA Minchin, 1900
Family THORECTIDAE Bergquist, 1978
Subfamily PHYLLOSPONGIINAE Bergquist, Sorokin and Karuso, 1999
Genus ***Phyllospongia*** Ehlers, 1870

**56. *Phyllospongia foliascens* (Pallas, 1766)

Class CALCAREA Bowerbank, 1864
Subclass CALCINIA Bidder, 1898
Order CLATHRINIDA Hartman, 1958
Family CLATHRINIDAE Minchin, 1900
Genus ***Clathrina*** Gray, 1867

**57. *Clathrina coriacea* (Montagu, 1818)

Family LEUCETTIDAE de Laubenfels, 1936
Genus ***Pericharax*** Polejaeff, 1883

58. *Pericharax heteroraphis* Polejaeff, 1883.

Class HEXACTINELLIDA Schmidt, 1870
Subclass AMPHIDISCOPHORA Schulze, 1886
Order AMPHIDISCOSIDA Schrammen, 1924
Family HYALONEMATIDAE Gray, 1857
Genus ***Hyalonema*** Gray, 1832

59. *Hyalonema aculeatum* Schulze, 1894
60. *Hyalonema affine* Marshall, 1875
61. *Hyalonema indicum* Schulze, 1894
**62. *Hyalonema lamella* Schulze, 1900
**63. *Hyalonema martabanense* Schulze, 1900
64. *Hyalonema masoni* Schulze, 1894
**65. *Hyalonema rapa* Schulze, 1900

Genus ***Lophophysema*** Schulze, 1900

*66. *Lophophysema inflatum* Schulze, 1900

Family PHERONEMATIDAE Gray, 1870
Genus ***Pheronema*** Leidy, 1868

67. *Pheronema raphanus* Schulze, 1894

Genus ***Semperella*** Gray, 1868

*68. *Semperella cucumis* Schulze, 1894

Subclass HEXASTEROPHORA Schulze, 1886
Order HEXACTINOSIDA Schrammen, 1903
Family APHROCALLISTIDAE Gray, 1867
Genus ***Aphrocallistes*** Gray, 1858

69. *Aphrocallistes beatrix* Gray, 1858
70. *Aphrocallistes bocagei* Wright, 1870
71 *Aphrocallistes ramosus* Schulze, 1886

Family TRETODICTYIDAE Schulze, 1886
Genus ***Hexactinella*** Carter, 1885

*72. *Hexactinella minor* Dendy & Burton, 1926

Order LISSACINOSIDA Zittel, 1877
Family EUPLECTELLIDAE Gray, 1867
Subfamily EUPLECTELLINAE Schulze, 1886
Genus ***Euplectella*** Owen, 1841

*73. *Euplectella regalis* Schulze, 1900
74. *Euplectella simplex* Schulze, 1895

Family ROSSELLIDAE Schulze, 1885
Subfamily LANUGINELLINAE Schulze, 1897
Genus ***Lophocalyx*** Schulze, 1887

*75. *Lophocalyx spinosa* Schulze, 1900

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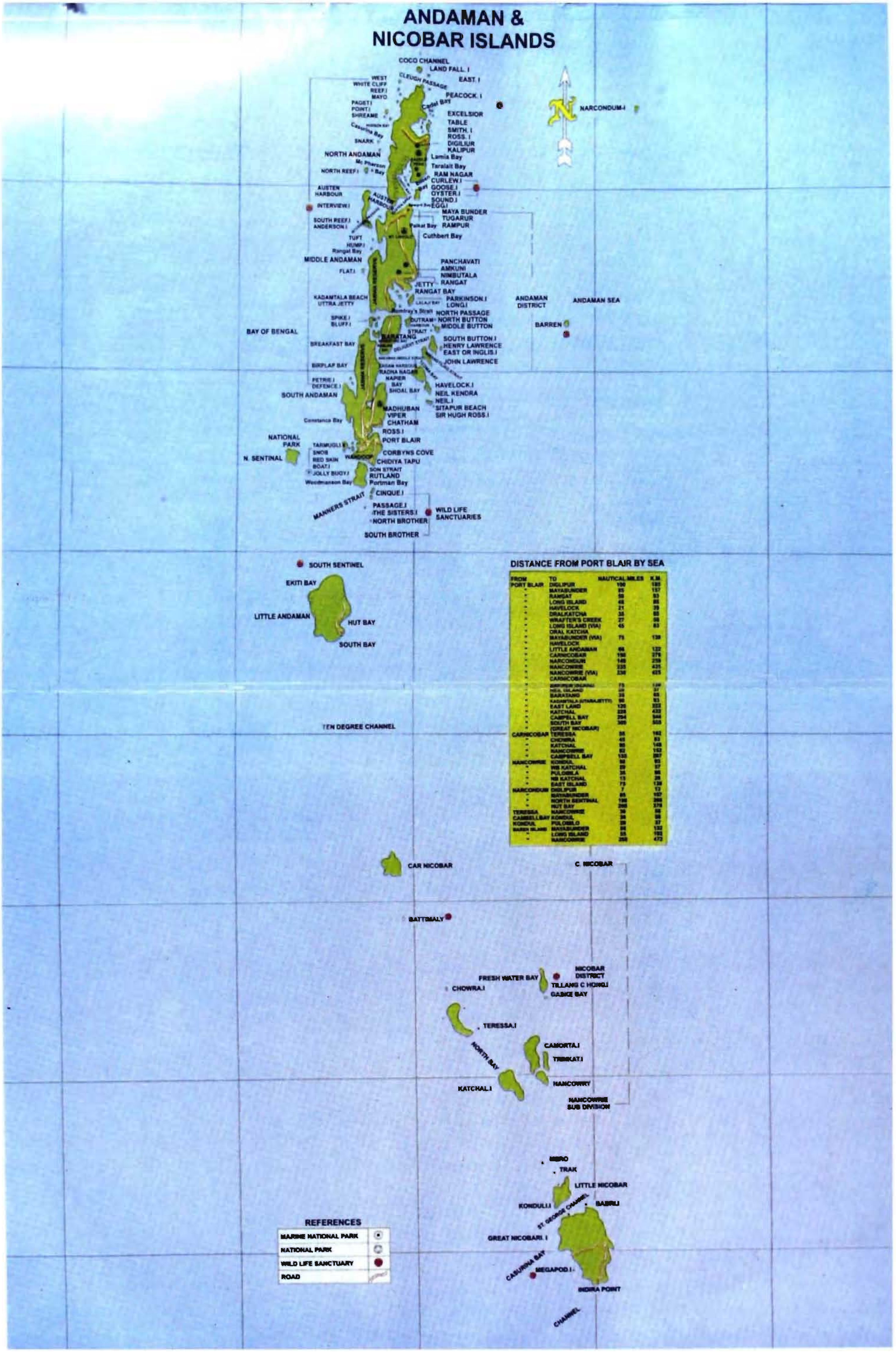
* *Endemic Species*

** *New Locality Records*

*** *New Species*



ANDAMAN &
NICOBAR ISLANDS
COCO CHANNEL
LAND FALL. I
EAST. I
PEACOCK. I
NARCONDUM-I
EXCELSIOR
TABLE
SMITH. I
ROSS. I
DIGILIUR
KALIPUR
Lamia Bay
NORTH ANDAMAN
NORTH REEF.I
Taralait Bay
RAM NAGAR
CURLEW.I
GOOSE.I
OYSTER.I
SOUND.I
EGG.I
AUSTEN HARBOUR
INTERVIEW.I
MAYA BUNDER
TUGARUR
RAMPUR
SOUTH REEF.I
ANDERSON.I
Cuthbert Bay
TUFT
HUMP.I
Rangat Bay
MIDDLE ANDAMAN
FLAT.I
PANCHAVATI
AMKUNI
NIMBUTALA
RANGAT
JETTY
RANGAT BAY
KADAMTALA BEACH
UTTRA JETTY
PARKINSON.I
LONG.I
ANDAMAN DISTRICT
ANDAMAN SEA
NORTH PASSAGE
NORTH BUTTON
MIDDLE BUTTON
SPIKE.I
BLUFF.I
BARREN
BAY OF BENGAL
BREAKFAST BAY
BARATANG
SOUTH BUTTON.I
HENRY LAWRENCE
EAST OR INGLIS.I
JOHN LAWRENCE
BIRPLAF BAY
RADHA NAGAR
NAPIER BAY
HAVELOCK.I
PETRIE.I
DEFENCE.I
SHOAL BAY
NEIL KENDRA
NEIL.I
SOUTH ANDAMAN
SITAPUR BEACH
SIR HUGH ROSS.I
MADHUBAN
VIPER
CHATHAM
Constance Bay
ROSS.I
PORT BLAIR
NATIONAL PARK
TARMUGLI
SNOB
RED SKIN
BOAT.I
JOLLY BUOY.I
N. SENTINAL
CORBYNS COVE
CHIDIYA TAPU
WANDOOR
RUTLAND
Portman Bay
Woodmanson Bay
CINQUE.I
MANNERS STRAIT
PASSAGE.I
THE SISTERS.I
NORTH BROTHER
SOUTH BROTHER
WILD LIFE SANCTUARIES
SOUTH SENTINEL
EKITI BAY
LITTLE ANDAMAN
HUT BAY
SOUTH BAY
TEN DEGREE CHANNEL
DISTANCE FROM PORT BLAIR BY SEA
FROM TO NAUTICAL MILES K.M
CAR NICOBAR
C. NICOBAR
BATTIMALY
NICOBAR DISTRICT
FRESH WATER BAY
CHOWRA.I
GABKE BAY
TERESSA.I
CAMORTA.I
NORTH BAY
TRINKAT.I
KATCHAL.I
NANCOWRY
NANCOWRIE SUB DIVISION
MERO
TRAK
LITTLE NICOBAR
KONDUL.I
ST. GEORGE CHANNEL
BABRIJ
GREAT NICOBAR. I
CASURINA BAY
MEGAPOD.I
INDIRA POINT
CHANNEL
REFERENCES
MARINE NATIONAL PARK
NATIONAL PARK
WILD LIFE SANCTUARY
ROAD

TAXONOMIC ACCOUNT

Phylum PORIFERA Grant, 1836

Diagnosis : Aquatic, sedentary, filter feeding Metazoa with a cellular grade of construction, without organs, mouth or nervous tissue, with a body permeated with pores, canals and chambers and involving a unidirectional water current through the body propelled by random beating of flagella occurring on a single layer of flagellated cells called choanocytes.

Body isolated from external environment by a perforated epithelium, one cell thick, the pinacoderm; incurrent opening ostia small and numerous, excurrent opening oscula large and few; internal epithelium with choanocytes called choanoderm; both pinacoderm and choanoderm differing from other metazoan epithelia by the absence of basement membrane and presence of mesohyle containing some mobile cells and some skeletal material.

Skeleton - made up mainly of spicules of silica or calcite and spongin fibres laid down around the spicules or parts thereof so that the skeleton held together in a reticulum, a set of plumose fibres, or as dense tracts of spongin and spicules. Fine collagen fibrils occur in the mesohyle of all sponges.

Key to classes of PORIFERA

1a. Mineral skeleton is composed entirely of calcium carbonate ..... CALCAREA.

1b. Mineral skeleton is not composed of calcium carbonate 2

2a. Siliceous mineral skeleton composed largely of hexactinal spicules ..... HEXACTINELLIDA.

2b. Siliceous mineral skeleton composed of spicules other than hexactinal gspicules and/ or spongin fibres ..... DEMOSPONGIAE.

Class DEMOSPONGIAE Sollas, 1885

Diagnosis : Comprising of about 95% (Hooper, 1996a) of all existing sponges and almost all the most familiar examples of the phylum Porifera; marine or freshwater, with a skeleton composed of spongin fibers alone or together with siliceous spicules in which megascleres monaxonid or tetraxonid and microscleres of divers type; a few species lack skeletal elements except for fibrillar collagen.

Canal system is of leuconoid type with flagellated chambers mostly small, spherical or hemispherical in shape but occasionally elongate and branched.

Size ranges from encrustations spreading several centimeters to huge cake-shaped masses of several meters across; shape encrusting, branching, lobate, spherical, tubuliform and bizarre forms.

A sexual reproduction by regeneration, reduction bodies or gemmules; sexual reproduction either oviparous or viviparous. Development by paranchymula in general but in few species by amphiblastula larva.

Key to subclasses of DEMOSPONGIAE

1a. Microscleres not clearly distinguished from megascleres ..... HOMOSCLEROMORPHA

1b. Microscleres clearly distinguished from megascleres 2

2a. Megascleres monaxonid, tetraxonid and microscleres include asterose forms and derivatives ..... TRTRACTINOMORPHA

2b. Megascleres monaxonid only and devoid of asterose miscroscleres ..... CERACTINOMORPHA

Subclass TETRACTINOMORPHA Levi, 1953

Diagnosis : Megascleres tetraxonid and monaxonid occurring together or separately; microscleres astrose or their derivatives, although sigmas and raphides may occur, but cheloid types absent; skeleton of megascleres, organised usually in radial, axial or plumose pattern; shape of these sponges encrusting, massive or branching.

Reproduction typically by oviparity, with eggs being extruded from the parent and development ensuing in seawater, typical larvae parenchymulae, but creeping blastula larvae reported in some genera.

Key to orders of subclass TETRACTINOMORPHA Known from Andaman and Nicobar Islands

1a. Skeleton with desma spicules ..... LITHISTIDA

1b. Skeleton without desma spicules 2

2a. Presence of tetraxonid megascleres 3

2b. Absence of tertaxonid megascleres ..... HADROMERIDA

3a. Presence of microspined sigmaspires microscleres ..... SPIROPHORIDA

3b. Presence of astrose microscleres ..... ASTROPHORIDA

Order SPIROPHORIDA Bergquist and Hogg, 1969

Diagnosis : Tetractinomorpha in which megascleres triaenes and oxeas, microscleres contorted sigmas termed as sigmaspires; megascleres arranged in radial pattern and consequently spherical in form; shape spherical.

Family TETILLIDAE Sollas, 1886

Diagnosis : Sponges with a perfect radial skeleton and consequent near spherical form, often referred to as 'golf ball sponges', megascleres oxeas and triaenes arranged in a radiate pattern, protriaenes amorphic for the family, often protruding from the surface of the sponge, microscleres contorted sigmaspires with minute spines.

Key to genera of family TETILLIDAE Known from Andaman and Nicobar Islands

1a. Root-tuft of long, silky spicules present ..... ***Tetilla***

1b. Root-tuft absent 2

2a. Orthotriaenes megascleres present ..... ***Paratetilla***

2b. Orthotriaenes megascleres absent ..... ***Cinachyra***

Genus *Cinachyra* Sollas, 1886

1886. *Cinachyra* Sollas, p. 183

Diagnosis : Megascleres triaenes other than orthotriaenes and oxeàs, microscleres microxeas and sigmaspires, with flask-shaped procalices and with specialised cortex reinforced by special oxeas.

Type species : *Cinachyra barbata* Sollas, 1886.

Distribution : Cosmopolitan.

Key to species of genus *Cinachyra* Known from Andaman and Nicobar Islands

1a. Presence of long, thin microxeas ..... *C. australiensis*

1b. Absence of microxeas ..... *C. arabica.*

1. *Cinachyra arabica* (Carter, 1869) (Fig. 1 a-d; Plate 1 A)

1869. *Tethea arabica* Carter, p. 15, pl. I, figs. 1-8, pl. ii, figs. 19 & 20.

1888. *Tetilla arabica* Sollas, p. 42.

1932. *Cinachyra arabica* Burton & Rao, p. 326.

Material examined : P3431/1, two ex., Camorta Island, Nicobars, Shore collection, 13.12.1921, Coll. R.I.M.S. "Investigator"; P3432/1, one ex., Andamans, Stn. 648, North and West of Fehendu Island, Hors burg Atoll, shore collection, 21.10.1923, Coll. R.I.M.S. "Investigator; P3433/1, one ex., Port Blair, Andamans, 04.12.1889, Coll. G.H. Booley.

Description : Spherical, 20-32 mm diameter, attached with substratum with broad base,tough, incompressible, surface hispid due to projection of protriaenes and anatriaenes; Colour–light gray in spirit, Oscules–inconspicuous, small, scattered all over surface.

Skeleton–Protriaenes, anatriaenes, oxeas radially arranged, reach upto surface; microxeas absent; sigmaspires distributed throughout sponge.

Megascleres–(1) Protriaenes, shaft 2.2-3.1 mm long, 0.015-0.018 mm wide; clads0.03-0.08 mm long; (2) Anatriaenes 2.8-3.5mm long, 0.01-0.015 mm wide; Clads 0.04 mm, chord 0.075 mm maximum long; (3) Oxeas slightly curved 1.5-3.2 mm long, 0.012-0.042 mm wide.

Microscleres–Sigmaspires only, size of chord 0.012 mm.

Distribution : In India : Andaman and Nicobar Islands and Krusadai Island.

Elsewhere : North East coast of Arabia (Carter, 1869

Remarks : This species differs from *C. australiensis* in the absence of microxeas; Burton and Rao (1932) recorded it from Andaman and Nicobars and Krusadai Island of Indian region but no detailed description was given. The present study incorporates detailed morphological structures of Andaman specimens.

2. ***Cinachyra australiensis*** (Carter, 1886)
(Fig. 2 a-e; Plate I B)

1932. *Cinachyra australiensis* Burton and Rao, p. 326, Burton, 1934, p. 523; Lévi, 1961a, p. 129; 1961b, p. 510; George & George, 1987, p. 225.

1886. *Tethya cranium* var. *australiensis* Carter, p. 127.

1888. *Tetilla australiensis* Sollas, p. 43.

Material examined : P3444/1, one ex., Andamans, 02.01.1887, Coll. R.I.M.S. "Investigator"

Description : Spherical, 31-44 mm diameter, attached to substratum by broad base; surface hispid, silt accumulated on surface; consistency fleshy; colour – pale yellow in spirit; oscules – inconspicuous, small scattered all over body.

Skeleton – Ectosomal skeletal framework radial, protriaenes and anatriaenes project out of surface considerably; oxeas radiate from center and diverge just beneath surface; microscleres microxeas and sigmaspires abundant

Megascleres – (1) Protriaenes with stout clads projecsting out of surface, shaft 1.8-2.8 mm long. 0.012-0.015 mm wide, clads 0.05-0.11 mm long, maximum width 0.015 mm. (2) Anatriaenes long and slender, shaft 1.7-3.2 mm long, 0.006-0.007 mm wide, clads sharp, recurved, 0.04 mm; chord 0.85 mm. (3) Oxeas slightly curved, 1.2-3.5 mm long, 0.010-0.045 mm wide.

Microscleres – (1) Microxeas slightly curved and sharply pointed average 0.2 mm long, 0.004mm wide. (2) Sigmaspires microspined, chord 0.02 mm.

Distribution : In India : Andamans, Ganjam coast, Gulf of Mannar and Palk Bay.

Elsewhere : Port Phillip Heads, South Australia (Carter, 1886). Great Barrier Reef (Burton, 1934); Zamboanga, Philippines (Levi, 1961b); Vietnam (Levi, 1961a); Bodgaya Island (Sabah: Malaysia) and Palau Sipadan (George & George, 1987).

Remarks : This species differs from *C. arabica* in the presence of long, thin microxeas scattered throughout the choanosome. Burton and Rao (1932) recorded this species from Andamans without detailed description. The present observation is the second record from Andamans.

Genus ***Paratetilla*** Dendy, 1905

1905. *Paratetilla* Dendy, p. 97.

Diagnosis : Tetillidae with a special layer of modified triaenes, orthotriaenes, at the junction of ectosome and endosome, without cortex and with porocalices.

Type species : *Tethya merguiensis* Carter, 1883.

Distribution : Indian Ocean.

3. ***Paratetilla bacca*** (Selenka, 1867)
(Fig. 3 a-f; Plate I C)

1867. *Stelletta bucca* Selenka, p. 569, figs 14-15.

1897. *Paratetilla bacca* Lindgren, p. 485; Dendy, 1905, p. 97; Dendy, 1921, p. 21; Kumar, 1925, p. 217; Burton and Rao, 1932, p. 325; Thomas, 1980a, p. 16; Thomas, 1985, p. 342, pl. VII, fig. 22.

Material examined : P3434/1, two ex., Port Blair, Andamans, 29.11.1888, Coll. R.I.M.S. "Investigator"

Description : Spherical, 18-26 mm diameter, attached to rocky substratum by a broad base, surface hispid; consistency fleshy; Colour – light brown in spirit; Oscule – inconspicuous, small scattered all over body. Skeleton – Bundles of spicules radiate from center and project through the surface; oxeas, anatriaenes, protriaenes, orthotriaenes form skeleton, sigmaspires abundant, no loose spicule lying between the radial bundles.

Megascleres - (1) Orthotriaenes, shaft short 0.15-0.32 mm long, 0.020-0.023 mm wide; clads 0.37-0.42 mm long, 0.014 - 0.017 mm wide, (2) Protriaenes, shaft 3.02 –3.28 mm long, 0.009 –0.015 mm wide; clads 0.06 – 0.12 mm, (3) Anatriaenes, shaft 3.2 –4.5 mm long, 0.005 mm wide, chord 0.05 mm gradually tapers, extremely thin at end. (4) Oxeas, 2.2-3.35 mm long, and 0.02-0.03 mm wide mostly straight, some slightly curved.

Microscleres – (1) Microxeas 0.18-0.25 mm long, 0.002 mm wide. (2) Sigmaspires 'c' or's' shaped, uniformly granulated, chord length 0.018-0.021 mm.

Distribution : In India : Andamans; Ramnad dist., Tamilnadu; Gulf of mannar and Palk Bay; Minicoy Island.

Elsewhere : Gasper straits, Java Sea (Lindgren, 1897); Mergui Archipelago (Burton & Rao, 1932); Indonesia (ZMA database)

Remarks : Burton and Rao (1932) recorded this species from the Andamans. Subsequently Thomas (1980) reported it from the Minicoy Island and Thomas (1985) reported it from the Gulf of Mannar and Palk Bay. This is the second record of this species from Andaman and Nicobar Islands with detailed description of the Andaman specimens.

Genus ***Tetilla*** Schmidt, 1868

1868. *Tetilla* Schmidt, p. 40

Diagnosis : Tetillidae with a root-tuft of long, silky spicules at the lower end of the sponge for anchoring into sandy substratum; megascleres oxeas, protriaenes, anatrianes; microscleres contorted sigmas; without cortex, porocalices and unusual accessory megascleres.

Type species : *Tetilla euplocamos* Schmidt, 1868

Distribution : Atlantic Ocean and Indian Ocean.

4. ***Tetilla dactyloidea*** (Carter, 1869)
(Fig. 4 a-d; Plate I D)

1869. *Tethya dactyloidea* Carter, p. 15

1888. *Tetilla dactyloidea* Sollas, p. 45; Carter, 1887. p. 79; Dendy, 1916a, p. 102;

1932. Burton and Rao, p. 326.

1915c. *Tetilla dactyloidea* var. *lingua* Annandale, p. 53.

Material examined : P3436/1, one ex., Port Blair, Andamans, 4.12.1889, Coll. G.H.Booley; P 3437/1, two ex., Andamans, 9.12.1896, Coll. R.I.M.S. "Investigator"

Description : Subcylindrical, 18-21 mm long, 7-10 mm diameter; surface smooth, porous; a long root tuft at lower end of spongebody; consistency soft, compressible; colour – light gray in spirit; Oscules – terminal, single, at upper extremity, 2 mm diameter.

Skeleton – Principal fibres of skeleton radiate from a 'nucleus' in a downward direction to lower extremity to form a root-tuft; skeleton composed of mainly oxeas along with protriaenes and anatriaenes, stigmata microscleres less in number scattered throughout body.

Megascleres – (1) Oxeas long, slender, 0.35-0.85 mm long and 0.007-0.012 mm wide, (2) Protriaenes with very slender shaft, hair-like cladi of unequal length, shaft 1.45-1.75 mm long, 0.002-0.004 mm wide and clads 0.015-0.026 mm long, (3) Anatriaenes seem to form principal constituents of descending fibres both inside sponge and in root-tuft; shafts very long, slender hair-like, cladomes unusually well developed with sharp, strongly recurved cladi; shaft 1.50-2.45 mm long, 0.004-0.008 mm wide, clads 0.025-0.035 mm long, 0.002-0.004 mm wide.

Microscleres – Sigmaspires, chord 0.011 – 0.013 mm.

Distribution : In India : Andamans; Chilka lagoon, Orissa; Mahim estuary, Maharastra; Okha Mandal, Gujarat.

Elsewhere : S. E. Coast of Arabia (Carter, 1869); King Island, Mergui Archipelago, Burma (Carter, 1887).

Remarks : Burton and Rao (1932) recorded this species from the Andamans, Annandale (1915) recorded the species *T. dactyloidea* var *lingua* from the brackish water of Chilka Lake, Orissa which was termed by Dendy (1916) as *T. dactyloidea* and he recorded this species from Okha Mandal, Gujarat. The present report is the second record of the species *T. dactyloidea* from Andaman and Nicobar Islands.

Order ASTROPHORIDA Sollas, 1888

Diagnosis : Megascleres tetractines, frequently triaenes, calthrops or short-shafted triaenes, together with oxeas, microscleres aster, sometimes accompanied by microxeas and rod-shaped microrhabds spicules; skeletal framework radially arranged at least peripherally and in large sponges the spicule orientation becomes confused towards center of the body; in some families a series of genera lost either tetractinal megascleres or microscleres or both, leaving only oxeote spicules but radial skeletal organization remains and generally coarse texture permit recognition of these forms as astrophorids

Key to families of order ASTROPHORIDA Known from Andaman and Nicobar Islands

1a. Presence of calthrops megascleres ..... PACHASTRELLIDAE

1b. Absence of calthrops megascleres 2

2a. Sterrasters microscleres present ..... GEODIIDAE

2b. Sterrasters microscleres absent ..... ANCORINIDAE

Family **Ancorinidae** Schmidt, 1870

Diagnosis : Megascleres long-shafted triaenes of various types and oxeas; microscleres eusters and microrhabds; sterrasters and amphiasters microscleres absent; shafts of triaenes directed towards interior and clads near surface; generally encrusting to massive.

Distribution : Cosmopolitan.

Key to genera of family ANCORINIDAE Known from Andaman and Nicobar Islands

1a. Microscleres asters only ..... ***Stelletta***

1b. Microscleres asters, raphides or microrhabds 2

2a. Microscleres microstrongyle and euasters ..... ***Ecionemia***

2b. Microscleres spherasters, oxyasters and raphides ..... ***Rhabdastrella***

Genus ***Ecionemia*** Bowerbank, 1864

1864. *Ecionemia* Bowerbank, p. 173.

Diagnosis : Megascleres triaenes and oxeas of different sets, microscleres microstrongyle and euasters, ectosome well developed.

Type species : *Ecionemia acervus* Bowerbank, 1864.

5. ***Ecionemia acervus*** Bowerbank, 1864
(Fig. 5 a–i; Plate I E)

1864. *Ecionemia acervus* Bowerbank, p. 173, Thomas, 1985, p. 334, pl. VII, fig.6.

1887. *Stelletta bacillifera* Carter, p. 78, pl. vi, fig.9-14.

1905. *Ecionemia carteri* Dendy, p. 59, pl. 1, fig. 5, pl. 3, fig. 1; Burton and Rao, 1932, p. 318.

1924. *Ancorina novae-zealandiae* Dendy, p. 301, pl. viii, fig. 8-15 b.

1937. *Ecionemia bacillifera* Burton, p. 5, pl. 1,fig. 2.

1965. *Ancorina acervus* Bergquist, p. 191, fig. 31 a, b; Bergquist, 1968, p. 38.

Material examined : P3438/1, two ex., Port Blair Andamans, 18.12.1975, Coll. J. Anderson; P3439/1, one ex., Nankauri Harbour, Reef off Naval point, Nicobars, 21.12.1922, Coll. R.I.M.S. "Investigator"; P3440/1, two exs., N.E. side of Spitful Bay near Leader point (coral and mud flat), 7.11.1922, Coll. R.I.M.S. "Investigator"; P3441/1, two exs., Stn. 630, South of western entrance of Barleigh Rock, shore collection, 3.12.1922, Coll. R.I.M.S. "Investigator"

Description : Small, irregularly spherical body, 7-48 mm diameter, massive, attached to substratum by broad base, foreign objects like silt and sand grains incorporated into body; surface hispid due to presence of projecting spicules; consistency hard, incompressible; oscules in groups of 3-8 and located in shallow depressions of 1-3 mm diameter; pores minute 0.5-0.8 mm diameter; Colour – dark to whitish gray in spirit and dry, Cortex about 0.2-0.3 mm thick, deeply pigmented; clads of triaenes arranged at various levels in cortex.

Skeleton – Ectosomal skeletal arrangement radial, consisting of closely packed bundles of oxeas and triaenes, clads of triaenes arranged in various levels in cortex, choanosomal skeleton radial with orthotriaenes, anatriaenes, protriaenes. Oxeas; microxeas, misrostrongyles, strongylaster euaster microscleres scattered; choanosomal sponging clear of detritus and other foreign bodies.

Megascleres – (1) Orthotriaenes, with shaft conical, straight; shaft 0.015-0.045 mm wide; each clad 0.065-0.185 mm long, 0.012-0.045 mm, (2) Anatriaenes, shaft 0.8-2.5 mm long, 0.008-0.018 mm wide diameter of cladom 0.042-0.058 mm across, (3) Protriaenes, shaft 2.5-2.7 mm long, 0.014-0.017 mm wide, each clad 0.04-0.08 mm long, 0.008-0.010 mm wide, (4) Oxeas, amphioxea, 1.8-2.4 mm long, 0.007-0.015 mm wide.

Microscleres – (1) Microxeas, straight or slightly curved, 0.2-0.3 mm long, 0.002-0.003 mm wide at center, (2) Microstrongyles straight with bulged central portion and minutely granulated, 0.015-0.022 mm long, 0.001-0.002 mm wide, (3) Strongylaster euaster, 6-9 rays, diameter 0.012-0.018 mm.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar and Palk Bay, Kilakarai; Minicoy Island.

Elsewhere : Western Pacific Ocean (Bowerbank, 1862), King Island, Mergui Archipelago (Carter, 1887), Coast of Ceylon (Dendy, 1905), Palau Archipelago (Bergquist, 1965), New-Zeland (Bergquist, 1968).

Remarks : Bowerbank (1862) first described the species as *Ecionemia acervus* from the western Pacific; Burton and Rao (1932) reported this species from Andaman and Nicobar

Islands as *E. carteri;* whereas subsequently Thomas (1985) synonimised it as *E. acervus* and recorded from the Gulf of Mannar and Palk Bay. The present author has examined several examples of specimens collected from both Andamans and Nicobar Islands and found the skeletal structures same as that of *E. acervus* Bowerbank (1862).

Genus ***Rhabdastrella*** Thiele, 1903

1903. *Rhabdastrella* Thiele, p. 934.

Diagnosis : Megascleres oxeas and triaenes and microscleres spherasters, oxyasters and raphides.

Type species : *Coppatias distinctus* Thiele, 1900.

Distribution : Indian Ocean.

6. ***Rhabdastrella globostellata*** (Carter, 1883) n. Comb.
(Fig. 6 a-h; Plate I F)

1883. *Stelletta globostellata* Carter, p. 353, pl. 14, figs. 5a-h.

1888. *Aurora globostellata* Sollas, p. 187; Dragnewitsch, 1906, p. 440; Burton and Rao, 1932, p. 317; Thomas, 1976a, p. 459; Thomas, p. 336.

1916b. *Aurora providentiae* Dendy, p. 246, pl. XLVI, fig. 2; Thomas, 1985, p. 337.

Material examined : P3476/1, one ex., Aberdeen reef, Andamans, 24.02.1921. Coll. S.W.Kemp.

Description : Dry fragments of a large sponge, 24 mm long and 18 mm wide, irregular in shape, surface reticulate and inner surface showing sieve-like group of vents; consistently hard; oscules – in groups and located in basin-like depressions, pores scattered, diameter about 0.5 mm; cortex well developed and densely packed with spherasters.

Skeleton – Ectosomal skeletal framework radial peripherally by loosely scattered spicules; choanosomal skeletal architecture confused, consisting of orthotriaenes, of which shafts directed interior, clads towards surface; oxeas accompanied by scattered spherasters, oxyasters and raphides microscleres.

Megascleres – (1) Orthotriaenes with clads at right angles with shaft, shaft 0.355-1.050 mm long, 0.017-0.042 mm wide; clads 0.05-0.125 mm long, 0.015-0.033 mm wide; (2) Oxeas, amphioxea, 0.45-1.30 mm long, 0.005-0.035 mm wide.

Microscleres – (1) Spherasters with small centrum, rays 1/3 of total diameter, diameter 0.02-0.08 mm, (2) Oxyasters with 4-10 slender rays with rough surface, centrum very small, diameter 0.015-0.075 mm, (3) Raphides slender, straight to slightly curved, hair-like, 0.015-0.195 mm long.

Distribution : In India : Aberdeen reef, Andamans; Gulf of Mannar and Palk Bay.

Elsewhere : Singapore (Dragnewitsch, 1906), Indonesia (ZMA database).

Remarks : Carter (1883) first described this species as *Stelletta globostellata*; Sollas (1888) palced it under the genus *Aurora* due to presence of spherasters, oxyasters and raphides as microscleres; Dendy (1916) described the species *Aurora providentiae* from Andaman and Nicobar Islands, which was synonymised with *Aurora globostellata* Sollas, 1888 by Burton and Rao (1932) due to their similarities. Presently the genus *Aurora* is synonymies with the genus *Rhabdastrella* (Hooper and Van Soest, 2002). In view of this present species is recognized as *Rhabdastrella globostellata* (Carter, 1883) as new combination.

Genus ***Stelletta*** Schmidt, 1862

1862. *Stelletta* Schmidt, p. 64, pl. iv.

Diagnosis : Microscleres euasters of oxyasters, chiasters and tylasters and magascleres triaenes and oxeas.

Type species : *Stelletta grubii* Schmidt, 1862.

Distribution : Cosmopolitan.

Key to species of genus *Stelletta* Known from Andaman and Nicobar Islands

1a. Orthotriaenes megascleres present ..... *S. purpurea*

1b. Orthotriaenes megascleres absent 2

2a. Protriaenes megascleres present ..... *S. validissima*

2b. Protriaenes megascleres absent ..... *S. clavosa*

7. ***Stelletta clavosa*** Ridley, 1884
(Fig. 7 a-f; Plate II A)

1884. *Stelletta clavosa* Ridley, p. 474, pl. xiii, fig.1; Dendy and Burton, 1926, p. 246, Burton and Rao, 1932, p. 311.

1888. *Myriastra clavosa* Sollas, p. 115; Lindgren, 1897, p. 485; Dendy, 1905, p. 72; Wilson, 1925, p. 387; Brondsted, 1934, p. 5; Thomas, 1985, p. 336, fig. 9.

1888. *Myriastra clavosa* var. *quadrata* Sollas, p. 116, pl. xii, figs. 34-43, pl xiv, figs. 29-30.

Material examined : P 3442/1, two ex., off Cinque Island, Andamans, 915 m, 08.12.1887, coll. R.I.M.S. "Investigator"; 9114/6, one ex., Andamans (surf line), Feb. 1888, coll. Marine Survey.

Description : Spherical, small, 6-11 mm diameter, solitary, surface rough to touch; colour – grayish brown in spirit; oscules – terminal, circular and with a distinct rim, 1 mm diameter.

Skeleton – composed of triaenes, oxeas in bundles arranged radially.

Megascleres – (1) Dichotriaenes, shaft straight, taper to sharply pointed end, 2.5-3.5 mm long, 0.03-0.04 mm wide, protocladome 0.07-0.1 mm across, deuterocladome 0.25-0.3 mm across, (2) Anatriaenes, shaft 2.5-3 mm long, 0.002-0.003 mm wide, tapering to end, distal half very thin, each clad 0.04-0.06 mm long, (3) Oxeas, amphioxea, 2.5-3.5 mm long, 0.015-0.030 mm wide; cortical oxeas 0.03-0.4 mm long, 0.008-0.009 mm wide.

Microscleres – Tylaster euaster, diameter 0.008-0.10 mm.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar.

Elsewhere : Indo-Pacific region (Ridley, 1884), Singapore (Lindgren, 1897), Ceylon (Dendy,1950), Philippines (Wilson, 1925), Mergui Archipelago, Kabusa Island (Burton and Rao, 1932), Vietnam and Indonesia (Brondsted, 1934).

Remarks : The present species was first described as *Stelletta clavosa* by Ridley (1884) and Dendy and Burton (1926) reported the species from the Andaman sea.

8. ***Stelletta purpurea*** Ridley, 1884
(Fig. 8 a-f; Plate II B)

1884. *Stelletta purpurea* Ridley, p. 473, pl. XL, fig. e, pl. XLIII, fig. j, p; Burton 1926, p. 14; Burton and Rao, 1932, p. 310; Burton, 1937, p. 4, pl. 1, fig. 1.

1886. *Pilochrota purpurea* Sollas, p. 190.

1924. *Myriastra biformis* Brondsted, p. 437, fig. 1,a-e.

1954. *Myriastra purpurea* de Laubenfels, p. 239, fig. 164, a-d; Bergquist, 1961, p. 201, fig. 19a, b; Thomas, 1985, p. 336, pl.VII, fig. 8.

Material Examined : P3443/1, five ex., Camorta Island (coral reef on Eastern side), Nicobars, shore collection, 10.01.1922, Coll. Marine Survey.

Description : Small, spherical, 5-12 mm diameter, with centrally placed circular vent at apex, surface hispid; consistency hard, incompressible; oscules – slit-like, protected by a sphincter, 1-2 mm diameter; colour – pale yellow to a purplish brown in spirit.

Skeleton - Consists of oxeas, orthotriaenes, anatriaenes in bundles arranged radially.

Megascleres – (1) Orthotriaenes, shaft straight, sharply pointed end, 0.35-1.30 mm long, 0.015-0.045 mm wide, each clad 0.05-0.15 mm long, 0.015-0.035 mm wide. (2) Anatriaenes, shaft straight or curved, tapering to pointed end, 0.35-1.45 mm long, 0.004-0.20 mm wide, and each clad 0.015-0.50 mm long. (3) Oxeas, amphioxea, 0.12-1.35 mm long, 0.01-0.03 mm wide, Cortical oxeas, 0.25-0.35 mm long.

Microscleres – Tylaster euasters with 6-10 slightly granulated rays, swollen at end, diameter 0.009-0.014 mm.

Distribution : In India : Gulf of Mannar and Palk Bay; Kilakarai, Ramnad Dist.; Nicobars; Tuticorin Pearl Oyster Banks.

Elsewhere : Indo-Pacific region (Ridley, 1884), New Zealand (Brondsted, 1924), South Africa (Burton, 1926), Preparis Island, Burma (Burton & Rao, 1932), West Central Pacific (de Laubenfels, 1954), Chatham Island, New Zealand (Bergquist, 1961), Brazil (Mothes and Moraes, 1985).

Remarks : This species was first recorded from the Nicobars by Burton and Rao (1932), whereas the present material was collected in 1922 from the shore of these Islands. Mention is to be made here that Thomas (1985) recorded this species from the Gulf of Mannar and Palk Bay as *Myriastra purpurea.* The present species differs from *S. clavosa* and *S. validissima* by the presence of orthotriaenes megasscleres.

9. ***Stelletta validissima*** Thiele, 1898
(Fig. 9 a-h; Plate II C)

1898. *Stelletta validissima* Thiele, p. 13; Burton and Rao, 1932, p. 310.

1926. *Stelletta trichotridena* Dendy and Burton, p. 241.

Meterial examined : P 3477/1, four ex., Andamans, 496 m, 02.01.1887, coll. R.I.M.S. "Investigator"; P 3445/1, five exs., Invisible bank, Andamans, 12.04.1888, coll. R.I.M.S. "Investigator"

Description : Spherical and sub-spherical, diameter 15-27 mm, surface characteristically harsh to touch but not visibly hispid; texture compact, hard; colour – pale grayish in spirit. Cortex – ecotosome about 1.7 mm thick, composed of thin fibrous layer; choanosome containing large sphincter canals arranged more or less radially; Oscules – inconspicuous, present throughout body.

Skeleton – dense bundles of triaenes and oxeas radiating from centre to surface; cladoms of triaenes lying at or just beneath surface although slender protriaenes commonly projecting freely; anatriaenes two types, larger stout anatriaenes numerous and thin, hair like anatriaenes or trichotriaenes less in number, with cladomes lying near surface.

Megascleres – (1) Dichotriaenes with very long, straight or slightly curved shaft tapering at apex with construction just beneath cladome, primary cladi short, stout, forwardly directed and secondaries short, conical, sharply pointed; shafts 6-7 mm long 0,05-0.07 mm wide, Cladome 0.4-0.45 mm across, each clad 0.15-o.18 mm long, 0.035-0.50 mm wide. (2) Anatriaenes with stout sharply recurved pointed cladi and slender shafts, tapering very gradually to hair-like fineness, shafts 7.5-8.5 mm long, cladome 0.075-o.125 mm across. (3) Small anatriaenes with very long, excessively slender shaft and very minute cladome, oonly

about 0.04 mm diameter or even smaller, sometimes reduced to minute knob. (4) Protriaenes with long, slender shaft, tapering gradually to finely pointed extremity and three short, forwardly directed cladi; shaft 4.5-5.5 mm long, 0.015-0.018 mm wide, each clad 0.06-0.09 mm long. (5) Oxeas straight or nearly so, gradually and sharply pointed at each end, 4.5-5.5 mm long and 0.005-0.007 mm wide.

Microscleres – (1) Strongylasters, characteristic of dermal membrane, abundant with 10-12 short truncated rays, diameter about 0.006 mm. (2) Spheroxyasters with distinct centrum and minutely rounded sharply pointed rays, diameter about 0.02 mm, found near junction of outer and inner layer of ectoso .. (3) Oxyasters without centrum, with comparatively few, fairly long, slender tapering sharply pointed rays, diameter upto 0.015 mm, occurring in inner portion of ectosome and choanosome, but not abundant.

Distribution : In India : Andamans..

Elsewhere : Pacific Ocean (Thiele, 1898); Arabean sea, Lat. 16°40' N. Long. 74°22'E (Dendy & Burton, 1926), Indonesia (ZMA database).

Remarks Burton and Rao (1932) recorded *S. validissima* for the first time from Andaman Islands. This is the second record of the species from Andaman region. It is to be mentioned here that Burton and Rao (1932) synonymies *S. trichotriaena* of Dendy and Burton (1926) from Arabian Sea with *S. validissima* of Thiele (1898) by the presence of trichotriaenes in both. The present species shows close resemblance to *S. trichotriaena* Dendy and Burton, 1926 in skeletal structure including trichotriaenes megascleres.

Family GEODIIDAE Gray, 1867

Diagnosis : Astrophorida with long shafted triaenes, oxeas or strongyles as megascleres and sterrasters microscleres always present with occasional presence of euasters microrhabds and sphewrules as microscleres; shape varies from thickly encrusting to massive to shallow-bowl-shaped.

Distribution Cosmopolitan.

Genus ***Erylus*** Gray, 1867

1867. *Erylus* Gray, p. 545

Diagnosis : Megascleres represented by triaenes and oxeas or strongyles; cortex packed with aspidasters and other spicules include microrhabds and euasters and surface always with aspidasters.

Type species : *Stelletta mammillaris* Schmidt.

Distribution : Cosmopolitan.

10. *Erylus lendenfeldi* Sollas, 1888
(Fig. 10 a-e; Plate II D)

1888. *Erylus lendenfeldi* Sollas, p. 239: Dendy, 1916b, p. 257, pl. xlvii, fig. 4; Burton and Rao, 1932, p. 320.

1985. *Erylus carteri*, Thomas p. 341, pl. VII, fig. 20.

Material examined : P3447/1, four ex., Andamans, 24.12.1890, Coll. J. Wood-Mason.

Description : Sponge thickly encrusting on molluscan shell mass, irregular in shape, hard, 42 mm long, 35 mm wide, 24 mm high; Surface even; colour pale yellow in spirit, oscules – scattered, 1-1.5 mm diameter, evenly distributed over surface.

Skeleton – consisting of orthotriaenes, oxeas as structural spicules of endosomal tracts, irregularly arranged; aspidasters, microxeas, strongylaster euaster arranged within the irregularly arranged skeletal framework of megascleres.

Megascleres - (1) Orthotriaenes which are almost calthrops, shaft 0.5-0.65 mm long, 0.008-0.026 mm wide, each clad 0.12-0.15 mm long. (2) Oxeas, amphioxea, 0.75-0.90 mm long, 0.025-0.03 mm wide.

Microscleres – (1) Aspidasters elliptical, disk-like, size 0.20-0.26 mm long, 0.08-0.11 mm wide, 0.04 mm thick. (2) Microxeas centrotylote. (3) Strongylaster euaster 0.025-0.028 mm diameter.

Distribution : In India : Andamans.

Elsewhere : Indian Ocean (Dendy, 1916b): Indonesia (ZMA database).

Remarks : Burton and Rao (1932) recorded this species from the Andamans; present study includes the detailed description of this species from same region.

Family PACHASTRELLIDAE Carter, 1875

Diagnosis : Megascleres calthrops, short-shafted triaenes and oxeas; microscleres streptasters, spherules and microrhabdi but euasters absent; shapes ranging from encrusting and massive to plate-shaped with ostia and oscula on opposite sides.

Distribution : Cosmopolitan.

Key to genera of family PACHASTRELLIDAE known from Andaman and Nicobar Islands

1a. Tetraxon only a variety of long-shafted triaenes ..... ***Thenea***

1b. Tetraxon either calthrops/short-shafted tetraxons or in combination with long-shafted triaenes ..... ***Poecillastra***

Genus *Poecillastra* Sollas, 1888

1888. *Poecillastra Sollas*, p. 105.

Diagnosis : Megascleres represented by calthrops, oxeas and long-shafted orthotriaenes; microscleres by spirasters and microxeas.

Type species : *Ecionemia compressa* Bowerbank, 1866.

Distribution : Atlantic Ocean and Indo-Pacific.

Key to species of genus *Poecillastra* Known from Andaman and Nicobar Island region

1a. Microxeas absent ..... *P. eccentrica*

1b. Microxeas present ..... *P. tenuilaminaris*

11. *Poecillastra eccentrica* Dendy and Burton, 1926 (Fig. 11 a-l; Plate II E)

1926. *Poecillastra eccentrica* Dendy and Burton, p. 238, fig. 5(a to z)

Material examined : P240/1, Holotype re-examined, one ex., between North and South Sentinal Island, Andamans, 402-439 m, 25.4.1889, Coll. R.I.M.S "Investigator"; P3478/1, one ex., Andamans, 238-458 m, 7.2.1888, Coll. R.I.M.S. "Investigator";

Description : Thin, almost flat plate, 17-43 mm long, 12-25 mm wide, 2-4 mm thick; surface hispid due to projections of ends of large spicules, friable; colour – light gray in spirit, oscules – numerous, small, rounded, closely set, about 0.5 mm diameter, cortex – no cortex but only a thin dermal membrane of gelatinous and transparent.

Skeleton – confused and irregular, large triaenes typically have their cladi at or near surface, calthrops at interior, oxeas directed towards surface singly or in bundles.

Megascleres – (1) Calthrops rays straight or bent variable size, 0.35-1.0 mm long, and 0.045-0.085 mm wide. (2) Triaenes extremely variable is size and form, long or short-shafted ; long-shafted ones smaller, rays often reduced to rounded stumps, sometimes forked, cladi sometimes recurved, shaft 0.95-1.15 mm long, short-shafted ones larger, shaft reduced in length but rays 1.0-1.2 mm long, 0.09-0.15 mm wide. (3) Oxeas measure 3.3-4.5 mm long, 0.05-0.06 mm wide, sharply pointed at each end; some oxeas very slender and very small, 0.45-0.58 mm long, 0.015 mm wide.

Microscleres – (1) Plesiasters with long slender sharply pointed rays, diameter 0.021-0.025 mm. (2) Spirasters smaller with short and numerous rays, size 0.01-0.015 mm long.

Distribution : Recorded from Andamans only.

Remarks : Dendy and Burton (1926) first described the species *P. eccentrica* from Andamans and present report is the second record of the same species from same locality. This species differs from all other congeneric species in absence of the very characteristic microxeas. This species recorded from Andamans only and so far not known from elsewhere.

12. ***Poecillastra tenuilaminaris*** Sollas, 1888
(Fig. 12a-i; Plate III A)

1916b. *Poecillastra tenuilaminaris*, Dendy, p. 245; Dendy and Burton, 1926, 238; Burton and Rao, 1932, p. 309.

Material examined : P3448/1, two ex., Table Island, Andamans 27-64 m, 8.12.1888, Coll. R.I.M.S. "Investigator"; 9945/6, one ex., North Andaman, 10.12.1890, Coll. J. Wood-Mason; P242/1, one ex., 8 miles west of Interview Island, 82-494 m, Coll. R.I.M.S. "Investigator"

Description : Thin lamellar, 15-45 mm long, 12-30 mm wide, 3-4 mm thick; surface hispid; consistency hard but friable; colour – pale white in spirit, oscules – numerous, simple, oval to rounded, diameter 0.5-0.8 mm, cortex – no cortex except the spicular component compact with mesohylum.

Skeleton – uneven with oxeas ; calthrops and triaenes with microscleres microxeas and spirasters lie in the skeletal framework of megascleres.

Megascleres – (1) calthrops rays 0.38-0.55 mm long 0.03-0.04 mm wide, (2) Orthotriaenes, clads projecting forward straight or curved, shaft 0.65-0.95 mm long, 0.03-0.04 mm wide, clads 0.35-0.40 mm long, 0.03-0.04 mm wide, (3) Oxeas, large sharply pointed 3.25-4.5 mm long, 0.6-0.65 mm wide, (4) slender oxeas 1.5-2.5 mm long, 0.015-0.03 mm wide, less in number, (5) Styles, large sharply pointed 1.75-2.25 mm long, 0.07-0.08 mm wide.

Microscleres – (1) Microxeas slightly curved 0.036-.0075 mm long, 0.002-0.004 mm wide, (2)Metasters 0.02-0.03 mm diameter, (3) Spirasters 0.007-0.012 mm long.

Distribution : In India : Andamans.

Elsewhere : Indian Ocean (Dendy, 1916b); Mergui Archipelago, off cape negrais, Burma (Dendy and Burton, 1926; Burton and Rao, 1932); Indonesia (ZMA database).

Remarks : This species was recorded from Andaman by Burton and Rao in 1932 with insufficient description. The present author has studied the same species in detail from the same locality and has given detailed description of the species.

Genus ***Thenea*** Gray, 1867

1867. *Thenea* Gray, p. 508

Diagnosis : Megascleres represented by dichotriaenes, protriaenes, anatriaenes, mesotriaenes

and large oxeas; microscleres represented by microxeas, triacts and streptasters of different from and size.

Type species : *Thenea grayi* Sollas, 1888.

Distribution : Indo-Pacific region, Atlantic and Mediterranean seas.

13. ***Thenea andamanensis*** Dendy and Burton, 1926
(Fig. 13 a-j; Plate III B)

1926. *Thenea andamanensis* Dendy and Burton, p. 235.

Material examined : 239/1, Holotype re-examined, one ex., Stn. 234, Lat. 13°15' 30" North, Long. 93°26' East, Andaman Sea, 911 m, 21.12.1897, Coll. R.I.M.S. "Investigator"

Description : Subspherical, irregular, maximum diameter 30mm, short root tuft columns of spicules, surface hispid but no projection of spicules; colour – light gray in spirit, oscules – at opposite to oral grove region, 1.5-2.0 mm diameter, cortex – no differentiation of body into cortical and endosomal region.

Skeleton - Chief skeletal framework composed of oxeas mainly in deeper layer and triaenes greater number in superficial layer, microxeas, triacts and streptasters abundant in the gaps of main skeleton.

Megascleres – (1) Dichotriaenes with short primary cladi and long, slender pointed secondary cladi; shaft tapering, slender, bluntly pointed apex; cladome 2.2-2.4 mm across, shaft 3.2-5.2 mm long, o.06-0.07 mm wide at base. (2) Protriaenes large, stout; cladi strongly turn forward, sharply pointed, 0.70-0.85 mm long, 0.06-09.08 mm wide; shaft tapering gradually, ends bluntly or may terminate in a large knob, 5.8-6.7 mm long, 0.8-0.9 mm wide. (3) Anatriaenes of two types (a) large anatriaenes with very long, slender, finely pointed cladi, 0.3-0.35 mm long, 0.013-0.015 mm wide and long, slender shaft, 8-10 mm long, (b) small anatriaenes with short, slender, bluntly ended shaft, very small, sharp cladi; shaft 0.5-0.65 mm long, 0.008-0.009 mm wide, cladome 0.05 mm across. (4) Mesotriaenes often reduced to mesodiaenes; large size with shafts 7-8.5 mm long, 0.03-0.035 mm wide and cladi about 0.17 mm long. (5) Oxeas, large stout, sharply pointed, 7-8 mm long, 0.053-0.074 mm wide.

Microscleres - (1) Microxeas, straight or curved or angulate, finely pointed, 0.15-0.16 mm long, 0.005 mm wide. (2) Triacts with long, slender, gradually sharp pointed rays, rays 0.085-0.095 mm long, 0.006 mm wide. (3) Streptasters, very variable in form and size, ranging from large plesiasters with four or five rays, through metasters with six to eight rays to small spirasters with twelve or more rays and about 0.028 mm in maximum diameter.

Distribution : In India : Andamans.

Remarks : This species was first described by Dendy and Burton (1926) from the

Andamans, after which it is not recorded so far from any where in the world. Present study is the restudy of the type specimen.

Order HADROMERIDA Topsent, 1894

Diagnosis : Monaxonid megascleres usually tylostyles subtylostyles or styles organized in a radial pattern and occasionally diactinal types present; microscleres, if present, euasters or streptasters or derivatives thereof; basic architecture redial; radial arrangement of spicules may be only at outer layer with a random arrangement or spicules in interior; peripheral megascleres smaller size assuming a radial disposition at surface, protruding some distance beyond and provide a plushlike surface; spongin moderate to small amounts but never as fibres, thus consistency of these sponges firm but non-elastic; sponges massive, spherical or stipitate form

Distribution : Cosmopolitan.

Key to families of Order HADROMERIDA Known from Andaman and Nicobar Islands

1a. Sponges excavate burrows in shells, corals, limestone or other calcareous material ..... CLIONIDAE

1b. Sponges not excavating burrows 2

2a. Megascleres styles or strongyloxeas ..... TETHYIDAE

2b. Megascleres tylostyles or subtylostyles ..... SPIRASTRELLIDAE

Family CLIONIDAE D'Orbigny, 1851

Diagnosis : Megascleres tylostyles or subtylostyles; microscleres spirasters, microspined oxeas or amphiasters; these sponges excavate burrows in any calcareous material, coralline algae, shells or corals; inhalant and exhalent papillae always present which extend beyond the surface or the substratum and help in feeding, respiration and discharge of waste products; the settled larvae of clionids, following metamorphosis, burrow into a calcareous substratum and dwell in galleries therein for part or throughout their life.

Distribution : Cosmopolitan.

Key to genera of family CLIONIDAE Known from Andaman and Nicobar Islands

1a. Microscleres spirasters ..... ***Cliona***

1b. Microscleres amphiasters and oxyasters ..... ***Thoosa***

Genus *Cliona* Grant, 1826

1826. *Cliona* Grant, p. 78

Diagnosis : Forming low encrustation on rocks, mollusk shells, corals and other calcareous objects. Commonly called "Boring sponge" or "Sulphur sponge", entering into interior of host animals live permanently there; forming extensive burrows and tunnels with raised osculum; skeleton formed of monaxon spicules; sexual reproduction by formation of gametes; development indirect through a larval stage of a compact mass; light yellow in colour but may be green or purple; due to sulphurous odour commonly called as sulphur sponge.

Type species : *Cliona celata* Grant, 1826.

Distribution : Cosmopolitan.

Key to species of genus *Cliona* Known from Andaman and Nicobar Islands

1a. Microscleres present 2

1b. Microscleres absent 5

2a. Oxeas present ..... *C. vastifica*

2b. *Oxeas absent* 3

3a. Mucronate spicules present ..... *C. mucronata*

3b. Mucronate spicules absent 4

4a. Spirasters with spines distributed at random ..... C. *lobata*

4b. Spirasters with spines distributed at angles only ..... *C. ensifera*

5a. Additional swelling near head of tylostyles ..... *C. kempi*

5b. Additional swelling of tylostyles absent ..... *C. quadrata*

14. *Cliona ensifera* sollas, 1878
(Fig. 14 a-e; Plate III C)

1878. *Cliona ensifera* Sollas, p. 54; Thomas, 1972, p. 346, pl.1, Figs 7, 7c; Thomas, 1985, p. 320, pl. VI. fig. 18.

Material examined : ZEV 6421/7, one ex., Port Monat, Andamans, Coll. R.I.M.S. "Investigator"

Description : Boring on coral, chambers of cavities spherical, 2-3 mm in diameter and

inter chamber canal 0.2-0.5 mm diameter; openings through which incurrent and excurrent papillae project out small, 0.5-0.75 mm in diameter; colour – grayish I dry specimen.

Megascleres – (1) Ensiform tylostyles, slightly curved, spherical head, sharply pointed tip, size 0.25-0.35 mm long and 0.01-0.02 mm wide, (2) slender tylostyles slightly curved shaft, sharply pointed tips and globular or trilobed head, 0.2-0.3 mm long, 0.002-0.006 mm wide.

Microscleres – Spirasters with 3-5 bends, sharp pointed spines at angles only; size 0.025-0.040 mm long, 0.001 mm wide.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Widely distributed in Indian Ocean. (Sollas, 1878; Thomas, 1972), Indonesia (ZMA database).

Remarks : This species is differentiated from other species of the genus by the presence of ensiform tylostyles and spirasters with spines distributed at angles only. The present observation is the first record from Andamans.

15. *Cliona kempi* Annandale, 1915
(Fig. 15.a-c)

1915b. *Cliona kempi* Annandale, p. 462, fig. 2; Thomas, 1979, p. 179, Fig. 5, E.

Material examined : Holotype on slide re-examined, ZEV 6956/7, Port Blair, Andamans, 2.3.1907, Coll. S. W. Kemp.

Description : Boring in corals, papillae numerous, small and guarded by upright spicules; spicules spirally arranged at the central part of papillae; chambers cylindrical and branch sparingly; diaphragm with transversely arranged spicules.

Megascleres – tylostyles only, slightly curved, sharply pointed, head subglobular or trilobed, additional swelling near the neck; size 0.127-0.205 mm long, 0.004-0.008 mm wide; head 0.008- 0.012 mm in diameter.

Microscleres – absent.

Distribution : Andamans

Remarks : This species is described for the first time from Andamans by Annandale (1915). This description of species is based on the description of type specimen collected from the Andamans. This is endemic species of Andaman and Nicobar region.

16. *Cliona lobata* Hancock, 1849
(Fig. 16 a-f; Plate III D)

1849. *Cliona lobata* Hancock, p. 341, pl. 12, figs. 4, 8; Burton, 1937, p. 16, pl. 8, fig. 53; Thomas, 1985, p. 318, pl. VI, fig. 14.

Material examined : P3479/1, one ex., Port Blair, Andamans, 28.07.1915, Coll. S. W. Kemp.

Description : Boring on calcareous objects; incurrent papillae 0.3-0.4 mm diameter; excurrent papillae 0.7-1.5 mm diameter; colour – pale brown in spirit.

Skeleton – Tylostyles form main skeleton of linear and reticulate pattern.

Megascleres – Tylostyles with trilobed heads, 0.15-0.58 mm long, 0.004-0.010 mm wide; Oxeas absent.

Microscleres – Spirasters of two types (a) spines distributed throughout body. (b) spines at angles and ends only. Spirasters 0.01-0.07 mm long and 0.002-0.05 mm wide.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Atlantic Ocean (Hancock, 1849), Indonesia (ZMA database).

Remarks : This species differs from other congeneric species by absence of oxeas and mucronate spicule and presence of spirasters with spines randomely distributed. From Indian waters this species is recorded by Burton (1937) from Pamban Bridge area of Gulf of Mannar. Present observation is the first record of the species from Andaman and Nicobar Islands.

17. *Cliona mucronata* Sollas, 1878
(Fig. 17 a-e)

1878. *Cliona mucronata* Sollas, p. 60; Dawydoff, 1952, p. 48; Thomas, 1972, p. 347,pl. 1, figs. 8A-D; Thomas, 1985, p. 320, pl. VI, fig. 19.

Material examined : P 3484/1, specimen on slide, one ex., Port Blair, Andamans, 29.7.1915, Coll. S. W. Kemp.

Description : Boring into corals, irregular cavities inside coral, 2-4 mm diameter; interchamber connection slender, provided with a sphincter formed of mucronate spicules; openings on surface of coral through which incurrent and excurrent papillae protrude out; solitary or in groups and 0.5-1.2 mm diameter; colour – pale yellow in dry.

Megascleres – Tylostyles straight or slightly curved with spherical trilobed head, size 0.15-0.17 mm long and 0.003-0.004 mm thick.

Microscleres – (1) Mucronate spicules with spherical or trilobed heads and shaft end with or without a mucronate, size 0.05-0.08 mm long and 0.006-0.010 mm wide, diameter of head 0.008-0.020 mm. (2) Spherules plenty, size 0.002-0.008 mm diameter.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Vietnam (Dawydoff, 1952); Indonesia (ZMA database).

Remarks : Branches of corals infested with this sponge show a stunted growth. The present observation is the first record of *Cliona mucronata* from Andamans.

18. *Cliona quadrata* Hancock, 1849
(Fig. 18 a & b; Plate III E)

1849. *Cliona quadrata* Hancock, p. 344, pl. 5, fig. 6; Thomas, 1985, p. 319, pl. VI, fig. 15.

1881. *Cliona warreni* Carter, p. 370, pl. 18, fig. 6.

Material examined : P 3449/1, one ex., Port Blair, Andamans, 28.7.1915, Coll. S. W. Kemp.

Description : Boring on hard corals, cavities formed inside the substratum 1-2 mm diameter and rectangular in shape; colour – dark brown of dry specimens.

Megascleres – Tylostyles only, head spherical, short, large and fusiform, 0.3-0.35 mm long, 0.008-0.016 mm wide.

Microscleres – absent.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Mediterranean Sea, South Atlantic (Hancock, 1869), Indonesia (ZMA database)

Remarks : This species generally occurs in calcareous algae and corals. Thomas (1979 & 1985) described this species from Gulf of Mannar. Present observation is the first record of the species from Andamans and Nicobar Islands.

19. *Cliona vastifica* Hancock, 1849
(Fig. 19 a-d; Plate IV A)

1849. *Cliona vastifica* Hancock, p. 342; Thomas, 1972, p. 345, pl. 1, fig. 3, 3A, 3B; Thomas, 1985, p. 318, pl. VI, fig. 13.

Material examined : P 336/1, three ex., Andamans, Coll. H. E. Weskin.

Description : Boring on shells of *Cyprea lynx* Linnaeus , *C. vitellus* Linnaeus (Family : Cypracidae) and *Cymatium nicobaricum* (Receding) (Family : Cumatidae); opening on shells very small from 0.5-1.0 mm in linear pattern on *C. lynx* and *C. vitellus* and an irregular pattern on *Cymatium nicobaricum*; colour – grey in dry specimen. Chambers found inside the shell different in shape and pores 0.5-1.5 mm in diameter and 0.5-2.0 mm apart.

Megascleres : (1) Tylostyles straight and sharply pointed head well developed and spherical, size 0.15-0.25 mm long, 0.001-0.005 mm wide. (2) Oxeas spined and sharply pointed, 0.04-0.15 mm long, 0.001-0.005 mm wide.

Microscleres - Spirasters with 3-6 angulations, spines more prominent at the angular region or granulated throughout or even smooth, size 0.007-0.025 mm long, 0.001-0.002 mm wide.

Distribution : In India : Andamans, Chilka Lagoon, Gulf of Mannar, Minicoy Island, Zuary and Mandovi Estuary.

Elsewhere : Cosmopolitan.

Remarks : This species is widely distributed throughout the world. Its power of salinity tolerance is very high and hence very common in the estuaries also. This species is recorded for the first time from Andaman and Nicobar Islands in the present investigation.

Genus *Cliothosa* Topsent, 1905

1905. *Cliothosa* Topsent, p. 95.

Diagnosis : Excavating sponge of alpha growth form with large tylostyles and generally two types of amphiasters as microscleres; stout, nodulose in the papillae and delicate thin-rayed with terminal branching of the slender rays, in the chambers. The nodulous amphiasters may be absent in some specimens of species. (Hooper and Van Soest, 2002).

Type species : *Thoosa hancocki* Topsent, 1888

Distribution : Cosmopolitan.

20. *Cliothosa hancocki* (Topsent, 1888)
(Fig. 20 a-g; Plate IV B)

1888. *Thoosa hancocki* Topsent, p. 81, pl. 7, fig. 12; Lindgren, 1897, p. 484; Annandale, 1915a, p. 21; Dawydoff, 1952, p. 47; Thomas, 1979, p. 180, fig. 1p.

2002. *Cliothosa hancocki* Hooper and Van Soest, p. 179.

Material examined : P 3498/1, one ex., Port Blair, Andamans, 28.7.1915, Coll. S. W. Kemp.

Description : Sponges boring into coral.

Megascleres – Tylostyles with straight shaft and spherical head, 0.32-0.48 mm long, 0.015-0.022 mm wide.

Microscleres - (1) nodular amphiaster 0.010-0.012 mm long, 0.003-0.004 mm wide, (2) slender amphiaster 0.018-0.030 mm long.

Distribution : In India : Andamans, South eastern coast of India.

Elsewhere : Mediterranean sea, Red sea (Topsent, 1888), Java (Lindgren, 1897), Paulo Condore, Riam, Vietnam (Dawydoff, 1952).

Remarks : This species was recorded from Indian Ocean from the shells of Tridacna but it is a common pest of coral. Present report of the species is the first record from Andaman and Nicobar Islands.

Family SPIRASTRELLIDAE Ridley and Dendy, 1886

Diagnosis : Megascleres tylostyles or subtylostyles, microscleres streptasters usually spirasters, often form a dermal crust; sponges encrusting to massive, lobate or digitate in form.

Distribution : Cosmopolitan.

Genus *Spirastrella* Schmidt, 1868

1868. *Spirastrella* Schmidt, p. 25

Diagnosis : As for the family.

Type species : *Spirastrella cunctatrix* Schmidt,1868.

Distribution : Cosmopolitan

Key to species of genus *Spirastrella* Known from Andaman and Nicobar Islands region

1a. Oscules connected with a riverine system of subdermal canals running straight to base ..... *S. andamanensis* sp. nov.

1b. Riverine system of subdermal canals absent ..... *S. inconstans*

21. *Spirastrella inconstans* (Dendy, 1887)
(Fig. 21 a-h; Plate IV C)

1887. *Suberites inconstans* Dendy, p. 154.

1902. *Spirastrella inconstans* Sollas, p. 216, pl. 14, fig. 3; Levi, 1961b, p. 513; Thomas, 1985, p. 305, pl. V, fig. 23.

Material examined : P3450/1, ten ex., Sta. 615, Spiteful Bay, Nankauri Island, Nicobars, 10.12.1921, Coll. Marine Survey; P3451/1, twenty ex. Andamans, 24.12.1890, Coll. J. Wood mason; P3452/1, three ex., Little Andamans, 19.12.1961, Coll. A. Daniel.

Description : Sponge massive, finger shaped, basal portion attached on coral rocks, surface smooth, size variable small to bigger ones; colour – light brown to grayish white in

spirit, oscules – terminal in digital form, 0.5-13 mm; pores distributed throughout body in massive form.

Skeleton – Tylostyles running vertically up through the interior ending in dermal brushes; fusion of tylostyles give rise to the compact mass in the interior; spirasters less in number, scattered throughout the body.

Megascleres – Tylostyles 0.10-0.65 mm long, 0.004-0.022 mm wide.

Microscleres – Spirasters few in number, 0.006-0.023 mm long and 0.0015-0.0025 mm wide.

Distribution : In India : Andamans, Gulf of Mannar and Palk Bay.

Elsewhere : Pulau Bidang, NE of Penang, 5°30' N (Sollas, 1902), Zamboanga, Philippines (Levi, 1961b), Indonesia (ZMA database).

Remarks : This species was recorded for the first time from Gulf of Mannar and Palk Bay of Indian region by Thomas (1985). Present observation is the first record of the species *S. inconstans* from Andaman and Nicobar Islands.

22. ***Spirastrella andamanensis*** sp. nov.
(Fig. 22 a-d; Plate IV D)

Material examined : P3480/1, Holotype, Mayabandar, North Andamans, 19.01.1992, Coll. G. C. Ghosh.

Description : Sponge massive, subspherical, irregular, leathery consistency with irregular foldings on surface, surface smooth but miutely hispid; 48 mm long, 26 mm wide and 15 mm thick; texture - hard but compressible; colour - whitish gray in spirit; Oscule - many, large, 1.5-4 mm diameter, present at the top, with a riverine system of subdermal canals running straight to base.

Skeleton - Choanosomal skeleton of radially arranged tylotyles, spirasters microscleres densely distributed in dermal region.

Megascleres - Tylostyles slightly curved, 0.18-0.58 mm long, 0.01-0.015 mm wide; head 0.006-0.017 mm.

Microscleres - Spirasters, 0.005-0.035 mm long and 0.0018-0.003 mm wide.

Remarks : This species belong to *Spirastrella* based on its spiculation, choanosomal skeletal structure and dermal skeleton with densely distributed spirasters. *S. cuspidifera* (Lamarck, 1814) has two types of spirasters and *S. pachyspira* Levi, 1963 has four types of spirasters. In *S. florida* Lendenfeld, 1885, *S. punctulata* Ridley, 1884 and *S. aurivilli* Lindgren, 1898 two types of tylostyles are present. Whereas in this species tylostyles and

spirasters are of single type only. This species is close to *S. vagabunda* var. *tubulodigitata* Dendy, 1905 and *S. coccinaea* (Duch & Mich, 1864) because of its skeletal arrangement and spicule structure. However the shape of the body, oscules and tuberous canals of this species separates it from them.

Etymology : This species is named for its type locality, Andamans.

Family TETHYIDAE Gray, 1848

Diagnosis : Megascleres a special type of subtylostyles known as a strongyloxeas or styles; microscleres euasters but in some lacking; tracts of megascleres radiate from the centre of the sponge to the surface verrucosities and a marked thick, fibrous cortex region present; encrusting to massive, spherical in form

Distribution : Widely distributed in tropical and warm -temperate regions.

Genus *Tethya* Lamarck, 1814

1888. *Tethya*, Sollas, p. 427.

Diagnosis : Typical genus of the family Tethyidae; rounded sponge with body surface tuberculate with radiating bundles of monaxon spicules strongyloxeas and several euasters, tylasters with indistinct tylote ends; spongin fibres absent.

Type species : *Tethya lyncurium* Linneaus, 1767

Distribution : Atlantic Ocean, Indo-Pacific region, Red sea.

Key to species of genus *Tethya*
Known from Andaman and Nicobar Isalnds

1a. Megascleres tylostyles ..... *T. repens*

1b. Megascleres strongyloxeas 2

2a. Oxyasters present ..... *T. diploderma*

2b. Oxyasters absent ..... *T. robusta*

23. *Tethya diploderma* Schmidt, 1870
(Fig. 23 a-g; Plate IV E)

1870. *Tethya diploderma* Schmidt, p. 52, pl. 4, fig. 2; Topsent, 1918, p. 563; Brondsted; 1934, p. 5; Burton, 1937, p. 12; pl. 9; Thomas, 1985; p. 331, pl. VII, fig. 2.

1905. *Tethya lyncurium* var.C Dendy, p. 114.

Material examined : P 3453/1, 6 ex., Port Blair, Andamans, 25.9.1889, Coll. G. H. Booley; P 3454/1, one ex., Andamans, Coll. J. Wood Mason; P 3455/1, one ex., Port Blair, Andamans, 4.12.1889, Coll. G.H.Booley; P3456/1, 8 ex., North Andamans, Coll. R.I.M.S. "Investigator";P3457/1, two ex., Camorta Island, Nicobars, 13.12.1921, Marine Survey.

Description : Hemispherical, cylindrical in shape, basal part spreading on rock surface, surface tuberculated, ridges extending over the surface, consistency tough and compressible; colour - pale brown in spirit, Oscules - opens at terminal ends, in groups, very minute, 0.5mm diameter.

Skeleton - Ectosome thin, densely packed, tylasters arranged compactly; choanosome consisting of radiate bundles of strongyloxeas; spherasters and oxyasters present in the flesh.

Megascleres - Strongyloxeas long, straight, base round with other end sharply pointed, 0.5-1.25 mm long, 0.010-0.022 mm wide.

Microscleres - (1) Spherasters with ten or more smooth conical rays, 0.035-0.055 mm diameter, (2) Oxyasters with several conical rays, 0.022-0.035 mm diameter, (3) Tylasters with several tylote rays, 0.013-0.017 mm diameter.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar and Palk Bay.

Elsewhere : Atlantic Ocean (Schmidt, 1870) Red sea (Topsent, 1918), Banda, Indonesia (Brondsted, 1934).

Remarks : The present report is the first record of the species from Andaman and Nicobar Islands.

24. ***Tethya repens*** Schmidt, 1870
(Fig. 24 a-e; Plate V A)

1870. *Tethya repens* Schmidt, p. 51.

1896. *Tethytimea repens* Lendenfeld, p. 164; Thomas, 1985, p. 332, pl. VII, fig. 4.

1924. *Donatia repens* Burton, p. 1036; Dendy & Burton, 1926, p. 247.

Material examined : 3254/9, one ex. Andamans, 238-531 m, 2.1.1887, Coll. R.I.M.S. "Investigator"

Description : Spherical, 1.25 cm diameter, surface hispid, consistency hard and incompressible; colour - light gray in spirit, Oscules - Slit like, less in number; scattered throughout the body, Cortex - well developed thick and densely packed with spherasters.

Skeleton - radial with bundles of tylostyles terminating at the dermal brushes; smaller brushes of tylostyles present in cortex region.

Megascleres - (1) Tylostyles long and slightly curved, 0.35-2.25 mm long, 0.004-0.025 mm wide.

Microscleres - (1) Spherasters with branched or unbranched rays, 0.075-0.285 mm diameter, (2) Strongylaster small with 6-12 rays 0.008-0.015 mm in diameter.

Distribution : In India : Andamans, Gulf of Mannar and Palk Bay.

Elsewhere : Atlantic Ocean (Schmidt, 1870), Mediterranian Sea (Lendenfeld, 1896), Indonesia (ZMA database).

Remarks : Thomas recorded this species from Gulf of Mannar and Palk Bay in the years 1980 and 1985. Dendy and Burton (1926) recorded this species as *Donatia repens* from Andamans. This is the second record from the Andamans.

25. ***Tethya robusta*** Bowerbank, 1858
(Fig. 25 a-e; Plate IV F)

1858. ***Tethya robusta*** Bowerbank, p. 287; Burton, 1937, p. 13, pl. 9, fig. 55; Thomas, 1980a, p. 12, fig. 1,n; Thomas, 1985, p. 330, pl. VII, Fig. 1.

1905. ***Tethya lyncurium*** var. *B*. Dendy, p. 114.

1924. ***Donatia robusta*** Burton, p. 1037. Dendy and Burton, 1926, p. 248.

Material examined : P3485/1, one ex., Andamans, 238-531 m, 2.1.1887, Coll. R.I.M.S. "Investigator"

Description : Spongebody spherical, surface tuberculated, consistency hard but compressible, colour whitish gray in sprit, Oscules - not traceable.

Skeleton - Main skeleton of cortex composed of strongyloxeas bound together by spongin materials; spherasters and strongylaster euasters microscleres scattered in cortex and choanosomal region;

Megascleres - (1) Strongyloxeas abundant, smooth, straight, sharply pointed tips, shaft fusiform with greatest width at middle point; 0.75-1.85 mm long, 0.012-0.020 mm wide.

Microscleres - (1) Spherasters with large centrum and conical rays, diameter 0.05-0.07 mm., (2) Cortical strongylasters small with insignificant centrum, 4-10 rays, 0.010-0.012 mm in diameter; rays with a crown of spines at their extremities, (3) Choanosomal strongylasters 0.015 - 0.020 mm diameter; ays strongylote or oxeote, branched or minutely spined.

Distribution : In India : Andaman and Nicobar Islands, Minicoy Island.

Elsewhere : Malay Archipelago (Dendy & Burton, 1926), Hong Kong (van Soest, 1980), Indonesia (ZMA database).

Remarks : This is the first record of the species from Andaman and Nicobar Islands.

Order LITHISTIDA Schmidt, 1870

Diagnosis : Megascleres chiefly desmas with some other types of spicules; microscleres of various types amphiasters, spirasters, microrhabds, microspined microstrongyles, sigmas and monocrepid discs; in some sponges microscleres absent; branches of desmas interlocked to form an extremely hard stony skeleton.

Distribution : Tropical or warm-temperate waters.

Family THEONELLIDAE Lendenfeld, 1903

Diagnosis : Megascleres tetracrepid or tricrepid desmas and phyllotriaenes, discotriaenes or dichotriaenes as ectosomal spicules, microscleres microxeas, microstrongyles or microrhabds, spirasters or amphiasters; shape massive, cup-shaped, vase-shaped, or cylindrical with a narrow central cavity.

Key to genera of family Theonellidae
Known from Andaman and Nicobar Islands

1a. Discotrianes present ..... ***Discodermia***

1b. Phylotriaenes present ..... ***Theonella***

Genus ***Discodermia*** du Bocage, 1870

Diagnosis : Ectosomal spicules discotriaenes and microscleres microxeas and microstrongyles or microrhabds.

Type species : *Discodermia polydiscus* Bocage, 1869.

Distribution : Indo-Pacific region.

Key to species of genus *Discodermia*
Known from Andaman and Nicobar Islands

1a. Microxeas present ..... *D. papillata*

1b. Microxeas absent ..... *D. gorgonoides*

26. ***Discodermia gorgonoides*** Burton, 1928
(Fig. 26 a-d; Plate V B)

1928. *Discodermia gorgonoides* Burton, p. 109.

Material examined : Holotype re-examined; ZSI Regn. No.281/1, One ex., 8 miles West of Interview Island, Andaman, 83-495 m, coll. R.I.M.S. "Investigator"

Description : A portion of sponge, 2 mm in diameter and 9 mm long, surface with spirally arranged small conical protuberances; Oscules not visible; colour yellow in spirit.

Skeleton - consisting of tetracrepid desmas, bundles of oxeas running through desmas ending just below the surface and not piercing the ectosome, discotriaenes forming a layer at the surface with the edges of individual spicules overlapping.

Megascleres - (1) Oxeas, long, slender, 0.25-0.38 mm long, 0.004-0.005 mm wide, (2) Desmas, tetracrepid with tubercules towards the ends and nearly smooth for the greater part of epactine, each epactine 0.08-0.12 mm long, (3) Discotriaenes, diameter of cladome 0.15-0.18 mm and length of rhabdome 0.08-0.12 mm.

Microscleres - Microstrongyles only, microspined, 0.008-0.012 mm long 0.002 mm wide.

Distribution : In India : Andamans.

Remarks : Burton (1928) first described the species from the Andamans. This species is endemic to Andaman and Nicobar Islands. Present study is the restudy of the type material.

27. ***Discodermia papillata*** Carter, 1880
(Fig. 27 a-f; Plate V C)

1880. *Discodermia papillata* Carter, p. 146, pl. vii, fig. 48; Sollas, 1888, p. 330; Lendenfeld, 1903, p. 131; Burton and Rao, 1932, p. 305; Thomas, 1985, p. 344, pl. VIII, fig. 4.

Material examined : P3486/1, one ex., Andamans, 29.2.1888, R.I.M.S. "Investigator"

Description : Sponge massive, irregular, surface smooth; Colour - pale white in spirit. Skeleton - Discotriaenes arranged in the dermal part with their shafts pointing inwards radially; beneath this layer desmas form a compact reticulation with the interlocking of their branches.

Megascleres - (1) Discotriaenes, diameter 0.20-0.25 mm, and shaft 0.10-0.12 mm long, 0.025-0.030 mm wide, (2) Tetracrepid desmas with wart-like tubercles, size 0.26-0.34 mm, arms 0.012-0.025 mm.

Microscleres - (1) Microstrongyles, microspined, 0.01-0.013 mm long, 0.002 mm wide, (2) Microxeas 0.33-0.35 mm long, 0.02 mm wide.

Distribution : In India : Andamans, Gulf of Mannar.

Elsewhere : Off Cape Negrais, Burma (Burton & Rao, 1932).

Remarks : Burton and Rao (1932) recorded *Discodermia papillata* from the Andamans

for the first time. Subsequently Thomas (1985) reported it from the Gulf of Mannar and Palk Bay from Indian waters. This is the second record of the species from Andaman and Nicobar Islands with detailed description of the Andaman specimens.

Genus ***Theonella*** Gray, 1868

1868. *Theonella* Gray, p. 438.

Diagnosis : Architecture radiate; ectosomal spicules phyllotriaenes and endosomal spicules desmas. Microscleres represented by microstrongyles.

Type species : Theonella swinhoei Gray, 1867.

Distribution : Red Sea, Indo-Pacific region.

28. ***Theonella swinhoei*** Gray, 1868
(Fig. 28 a-e; Plate V D)

1868. *Theonella swinhoei* Gray, p. 556; Carter, 1873, p. 437; Sollas, 1888, p. 284, pls. 29 & 30; Lendenfeld, 1903, p. 126; Wilson, 1925, p. 448; Burton and Rao, 1932, p. 307; Thomas 1985, p. 346, pl. VIII, Fig. 10.

Material examined : P3458/1, 6exs. Nancouri Harbour, Nicobars, 19.12.1922, Coll. R.I.M.S. "Investigator"

Description : Sponge tubular, perpendicular to substratum, raised into irregular tubercles, diameter of tubular body 16-45 mm, surface smooth; colour - greyish white in spirit; Oscules - terminal, 8-10 mm in diameter.

Skeleton - Phyllotriaenes, desmas and strongyles arranged around the axial canal, microscleres microstrongyles; silica deposited in irregular, granular masses around axial canals.

Megascleres - (1) Phyllotriaenes, conical shaft 0.12-0.16 mm long and 0.015-0.019 mm wide, diameter of clads 0.2-0.6 mm, (2) Desmas, ridged tuberculated, 0.5-0.7 mm diameter, (3) Strongyles arranged in bundles, 0.5-0.6 mm long, and 0.007-0.008 mm wide.

Microscleres - (1) Microstrongyles, spiny, cylindrical, 0.025-0.030 mm long, 0.0025-0.0035 mm wide.

Distribution : In India : Andaman and Nicobar Islands, Gulf of Mannar, Krusadai Island.

Elsewhere : Red Sea, Indo-Pacific; Philippines (Wilson, 1925); Indonesia (ZMA database).

Remarks : Burton and Rao (1932) recorded *Theonella swinhoei* for the first time from Nicobars, Krusadai Island and Gulf of Mannar. Thomas (1985) re-reported the species from Gulf of Mannar and Palk Bay. This species was vividly studied by many authors and its

phyllotriaenes and desmas give it a separate entity. This is second record of the species from Nicobars.

Family DESMANTHIDAE Topsent, 1893

Diagnosis : Encrusting, rarely massive in habit; basal skeleton composed of clearly monaxon (or supposedly monaxial) desma of complex branching patternto trider-like morphology, accompanied by oxeas and styles/tylostyles perpendicular to the sponge surface, One genus has large microscleres slightly resembling sanidasters. (Pisera and Levi,2002)

Genus *Petromica* Topsent, 1898

1898. *Petromica* Topsent, : 226

Diagnosis : Desmas monocrepid and other spicules, monaxons collected in fibres, or a mixture of both diaxons and monaxons.

Type species : *Petromica grimaldii* Topsent, 1898.

Distribution : Indian Ocean.

29. *Petromica massalis* Dendy, 1905
(Fig. 29 a & b; Plate V E)

1905. *Petromica massalis* Dendy, p. 104, pl. 4, fig. 5; Burton, 1928, p. 110; Thomas, 1985, p. 304.

Material examined : P 284/1, one ex., 8 miles west of Interview Island, Andamans, Coll. R.I.M.S. "Investigator"

Description Massive, hemispherical, broad base, diameter 6mm, surface hispid, uneven with pores bearing dermal membrane; texture hard and incompressible; colour - light gray; Oscules-inconspicuous.

Skeleton - reticulation of desmas and monaxon spicules; monaxon spicules partly arranged in bundles and end in surface supporting the dermal memberane.

Megascleres - (1) Desmas, monocrepid, 0.56-0.78 mm long, 0.04-0.07 mm wide, (2) Oxeas 0.95-1.15 mm long, 0.028-0.035 mm wide.

Microscleres - absent.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Ceylon (Dendy, 1905).

Remarks : This species was first described by Dendy (1905) from Gulf of Mannar and subsequently by Thomas (1985) from the same locality. Burton (1928) reported this species

from Andamans. The present observation is the restudy and redescription of this species from the Andamans.

Subclass CERACTINOMORPHA Levi, 1953

Diagnosis : Skeleton composed of siliceous spicules and spongin fibre or spongin fibre alone; in some, when both absent, collagen fibrils present in mesohyle, when present megascleres always localised in specific parts of sponge, such as surface or choanosome; microscleres generally sigmoid or chelate, never asterose; spongin always present except one family Halisarcidae; shapes branching, encrusting, massive, lobate, fan-shaped or cuplike; reproduction viviparous, sexual and incubated parenchymula larvae except oviparous order Agelasida and families Petrosiidae, Axinellidae, Desmoxyidae

Key to orders of Subclass CERACTINOMORPHA Known from Andaman and Nicobar Islands

1a. Siliceous spicules absent ..... DICTYOCERATIDA

1b. Siliceous spicules present 2

2a. Microscleres absent and skeletal Structure halichondroid or axial ..... HALICHONDRIDA

2b. Microscleres present and skeletal Structure not halichondroid or Axial 3

3a. Microsclere include chelae ..... POECILOSCLERIDA

3b. Chelae microsclere absent ..... HAPLOSCLERIDA

Order POECILOSCLERIDA Topsent, 1928

Diagnosis : Megascleres monactinal or diactinal or both with many curious structural variations; microscleres basically chelate, sigmoid, or toxiform, with many detailed structural variants, spiny spicules common; skeleton composed of megascleres and spongin varying in amount from an interspicular cement to distinct fibre enclosing spicules; sponges ranging from arborescent to massive or encrusting; deep-sea species may exhibit bizarre forms adapted to live in soft substrates.

Distribution : Occurring in all seas.

Key to suborders of order POECILOSCLERIDA Known from Andaman and Nicobar Islands

1a. Microscleres consisting of sigmancistra ..... MYCALINA

1b. Microscleres never sigmancistra 2

2a. Microscleres palmate chelae and diverse toxas but never sigmas ..... MICROCIONINA

2b. Microscleres tridentate-derived chelae but never toxas ..... MYXILLINA

Suborder MICROCIONINA Hajdu, van Soest and Hooper, 1994

1994. Microcionina Hajdu, van Soest and Hooper, p. 125.

Diagnosis : Ectosomal megascleres terminally microspined and structural megascleres upto 5 categories, most frequently monactinal; microscleres palmate chelae, diverse toxas.

Key to families of suborder MICROCIONINA Known from Andaman and Nicobar Islands

1a. Microscleres absent ..... RASPAILIIDAE

1b. Microscleres present 2

2a. Palmate isochelae present ..... MICROCIONIDAE

2b. Palmate isochelae absent ..... RHABDEREMIIDAE

Family MICROCIONIDAE Carter, 1875

Diagnosis : Megascleres styles or acanthostyles; icroscleres palmate isochelae and toxas; skeleton of megascleres organised into spicule tracts which include variable quantities of spongin and which support echinating acanthostyles; accessory ectosomal spicules also styles, usually thinner than endosomal types; these sponges encrusting, lobate, arborescent, or flabellate in shape.

Distribution : Widely distributed and abundant.

Genus *Clathria* Schmidt, 1862

1862. *Clathria* Schmidt, p. 57

Diagnosis : Megascleres basally spined or smooth subtylostyles and echinating acanthostyles; microscleres palmate isochelae and forcep-shaped or accolada toxas with spinose extremities; body massive, clathrous, erect, arborescent, thinly lamellar or any combination thereof.

Type species : *Clathria compressa* Schmidt, 1862

Key to Subgenera of genus *Clathria* Known from Andaman and Nicobar Islands

1a. Ectosomal skeleton with only one size class of auxiliary subtylostyles ..... ***Microciona***

1b. Ectosomal skeleton with two size class of auxiliary subtylostyles ..... ***Thalysias***

Subgenus ***Microciona*** Bowerbank, 1862

1862. *Microciona* Bowerbank, p. 1109.

1996. *Clathria (Microciona)* Hooper, p. 202.

Definition : Persistently encrusting growth form with hymedesmoid skeletal architecture consisting of a basal layer of spongin, typically with ascending, plumose, non-anastomosing, spongin fibre nodes, and megascleres embedded and erect on basal layer; ectosomal skeleton with only a single undifferentiated category of auxiliary megascleres.

Type species : *Microciona atrasanguinea* Bowerbank, 1862

Distribution : Atlantic Ocean, Indian ocean, Indo-Australian region, Mediterranean sea, Red sea.

30. ***Clathria (Microciona) atrasanguinea*** (Bowerbank, 1862)
(Fig. 30 a-e; Plate V F)

1862. *Microciona atrasanguinea* Bowerbank, p. 824, 1109, 1110, 1135, pl. 30, fig. 1, pl. 74, fig. 2; Burton, 937, p. 30, pl. 4, fig. 24.

1866a. *Scopalina atrosanguinea* Schmidt, p. 149, Schmidt, 1866b, p. 15.

1867. *Microciona atrosanguinea* Gray, p. 535; Carter, 1880, p. 38-41, 151; Burton and Rao, 1932, p. 344-345.

1868. *Scopalina lophyropoda* Schmidt, p. 26, 40.

1880. *Amphilectus atrasanguineus* Vosmaer, p. 115.

1890. *Pluemohalichondria atrasanguinea* Hanitsch, p. 207-208, 210.

1903. *Microciona atrasanguineum* Cuenot, p. 4.

1935. *Cf. Microciona prolifera* Vosmaer, p. 604, 607.

1993. *Clathria (Microciona) atrasanguinea* van Soest, p. 103; Hooper, 1996, p. 219.

Material examined : P3459/1, One ex., North sentinel Island, Andamans, 7.2.1888, Coll. R.I.M.S. "Investigator."

Description : Spongebody thin, encrusting with some elevations, colour - pale brown in spirit; Oscules - minute irregularly distributed.

Skeleton - main skeleton arranged vertically on substratum either singly or in plumose columns.

Megascleres - (1) Subtylostyles of main skeleton smooth 0.3-.5 mm long, 0.01-0.015 mm wide, (2) Acanthostyles spined throughout, 0.15-0.18 mm long, 0.006-0.007 mm wide, (3) Dermal subtylostyles smooth, 0.025-0.028 mm long and 0.003-0.004 mm wide.

Microscleres - (1) Toxas, 0.035-0.095 mm long, (2) Isochelas, chord, 0.006-0.007 mm long.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Caribbean, NE Atlantic, Mediterranean sea, Red sea, Arabian Gulf, W.Indian Ocean, Bay of Bengal.

Remarks : Burton and Rao (1932) recorded this species first time from Andamans as *Microciona atrasanguinea*, but did not give any description. Hooper (1996) revised the family Microcionidae and placed the genus *Microciona* as subgenus of *Clathria.* This account is the restudy and redescription of the species from the Andamans.

Subgenus ***Thalysias*** Duchassaing & Michelotti, 1864

1864. *Thalysias* Duchassaing & Michelotti, p. 82.

1996. *Clathria (Thalysias)* Hooper, p. 280.

Definition : Specialised ectosomal skeleton composed of two size classes of auxiliary (subtylo) styles, with smaller ectosomal spicules usually overlaying large subectosomal ones forming a continuous palisade, or discrete bundles, mainly erect, sometimes paratangential or rarely tangential to surface; choanosomal skeleton without any marked differentiation between axial and extra-axial regions; echinating acanthostyles usually present.

Type species : *Spongia juniperina* Lamarck, 1814, p. 444 (by synonymy).

Distribution : Indian Ocean, Pacific Ocean, Red sea, Indo-Australian region and Antarctica.

31. ***Clathria (Thalysias) vulpina*** (Lamarck, 1814)
(Fig. 31 a-f; Plate VI A)

1814. *Spongia vulpina* Lamarck, p. 449, Lamarck, 1814, p. 376.

1875. *Halichondria fondifera* Bowerbank, pp. 288-289.

1880. *Amphilectus frondifera* Vosmaer, p. 115.

1884. *Rhaphidophlus vulpina* Ridley, p. 615.

1884. *Clathria frondifera* Ridley, pp. 448-449, 612, pl. 42, fig.i, pl. 53, fig.j; Burton, 1937, pp. 27-28, pl. 3, fig. 21; Thomas, 1970, pp. 206-207; text fig. 11; Thomas, 1973b, pp. 33-34, pl. 2, fig. 6, pl. 8, fig. 4. Thomas, 1979b, pp. 26-27, pl. 2, fig. 1.

1884. *Clathria reinwardti* var. *palmata* Ridley, p. 447.

1889. *Clathria corallitincta* Dendy, p. 85, pl. 4, fig. 8; Dendy, 1916a, p. 128; Dendy, 1921, p. 65.

1898. Not *Rhaphidophlus filifer* var. *spinifera* Lindgren, pp. 311-312, pl. 17, fig. 7, pl. 19, fig. 18; Thiele, 1903, 958.

1899. *Rhaphidophlus seriatus* Thiele, p. 14, pl. 1,fig. 6, pl. 5, fig. 7.

1903. *Rhaphidophlus frondifera* Thiele, p. 958, text fig. 23.

1912. *Clathria frondifera* var. *dichela* Hentschel, pp. 360-361.

1912. Not *Clathria nuda* Hentschel, p. 298, 359, 364-365, pl. 19, fig. 28.

1912. Not *Clathria frondifera* var. *major* Hentschel, p. 361.

1920. *Tenacia frondifera* var. *dichela* Hallman, p. 771.

1925. *Clathria frondifera* var. *seto-tubulosa* Wilson, p. 439.

1932. *Tenacia frondifera* Burton and Rao, pp. 337-339; Burton, 1934, p. 559; Levi, 1961b, pp. 521-522, Text figs. 12,13.

1932. *Rhaphidophlus vulpinus* Topsent, p. 110, pl. 5, Fig. 3. cf. *Microciona prolifera* Vosmaer, 1935, p. 609, 629.

1954. *Thalysias frondifera* de Laubenfels, pp. 138-139, text Fig. 88.

1971. *Clathria typical* Vacelet & Vasseur, p. 94.

1976. *Clathria dichela* Vacelet et al., p. 71, pl. 3, fig.b, Vacelet & Vasseur, 77, p. 114.

1984. *Rhaphidophlus dichela* van Soest, p. 115.

1993. *Clathria vulpina* Hooper & Levi, pp. 1246 - 1250, figs. 11-12, table 6; Hooper & Wiedenmayer, 1994, p. 274.

1996. *Clathria (Thalysias) vulpina* Hooper, pp. 397- 405, figs. 206-209, tables 41-42, plate 8F.

Material examined : P3460/1; one ex., Off Cinqui Island, Andamans,07.12.1887, Coll. Dr. Giles; P3461/1, one ex., Andamans, 22.12.1890, Coll. J.Woodmason.

Description : Spongebody massive and clathrous, uneven, largest one 76 mm long, 53 mm wide, 22 mm high, surface - smooth, consistency - hard but brittle, colour - light gray in spirit; oscules - very less in number of irregularly scattered, 0.5-1.0 mm diameter.

Skeleton - composed of irregularly isodictyal network of spongin fibres cored by several lines of smooth styli and echinated by acanthostyles; auxiliary spicules subtylostyles of two sizes, larger occurring interstitially, smaller as dermal skeleton; microscleres chelae and toxons.

Megascleres - (1) Coring styles 0.180-0.3 mm long, 0.01-0.015 mm wide, (2) Interstitial subtylostyles 0.2-0.3 mm long, 0.005-0.008 mm hick, (3) Dermal substylostyles 0.065-0.2 mm long, 0.003-0.008 mm wide (4) Acanthostyles 0.05-0.07 mm long, 0.005 mm thick.

Microscleres - (1) Chelas Isochelas, 0.013-0.016 mm long, (2) Toxa 0.14-0.16 mm long, 0.003-0.005 mm wide.

Distribution : In India : Andamans, Tuticorin, Kilakarai and Palk Bay, Katiawar West Coast of India.

Elsewhere : Widely distributed throughout Indo-West Pacific, Australian region (Hooper, 1996); Mozambique (Thomas, 1979); Madagascar (Vacelet *et al.*, 1971, 1976, 1977; Hooper, 1996); Amirante Is (Ridley & Dendy, 1887); Seychelles Is (Ridley & Dendy, 1887; Thomas, 1979); Aldabra Is (Levi, 1961); Red Sea (Topsent, 1892; Burton, 1959); Sri Lanka (Dendy, 1889, 1916; Lindgren, 1897); Mergui Archipelago and Andaman Is (Burton & Rao, 1932); Straits of Malacca, Malaysia and Gaspar Straits (Bowerbank, 1875); Aru Is, Arafura sea, Java sea and Sulewasi, Indonesia (Thiele, 1889; Lindgren, 1898; Hentschel, 1912; Hooper, 1996); Hon Rai I., Vietnam (Hooper, 1996); Negros orientale, Bohol sea, Mindinao and S. philippines (Wilson, 1925; Levi, 1961; Hooper 1996); Guam, Micronesia (de Laubenfels, 1954); New Caledonia (Hooper and Levi, 1993), Madang, Papua New Guinea (Hooper, 1996).

Remarks : Burton and Rao (1932) recorded this species as *Tenacia frondifera* from the Andamans. Hooper (1996) revised the species and synonymised it with *Clathria (Thalysias) vulpina* (Lamarck, 1814). The present species has the same characters and hence identified as *Clathria (Thalysias) vulpina* (Lamarck, 1814).

Family RASPAILIIDAE Hentschel, 1923

Diagnosis : Megascleres monactinal of small acanthostyles, rhabdostyles or diactinal or both intermixed; microscleres absent; reticulation of spongin fibres axially condensed and enclosed megascleres; radial or plumose fibres extend from axis to surface, where long terminal spicules occur; typical skeleton supplemented by dermal spicule brushes, usually of fine styles grouped around a long central style, and by echinating very small acanthostyles and rhabdostyles; ponges branching and rarely massive in form.

Distribution : Cosmopolitan.

Key to Subfamily of family RASPILIIDAE
Known from Andaman and Nicobar Islands

1a. Choanosomal skeleton with greater or lesser differentiation between axial and extra-axial regions, ectosome with specialized raspailiid skeleton ..... RASPAILIINAE

1b. Choanosomal skeleton regularly reticulate, extra-axial skeleton vestigial or virtually absent, and all but one species lack ectosomal specialization .... ECHINODICTYINAE

Subfamily ECHINODICTYINAE Hooper and Van Soest, 2002

Definition : Raspailiidae with regularly reticulate choanosomal skeletal structure, extra-axial skeleton vestigial or virtually absent, and all but one species lack ectosomal specialisation. Echinating megascleres are microcionid-like club-shaped acanthostyle (Hooper and Van Soest, 2002).

Genus ***Echinodictyum*** Ridley, 1881

1881. *Echinodictyum* Ridley, in Ridley and Duncan, p. 493.

Diagnosis : Skeleton reticulate, megascleres oxeas in fibres accompained by partly projecting styles, fibres echinated by acanthostyles, microscleres absent.

Type species : *Spongia bilamellata* var. *B.* Lamarck, 1816.

Distribution : Indo-Pacific region.

32. ***Echinodictyum asperum*** Ridley and Dendy, 1886
(Fig. 32 a&b; Plate VI B)

1886. *Echinodictyum asperum* Ridley and Dendy, p. 477; Ridley & Dendy, 1887, p. 165, pl. 32, fig. 2; Whitelegge, 1897, pp. 328-329; Topsent, 1897, p. 446, pl. 20, fig. 23; Burton and Rao, 1932, p. 348; Levi, 1961b, p. 524, fig. 15; Desqueyroux-Faundez, 1981 : 757, table II; Hooper, 1984, p. 55; Hooper, 1991, p. 1353, figs. 86, 87, 110 c, table 20.

Material examined : P 3462/1, one ex., Ross Island, Andamans, 25.4.1888, Coll. R.I.M.S. "Investigator"

Description : Branching growth form with a slightly expanded and flattened basal attachment, surface smooth to naked eye but microscopically hispid; texture firm, compressible, brittle; size 55 mm in across and 38 mm in height from base to tip; colour-light brown in spirit, Oscules - very small, scattered throughout the sponge.

Skeleton - No special spiculation in ectosome; dermal skeleton consists of an interconnected network of small fibre bundles of spongin fibres, oxeas and echinated acanthostyles;

choanosomal skeleton consisting of choanosomal fibres irregularly reticulated, containing very less spongin and very few spicules.

Megascleres - (1) Oxeas slightly curved, short and thin, sharply pointed, 0.195-0.435 mm long, 0.008-0.009 mm wide, (2) Acanthostyles heavily echinated, club-shaped, evenly tapering, 0.112-0.125 mm long, 0.008-0.009 mm wide; spines slender, sharply pointed and recurved.

Microscleres - absent.

Distribution : In India : Andamans.

Elsewhere : Widely distributed in Indo-Pacific region, Papiete, Tahiti (Ridley & Dendy, 1886, 1887); Ellice Is. (Whitelegge, 1897), Ambon, Indonesia (Topsent, 1897; Desqueyroux -Faundeze, 1981); Lucap Bay, Philippines (Levi, 1961); North-West Australia (Hooper, 1984, 1991).

Remarks : This species was recorded from Andamans by Burton and Rao (1932) for the first time. The present study contains the detail description of the species from the same locality.

Subfamily RASPAILIINIAE Nardo, 1833

Definition : Raspailiidae with echinating megasclere geometry ranging from microcionid-like club-shaped acanthostyles with small granular or erect spines, to club-shaped with strongly recurved or clavulate spines on the basal and distal ends of spicules, to acanthose rhabdostyles. (Hooper and Van Soest, 2002)

Genus ***Raspailia*** Nardo, 1833

1833. *Raspailia* Nardo, p. 522.

Diagnosis : Typical genus of the family. Ramose sponges with axial condensation; structural spicules styles or subtylostyles and echinating spicules acanthostyles, dermal spicules styles or oxeas typically grouped around one long central spicule.

Type species : *Raspailia typica* Nardo, 1833.

Subgenus ***Raspailia*** Nardo, 1833

1833. Syn *Raspailia* Nardo, p. 522

Raspailia (*Raspailia*) Hooper and Van Soest, 2002

Definition : *Raspailia* with microcionid-like acanthostyles, myxillid-like acanthostyles or thin vestigial acanthostyles. (Hooper and Van Soest, 2002)

33. ***Raspailia (Raspailia) typica*** Nardo, 1833
(Fig. 33 a-e; Plate VI C)

1833. *Raspailia typica* Nardo, p. 522.

1862. *Raspailia viminalis* Schmidt, p. 59; Burton and Rao, 1932, p. 342.

1905. *Raspailia viminalis freyeri* Pick, p. 7, 30, pls. i-iv.

2002. *Raspailia (Raspailia) typica* Hooper and Van Soest, p. 473, fig. 1.

Material examined : P3463/1, One ex., Cinque Island, Andamans, 12.4.1888, Coll. R.I.M.S. "Investigator"; 8921/6, one ex., Cinqui Island, Andamans, 03.12.1887, Coll. Marine Survey.

Description : Branching, vermiform and anastomosing colony with a strongly hispid surface, branches 3 mm thick; colour - pale yelow in spirit; consistency - tough but compressible, Oscules - rare, minute, circular openings on surface, 0.2 mm in diameter.

Skeleton - two parts, axial and extra axial, axial condensation of fibres cored by styles subtylostyles and oxeas and echinated by acanthostyles; extra axial fibres with long styles end in surface brushes forming the surface hispid.

Megascleres - (1) Large styles, 0.425-0.635 mm long, 0.008-0.012 mm wide, (2) small styles very fine, 0.205-0.310 mm long, 0.002-0.005 mm wide, (3) Subtylostyles, 0.615-0.735 mm long, 0.008-0.014 mm wide, (4) Oxeas 0.280-0.525 mm long, 0.006-0.012 mm wide, (5) Acanthostyles 0.035-0.085 mm long, 0.006-0.007 mm wide.

Microscleres - absent.

Distribution : In India : Andamans; Puri Coast, Orissa.

Elsewhere : Adriatic sea (Schmidt, 1862); Bay of Bengal (Burton & Rao, 1932).

Remarks : Burton and Rao (1932) recorded this species first time from Andamans as *Raspailia viminalis* Schmidt, 1862. *Raspailia viminalis* Schmidt, 1862 is synonymised with *Raspailia typica* Nardo, 1833 by Hooper and Van Soest, 2002. The present account is the restudy of the species from the same locality with detailed description.

Family RHABDEREMIIDAE Topsent, 1928

Diagnosis : Encrusting, massive, bulbous or digitate growth forms; skeleton lacking any axial compression, usually plumose or plumo-recticulate, composed of light spongin fibres cored by bouquets of entirely smooth, slightly spined or entirely spined rhabdostyles. Microscleres normal or contort sigmas, microstyles and thraustoxeas (all with/without microspines).

Genus ***Rhabderemia*** Topsent, 1890

1890. *Rhabderemia* Topsent, p. 28.

Diagnosis : Encrusting, massive or lobate-branching forms; choanosomal architecture veries from hymedesmoid, to plumose, to reticulate; spongin fibres typically poorly developed and cored by diverging tracts of rhabdostyles; Rhabdostyles either spined or smooth shafts, or both, and if present spines usually occur at the distal end of the spicules; microscleres smooth or microspined sigmoid spicules (either contort sigmas or true sigmas), microstyles (including both true forms and toxa-like thraustoxeas) and true toxas.

Type species : *Microciona pusilla* Carter, 1876.

Distribution : Indian ocean, Australian region and Red sea.

34. ***Rhabderemia prolifera*** Annandale, 1915
(Fig. 34 a-e)

1915b. *Rhabderemia prolifera* Annandale, p. 464, pl. 34, fig. 3, text fig. 3; Hallman, 1917, p. 399; Thomas,1979b, p. 26, pl. 1, fig. 19; Thomas, 1985, p. 271, pl. III, fig. 13; van Soest & Hooper, 1993, p. 319.

Material examined : ZEV6420/7, Holotype on slide re-examined, Port Monat, Andamans, 29.2.1888, Coll. R.I.M.S. "Investigator"

Description : Sponge encrusting, consistency friable; colour - pale gray in spirit; Osculesless in number and pores scattered throughout body.

Skeleton - Skeletal architecture erect hymedesmoid.

Megascleres - Rhabdostyles, 0.10-0.20 mm long, 0.005-0.008 mm wide.

Microscleres - (1) Microstyles entirely smooth, 0.045-0.05 mm long, 0.001 mm wide, (2) Sigmas contorted, chord 0.008-0.012 mm long, (3) Thraustoxea and true toxa absent.

Distribution : In India : Andamans, Gulf of Mannar and Palk Bay.

Elsewhere : Mozambique channel (Thomas, 1979 b); Indian ocean (Hallman, 1917)

Remarks : Annandale (1915) first described the species from Andamans. This is the restudy and redescription of the type specimen from the Andamans.

Suborder MYXILLINA Hajdu, van Soest & Hooper, 1994.

1993. *Myxillina* Hajdu, van Soest and Hooper, p. 126

Definition : Poecilosclerida with tridentate or polydentate chelae microscleres; palmate chelae absent; toxas absent; sigmas usually present. Differentiated ectosomal and choanosomal megascleres, although either or all may be lost secondarily. Ectosomal megascleres typically

diactinal, commonly with aniso-terminations. Choanosomal megascleres usually styles, rarely oxeas or strongyles (Hooper and Van Soest, 2002).

Key to families of suborder MYXILLINA
Known from Andaman and Nicobar Islands

1a. Onychaetes or birotulas microscleres present 2

1b. Onychaetes or birotulas microscleres absent 3

2a. Microscleres exclusively onychaetes ..... TEDANIIDAE

2b. Microscleres include birotulas ..... IOTROCHOTIDAE

3a. Megascleres consisting of peripheral thinner subtylostyles and choanosomal thicker styles ..... CRAMBEIDAE

3b. Megascleres a combination of diactinal and Monactinal spicules, or entirely absent 4

4a. Chelae anchorate or polydentate ..... MYXILLIDAE

4b. Chelae arcuate or absent ..... HYMEDESMIIDAE

Family HYMEDESMIIDAE Topsent,1928

Definition : Myxillina with smooth ectosomal tornotes (basically diactinal, but may be anisotornotes or styles), a peripheral choanosomal plumose skeleton of bundles of smooth tornotes, a basal skeleton of acanthostyles, singly or in plumose bundles (may be absent), echinating acanthostyles (may be absent). Additional non-echinating acanthostyles or acanthoxeas may occasionally be present. Microscleres include arcuate chelaes and sigmas, but may be absent (Hooper and Van Soest, 2002).

Genus ***Kirkpatrickia*** Topsent, 1912

Diagnosis : Hymesdesmiidae with megascleres styles and tornotes; microscleres absent.

Type species : *Tedania variolosa* Kirkpatrick, 1907

35. ***Kirkpatrickia spiculophila*** Burton and Rao, 1932
(Fig. 35 a,b)

1932. *Kirkpatrickia spiculophila* Burton and Rao, p. 334, pl. XVIII, figs. 5, 5a.

Material examined : P786/1, Holotype re-examined, Port Blair, Andamans, April, 1890, Coll. G.H.Booley.

Description : Spongebody irregular, massive, surface uneven and minutely hispid, colour - greyish yellow in spirit, Oscules - small, scattered throughout the body.

Skeleton - main skeleton of an irregular reticulation of long styles; ectosome pierced by stout dermal brushes of oxeote tornota.

Megascleres - (1) Styles long, smooth, slightly curved, 0.5-0.8 mm long, 0.015-0.021 mm wide, (2) Oxeote tornote 0.3-0.4 mm long, 0.006-0.008 mm wide.

Microscleres - absent

Distribtion : The Andamans.

Remarks : This is an endemic species. Burton and Rao (1932) described the species from the Andamans. The present account is based on the description of type specimen collected from Andamans.

Family MYXILLIDAE Dendy, 1922

Diagnosis : Encrusting, massive, fan-shaped and branching sponges, specialised ectosomal skeleton composed of diactinal tylotes or tornotes with smooth or microspined, slightly swollen bases, arranged as bouquets or lying paratangential or perpendicular to the surface; choanosomal skeleton composed of isotropic; anisotropic or plumose tracts of smooth or partially spined monactinal or diactinal choanosomal megascleres, sometimes echinated by small acanthose styles; spongin development variable, usually consisting of light spongin cementing spicules together at their nodes, but sometimes with heavy fibres; microscleres include anchorate isochelae and/ or derivatives, sometimes together with palmate isochelae, and smooth sigmas, and sometimes forceps.

Key to genera of family MYXILLIDAE Knwon from Andaman and Nicobar Islands

1a. Choanosomal skeleton includes smooth or spined strongyles ..... ***Damiriopsis***

1b. Choanosomal skeleton consists of styles only ..... ***Psammochela***

Genus ***Psammochela*** Dendy, 1916

1916a. *Psammochela* Dendy, p. 126

Diagnosis : Crambeidae with a reticulate skeleton composed of fibres cored by spicules and sand grains also incorporated in plenty; megascleres styles or strongylote styles or both; microscleres anchorate (tridentate) isochelae with vestigial teeth and sigmas.

Type species : *Psammochela elegans* Dendy, 1916.

Distribution : Beyt Island (Type locality) and Andamans.

36. ***Psammochela elegans*** Dendy, 1916
(Fig. 36 a-l; Plate VI D)

1916a. *Psammochela elegans* Dendy, p. 126, pl. i, fig. 6, pl. iii, fig. 22; Burton and Rao, 1932, p. 334, pl. xviii, fig. 7.

Material examined : P3464/1, one ex., off North Coast of Table Island, Andamans, 8.12.1888, Coll. R.I.M.S. "Investigator"

Description : Encrusting, thin, 1 mm thick, surface smooth, irregular; colour - Pale white in spirit, Oscules - very small and scattered.

Skeleton - Main skeleton very irregular reticulation of slender fibres composed of sand grains and megascleres with no visible spongin.

Megascleres - (1) Styles slender, 0.15-0.18 mm long and 0.004-0.005 mm wide.

Microscleres - (1) Tridentate isochelae with stout, curved shaft, 0.018-0.027 mm long, (2) 'C' shaped isochelae strongly curved, with slightly enlarged ends, 0.005-0.010 mm long, (3) large 'C' shaped sigmata & contorted 'S' shaped sigmata with short, strongly recurved, finely pointed ends, 0.030-0.035 mm from bend to bend, (4) small sized sigmata 0.005-0.008 mm in length.

Distribution : In India : Beyt Island, Gujarat and Andamans.

Elsewhere : Mergui Archipelago (Burton & Rao, 1932), Indonesia (ZMA database).

Remarks : This species was first described by Dendy (1916) from Beyt Island, Gujarat. After that Burton and Rao (1932) recorded it from Andamans. The present account is the second record of the species from the Andamans.

Genus ***Damiriopsis*** Burton, 1928

1928. *Damiripsis* Burton, p. 124

Diagnosis : Myxillidae in which the main skeleton consisting of an irregular reticulation of amphistrongyles with minutely roughend heads arranged in a loose manner, not connected with spongin; auxilary spicules present in the form of slender tornota with spined heads; microscleres tridentate and palmate isochelae; special dermal skeleton absent.

Type species : *Damiriopsis brondstedi* Burton, 1928.

Distribution : Indian Ocean.

37. ***Damiriopsis brondstedi*** Burton, 1928
(Fig. 37 a-e; Plate VI E)

1928. *Damiriopsis brondstedi* Burton, p. 124, fig. 6.

Material examined : P310/1, Holotype re-examined., Andamans, 238-531 m, Coll. R.I.M.S. "Investigator"

Description : Small irregularly massive sponge, 1-2 cm long 0.5 cm high; surface minutely hispid by projection of skeletal spicules; sub-dermal cavities visible through dermal membrane; colour - pale greyish in spirit, Oscule - about 1.5 mm in diameter, leading into deep cloacal tubes running vertically downwards to base of sponge.

Skeleton - main skeleton consisting of an irregular reticulation of loosly arranged amphistrongyla lying singly or in bundles of 3 to 6 spicules in choanosome; bundles of tornota mixed with main skeleton without any order.

Megascleres - (1)Amphistrongyles, slightly curved, irregularly angulated, smooth but extreme ends of spicule minutely roughened, 0.75-0.80 mm long, 0.035-0.037 mm wide, (2) Tornote straight, slender, smooth, beset at each end with a crown of small spines, 0.262-0.266 mm long and 0.006 mm wide.

Microscleres - (1) Large isochelae, tridentate, 0.052-0.057 mm long, (2) small isochelae, palmate, 0.030-0.035 mm long.

Distribution : In India : Andamans.

Remarks : This species is endemic to Andamans. Burton first described this species from the Andamans in the year 1928. The present observation is the restudy of the type specimen.

Family IOTROCHOTIDAE Dendy 1922

Diagnosis : Encrusting, massive, fistulate, ramose or flabellate sponges; ectosomal skeleton variously consisting of perpendicular or tangentially arranged tornotes or absent; many genera demonstrate a lack of differentiation of megascleres. Choanosomal skeleton reticulate or hymedesmoid. Choanosomal megascleres styles, strongyles or tylotes, smooth or acanthose. Microscleres birotulas, occasionally also anchorate isochelae and sigmas(Hooper and Van Soest, 2002).

Genus ***Iotrochota*** Ridley, 1884

1884. *Iotrochota* Ridley, p. 433

Diagnosis : Skeleton of well developed reticulation of spicular fibres; megascleres smooth choanosomal styles, or oxeas or strongyles and microscleres peculiar birotulates.

Type species : *Haliclona birotulata* Higgin, 1877.

Distribution : Atlantic Ocean, Red Sea and Indo-Pacific region.

38. ***Iotrochota baculifera*** Ridley, 1884
(Fig. 38 a-c; Plate VI F)

1884. *Iotrochota baculifera* Ridley, p. 435, pl. 39, fig, m; pl. 42, fig. t; Lindgren, 1897, Burton & Rao, 1932, 353; Dawydoff, 1952; Levi, 1961b : 518; Thomas, 1985, p. 235.

Material examined : P 3465/1, two ex. North West side of spiteful Bay near leader Pt., Nicobars, 7.11.1892, Coll. Marine Survey.

Description : Sponge body encrusting, growing on a shell of *Pinna nigra*, surface conulose, texture hard and slightly compressible; colour - black in spirit, Oscule - small, irregularly distributed.

Skeleton - dermal skeleton of tangentially placed spicules and main skeleton of well developed fibres cored by styles; fibres divisible into main and connecting forms.

Megascleres - (1) Styles 0.13-0.15 mm long, 0.003-0.005 mm wide, (2) Strongyles 0.19-0.23 mm long, 0.003 mm wide, some with very feebly developed heads.

Microscleres - (1) Birotulates, abundant, minute, 0.011-0.015 mm long.

Distribution : In India : Andaman and Nicobar Islands.

Elsewhere : Thailand (Burton & Rao, 1932); Vietnam (Dawydoff, 1952); Indonesia (ZMA database); Philippines (Levi, 1961b); Singapore (Lindgren, 1897); Indo-Pacific region (Ridley, 1884).

Remarks : Burton and Rao (1932) recorded the species from Nicobar. Thomas recorded this species from Gulf of Mannar and Palk Bay in 1985, and the present account is the second record of the species from Andaman and Nicobar Islands with a detailed description.

Family CRAMBEIDAE Lévi, 1963

Diagnosis : Encrusting or massive growth forms, ectosomal megascleres consist of smooth subtylostyles, usually standing perpendicular to surface; choanosomal megascleres smooth or acanthose styles-tylostyles forming hymedesmoid, plumose or plumoreticulate skeletal structure; a secondary interlocking desma ("sublithistid") skeleton common; microscleres anchorate or unguiferous isochelae.

Genus ***Monanchora*** Carter, 1883

1883. *Monanchora* Carter, p. 369.

1932. *Ectyobatzella*, Burton and Rao, p. 332.

Definition : Crambeidae without pseudoastrose spicules or desmas; microscleres spatulate or unguiferate anchorate isochaelae (may be absent), reduced sigmoid chelae (may be absent), and spined microxeas (may be absent). In life, the surface characteristic white or yellow – lined veinal channel pattern (Hooper and Van Soest, 2002).

Type species : *Monanchora clathrata* Carter, 1883

39. ***Monanchora enigmatica*** (Burton and Rao, 1932) n. comb.
(Fig. 39 a&b; Plate VII A)

1932. *Ectyobatzella enigmatica* Burton and Rao, p. 332, pl. XVIII, fig. 6.

Material examined : P1170/1, Holotype, re-examined One ex., Nicobar Island, Coll. J. Wood Mason.

Description : Spongebody massive with lobose outgrowth, 28 mm long, 23 mm wide, 14 mm high; surface uneven with some minute conulose, composed of a thin aspiculous dermis overlying cavernous subdermal spaces; colour - light brown in spirit; Oscule - inconspicuous.

Skeleton- An irregular multispicular reticulation of bundles of tornota, bound together with much spongin and echinated by short smooth styli, with wisp - like columns of tornota running more or less vertically from the outer meshes of the main skeleton to the surface.

Megascleres- (1) Tornote strongylote or slightly amphitylote, straight, smooth, 0.160-0.175 mm long, 0.003-0.004 mm wide, (2) Styles smooth, thickest at about the lower third of the spicule length, 0.12-0.125 mm long, 0.005-0.006 mm wide.

Microscleres - absent.

Distribution : Only recorded from the Nicobars.

Remarks : *Monanchora enigmatica* is an endemic species to Nicobars. Burton and Rao (1932) first described the species as *Ectyobatzella enigmatica* from the Nicobars. After that it is not recorded from anywhere else. Presently the genus *Ectyobatzella* is synonymised with the genus *Monanchora* (Hooper and Van Soest, 2002). In view of this present species is recognised as *Monanchora enigmatica* (Burton and Rao, 1932) as a new combination. This account is the restudy and redescription of the type specimen of *Ectyobatzella enigmatica*.

Family TEDANIIDAE Ridley and Dendy, 1886

Diagnosis : Megascleres monactinal or diactinal smooth spicules; microscleres onychaetes, extremely thin, long, oxeote with a roughened surface; endosomal skeleton of megascleres diacts, usually tylotes or strongyles, usually with spined bases; sponges encrusting, massive or digitate in shape.

Distribution : Cosmopolitan.

Genus ***Tedania*** Gray, 1867

1867. *Tedania* Gray, p. 520

Diagnosis : Ectosomal spicules diacts, usually tylotes with microspined heads, endosomal skeleton of styles which in some cases, may be spined; microscleres only onychaetes.

Distribution : Cosmopolitan.

Subgenus ***Tedania*** Gray, 1867

1867. *Tedania* Gray, p. 520

2002. *Tedania (Tedania)* Hooper and Van Soest, p. 629

Diagnosis : Smooth, relatively small styles, occasionally strongylote styles as structural megascleres and microspined tylotes as ectosomal megascleres. (Hooper and Van Soest, 2002).

Type species : *Reniera digitata* Schmidt, 1862, junior synonym of *Halichondria anhelans* Lieberkuhn, 1859.

Distribution : Cosmopolitan.

40. ***Tedania (Tedania) anhelans*** (Lieberkuhn, 1859) (Fig. 40 a-c; Plate VII B)

1859. *Halichondria anhelans* Lieberkuhn, p. 365.

1862. *Reniera nigrescens* Schmidt, p. 74.

1862. *Reniera digitata* Schmidt, p. 75, pl. vii, fig. 11.

1864. *Reniera ambigua* Schmidt, p. 39, pl. iv, fig. 8.

1867. *Tedania digitata* Gray, p. 520.

1867. *Tedania ambigua* Gray, p. 520.

1868. *Reniera muggiana* Schmidt, p. 28.

1887. *Tedania digitata* var. *fibrosa* Ridley and Dendy, p. 51.

1887. *Tedania digitata* var. *bermudensis* Ridley and Dendy, p. 51.

1887. *Tedania nigrescens* Vosmaer, p. 338; Burton & Rao, 1932, p. 353; Burton, 1937, 27, pl. 3, fig. 22.

1888. *Tedania rubicanda* Lendenfeld, p. 190.

1891. *Tedania assabensis* Keller, p. 313, pl. xvi, figs. 11 & 12.

1895. *Tedania grasilis* Lambe, p. 116, pl. ii, fig. 3.

1894. *Tedania brucei* Wilson, p. 320, pls. xix, xx.

1897. *Tedania digitata* var. *vulcani* Lendenfeld, p. 112, pl. x, figs. 117-119.

1906. *Tedania digitata* var. *sansibarensis* Baer, p. 17, pl. i, fig. 2.

1907*Tedania ignis*, Verill p. 339.

1911. *Tedania digitata* var. *inermis* Hentschel, p. 333.

1911. *Tedania digitata* var. *polytyla* Hentschel, p. 333.

1963. *Tedania anhelans* Levi, p. 32, fig. 33; Thomas, 1985, p. 262, pl. III, fig. 1.

2002. *Tedania (Tedania) anhelans* Hooper and Van soest, P. 629, fig. 2A-F.

Material examined : P 3466/1, 4 exs., Sta.8, 27 kms South ast of Cinque Island, Andamans, 5.1.1888, Coll. "R.I.M.S. Investigator"; P 3467/1, one ex., Stn. 657, North side of Rest end of Macpherson straits near Chiriatapu, Andamans, 20.1.1924, Marine Survey.

Description : Sponges attached on stones, 8-24 mm long finger like branched, surface smooth, irregular; consistency soft and fragile; colour - pale white in spirit; Oscule - irregularly distributed, 1-3 mm in diameter.

Skeleton - Dermal part composed of tornotes arranged irregularly and interior part composed of styles and onychaetes arranged in halichondroid pattern.

Megascleres - (1) Styles slightly curved and sharply pointed; 0.17-0.22 mm long, 0.004-0.008 mm wide, (2) Tornotes straight with oblong and minutely spined head, 0.195-0.215 mm long, 0.002-0.005 mm wide.

Microscleres - Onychaetes with unequal ends, 0.095-0.175 mm long.

Distribution : In India : Andamans, Gulf of Mannar and Palk Bay, Mincoy Island.

Elsewhere : Cosmopolitan.

Remarks : This species is essentially polymorphic in form and distributed throughout the world. Due to its variation of spicule orientation, colour and forms different authors described it in different names. Burton and Rao (1932) recorded this species from Andaman and Nicobar Islands as *T. nigrescens*, which is now synonymised with *T. anhelans*. The present species also shows similarities with *T. anhelans*, so it is identified as *T. anhelans*. Presently the genus *Tedania* Gray, 1867 is devided into three subgenera *Tedania (Tedania), Tedania (Tedaniopsis)* and *Tedania (Trachytedania)* and *Tedania anhelans* is placed under the subgenus *Tedania (Tedania)* (Hooper and Van Soest, 2002).

Suborder MYCALINA Hajdu, van Soest & Hooper, 1994

Diagnosis : Poecilosclerida with microscleres consisting of sigmancistra derivatives and megascleres being subtylostyles, with swollen bases and faintly constricted necks (mycalostyles), usually of a single smooth category (never echinating).

Key to families of suborder MYCALINA
Known from Andaman and Nicobar Islands

1a. Microscleres include chelae or derivatives ..... MYCALIDAE

1b. Microscleres include no chelae or derivatives ..... DESMACELLIDAE

Family DESMACELLIDAE Ridley and Dendy, 1886

Diagnosis : Megascleres smooth styles sometimes oxeas or strongyles; microscleres sigmas, microxeas. toxas and sometimes with curious siliceous spheres and 'commas'; skeleton plumoreticulate formed of megascleres provided with small to moderate amounts of spongin, but occasionally showing some axial condensation in stalked, lamellate forms.

Distribution : Cosmopolitan.

Genus ***Biemna*** Gray, 1867

Diagnosis : Plumose or plumo-reticulate choanosomal skeleton, with variable development of spongin fibres cored by styles or subtylostyles of a single size; an erect ectosomal skeleton and often shaggy surface, and microscleres sigmas and raphides, and sometimes microxeas, commata, microstrongyles and spheres but never toxas.

Type species : *Desmacella peachii* Bowerbank, 1866.

Distribution : Indo-Australian region, Red Sea.

41. ***Biemna liposigma*** Burton, 1928
(Fig. 41. a-d; Plate VII.C)

1928. *Biemna liposigma* Burton, p. 720.

Material examined : Holotype re-examined P307/1, One ex., Andamans, 495 m, Coll. R.I.M.S. "Investigator"

Description : Subspherical, 5 mm diameter, surface minutely reticulate appearance but glabrous to touch; texture firm but compressible; colour - pale yellow in spirit, Oscules - several conspicuous, minute, distributed over general surface of sponge.

Skeleton - composed entirely of styli and three types of raphides; large raphides present in bundles of twenty to forty forming conspicuous feature of skeleton in choanosome; raphides either singly or in bundles distributed together with styli throughout whole of choanosome; in dermal memberane regular arrangement of styli and bundles of raphides lying parallel to and just beneath surface as a special dermal skeleton.

Megascleres - (1) Style smooth, slightly curved, 0.5-0.6 mm long, 0.022-0.025 mm wide.

Microscleres - (1) Large rhaphides, smooth, slender and sharply pointed at each end, 0.5 mm long, 0.004 mm wide, (2) Medium raphides, smooth, slender and pointed at each end, 0.082-0.086 mm long, 0.004 mm wide, (3) small rhaphides 0.030-0.035 mm long, 0.015 mm thick.

Distribution : In India : Andamans.

Elsewhere : Indonesia (ZMA database).

Remarks : Burton (1928) described the species from the Andamans for the first time. The present account is the restudy and redescription of the type specimen.

Family MYCALIDAE Lundbeck, 1905

Diagnosis : Megascleres styles or oxeas or subtylostyles; microscleres anisochelas as well as sigmas, toxons, raphides, isochelas and other cheloid variants; as many as seven kinds of microscleres may occur in a single species; skeleton radially arranged plumoreticulate, comprising of megascleres enclosed in moderate amount of spongin; these sponges ranging from encrusting and massive to flabellate, cup-shaped and lobate in form.

Genus *Mycale* Gray, 1867

1867. *Mycale* Gray, p. 533.

Diagnosis : Typical spiculations of styles or subtylostyles arranged in plumose columns in a reticulated pattern; microscleres represented by anisochelas, sigmas and raphides of one or more type.

Subgenus *Mycale* Gray, 1867

1867. *Mycale Gray*, p. 533.

1999. *Mycale (Mycale)* Hajdu, p. 225

Diagnosis : *Mycale* with a confused ectosomal skeleton of tangetially aranged megascleres over subectosomal divergent brushes; toxas absent; occasionally two categories of megascleres found, in which case ectosomal and choanosomal ones may be distinguished by size along (ectosomal slightly smaller), or additionally by a slight distinction in geometry; surface pore-grooves may occur.

Type species : *Hymeniacidon lingua* Bowerbank, 1863.

Key to species of subgenus *Mycale (Mycale)* Known from Andaman and Nicobar Islands

1a. Megascleres styles ..... *M.(M) indica*

1b. Megascleres subtylostyles ..... *M.(M) crassissima*

42. ***Mycale (Mycale) crassissima*** (Dendy, 1905)
(Fig. 42 a-f; Plate VII E)

1905. *Esperella crassissima* Dendy, p. 160, pl. II, fig.6.

1961a. *Mycale crassissima* Levi, p. 134. Thomas,1985, p. 282, pl. IV, Fig. 10.

Material examined : P3487/1, one ex., Port Blair, Andamans, 28.7.1915, Coll. S.W.Kemp.

Description : Cushion-shaped or massive, with finger-shaped branches; consistency hard but compressible, surface reticulated, colour-pale gray in spirit, Oscules - large, irregulary scattered on surface, 3 mm in diameter.

Skeleton - dermal skeleton of loosely scattered tangentially arranged spicules; main skeleton compact, spicules entangled by fibres.

Megascleres - (1) Subtylostyles, 0.45-0.52 mm long, 0.015-0.016 mm wide.

Microscleres - (1) Anisochelas two types, large sized anisochelas 0.050-0.065 mm long and small size anisochelas 0.015-0.019 mm long, (2) Sigmas, chord 0.025-0.035 mm long, (3) Raphides, present in bundles, hair-like 0.020-0.025 mm long.

Distribution : In India : Andamans and Gulf of Mannar.

Elsewhere : Vietnam (Levi, 1961a); Indonesia (ZMA database).

Remarks : Presently the genus *Mycale* Gray, 1867 is devided into eleven subgenera (Hooper and Van Soest, 2002). *Mycale crassissima* (Dendy, 1915) shows similarities with the subgenus *Mycale (Mycale)* and so present species is recognised as *Mycale (Mycale) crassissima.* Present observation is the first record of *Mycale (Mycale) crassissima* from the Andamans.

43. ***Mycale (Mycale) indica*** (Carter, 1887)
(Fig. 43a-i; Plate VII F)

1887. *Esperia indica* Carter, p. 72, vi, Figs. 3-6.

1932. *Mycale indica* Burton and Rao, p. 327; Rao, 1941, p. 445.

Material examined : P3488/1, One ex., Ross Island, Andamans, 6.12.1912, Coll. R.I.M.S., "Investigator"

Description : Massive body, 120 mm broad, 70 mm thick and finger-like processes 12-15 mm long on upper surface of body; surface smooth in naked eye but under lens minutely roughened by ends of dermal styles, foreign matters embedded in sponge body; colour-pale yellow in spirit; consistency - slightly compressible and fragile, Oscules - not evident, but invagination of sponge surface gives it a cavernous form.

Skeleton - primary skeleton consisting of reticulum of spicular fibres, which radiating fan-wise toward dermal spicular layer, seems to support it.

Megascleres - (1) Styles 0.42-0.70 mm long, 0.012-0.014 mm wide.

Microscleres - (1) Large anisochelae 0.105-0.135 mm, (2) Small anisochelae 0.014-0.018 mm, (3) Sigmas small and large 'C' shaped, 0.013-0.080 mm cord and 'S' shaped or contorted sigmas 0.015-0.065 mm chord, (4) Raphides 0.022-0.045 mm.

Distribution : In India : Andamans, Gulf of Mannar.

Elsewhere : Mergui Archipelago, Burma (Carter, 1887, Burton & Rao, 1932).

Remarks : Presently the genus *Mycale* Gray, 1867 is devided into eleven subgenera (Hooper and Van Soest, 2002). *Mycale indica* (Carter, 1887) shows similarities with the subgenus *Mycale (Mycale)* and so present species is recognised as *Mycale (Mycale) indica*. Burton and Rao (1932) recorded *Mycale indica* from Mergui Archipelago and Andamans. Rao (1941) recorded the species as *Mycale indica* from Pamban, Gulf of Mannar and Trincomalee of Ceylon. The present account is the restudy of the species from Andaman and Nicobar Islands with detailed description.

Order HALICHONDRIDA Topsent

Diagnosis : Megascleres diactinal, or monactinal or both; microscleres usually absent, but a few species have raphides; ectosomal skeleton may be a reticulum formed of multispicular tracts joined by little spongin, or may include surface spicule brushes' endosomal skeleton with spicules in confusion termed as 'halichondroid'

Key to families of order HALICHONDRIDA Known from Andaman and Nicobar Islands

1a. Ectosomal specialization present, either in the form of a tangential crust or single spicule layer, a palisade of smaller and/or larger smooth megascleres or microscleres; surface smooth, but may be wrinkled or thrown up into folds of depressions .... HALICHONDRIIDAE

1b. No ectosomal specialization, surface velvety, or hispid due to single projecting spicule, or fleshy-organic, without tangential spicules 2

2a. Thinly encrusting, not exceeding 1cm thickness, strongly hispid due to erect monactinal megascleres with bases embedded in the basal skeleton ..... BUBARIDAE

2b. Elaborate growth forms; surface microhispid, often velvety, megascleres condensed axially and run a plumose or plumoreticulate course to the surface ..... AXINELLIDAE

Family AXINELLIDAE Carter, 1875

Diagnosis : Megascleres monactinal, diactinal or both; microscleres absent except genus *Tragosia*; spongin fibres enclosing megascleres condensed axially and run a plumose or plumoreticulate course to the surface; generally branching in form but funnel-shaped, flabellate, tubular and massive forms also occur.

Distribution : From polar region to the tropics.

Key to genera of family AXINELLIDAE Known from Andaman and Nicobar Islands

1a. Hollow tubular, branching or Cylindrical growth forms, stacked, choanosomal skeleton with spicules tracts of strongyles plumo-echinated by styles ..... ***Auletta***

1b. Body branching, arborescent or bushy, flabellate and digitate growth form, choanosomal skeleton with styles and oxeas differentiated in axial (compressed or vaguely reticulated) and extra-axial (plumoreticulated) region ..... ***Axinella***

Genus *Auletta* Schmidt, 1870

Diagnosis : Specialized hollow tubular, branching or cylindrical growth forms, with terminal oscules; choanosomal skeleton basally condensed layer of sinuous strongyles and styles lining the endopinacoderm; radial plumo-reticulate extra-axial tracts of long styles or rhabdostyles of two sizes, embedded perpendicular to axial skeleton; these extra-axial tracts ascending towards surface in longitudinal bands, united by abundant fibres and collagenous spongin, interconnected by occasional uni-or aspicular fibres; ectosome lacks a specialized skeleton, but extra-axial spicules may piercing surface singly or in brushes.

Type species : *Auletta sycinularia* Schmidt, 1870.

44. *Auletta andamanensis* sp. nov.
(Fig. 44 a, b; Plate VII D)

Material examined : Holotype, P3481/1, one ex. Andaman Sea, Lat. 13°17' North, Long. 93°7' East, 165 m, 13.04.1898, Coll. R.I.M.S. "Investigator"

Description : Sponge erect, hollow tubular, branching from a main cylindrical body; irregular, 32 mm long from base to tip, 20 mm wide; branches 25-27 mm long, 4 mm wide; texture - soft, compressible, surface smooth; colour - dull white in spirit; oscules - large, upto 2 mm diameter at tip of branches.

Skeleton - Choanosomal skeleton with basally condensed layer of styles lining endopinacoderm; extra-axial tracts of styles embedded perpendicular to axial skeleton, ascending towards surface. Ectosomal skeleton irregular with oxeas and styles but not extended beyond surface.

Megascleres - (1) styles straight or slightly curved, sharply pointed 0.4-0.65 mm long, 0.006-0.015 mm wide, (2) Oxeas slightly curved, 0.3-0.4 mm long, 0.009-0.015 mm wide.

Microscleres - absent.

Remarks : This species differs from *A. elongate* Dendy, 1905 and *A. elongata* var. *fruticosa* Dendy, 1916 in having oxeas megascleres. This species is close to *A. lurata* (Erpor, 1806) in that both have styles and oxeas as megasclers but tubular branches and the body structure is quite different from that of *A. lyrata.*

Etymology : This species is named for its type locality Andamans.

Genus *Axinella* Schmidt, 1862

Diagnosis : Flabellate and digitate growth forms; surface typically hispid, conulose; choanosomal skeleton always with some axial compression of spongin fibres, with or without differentiated primary and secondary fibre elements; fibres usually cored by styles, sometimes oxeas, occasionally strongyles, or sometimes all three in various combinations; extra-axial skeleton plumose or plumo-reticulate; ectosome without special megascleres but often with single spicules or bundles of extra-axial spicules protruding through the sruface; microscleres may include raphides or microraphides, but not widely distributed amongst all species.

Type species : *Axinella polypoides* Schmidt, 1862.

Distribution : Indian Ocean.

Key to species of genus *Axinella* Known from Andaman and Nicobar Islands

1a. Oxeas present ..... *A. acantheloides* sp. nov.

1b. Oxeas absent ..... *A. tenuidigitata*

45. *Axinella tenuidigitata* Dendy, 1905
(Fig. 45.a&b; Plate VIII.A)

1905. *Axinella tenuidigitata* Dendy, p. 189, pl. 13, fig. 4; Thomas, 1985, p. 290, pl. IV, fig. 25.

Material examined : P3468/1, 3 ex., Port Monat, Andamans, 29.02.1888, Coll. R.I.M.S. "Investigator"

Description : Sponge massive, irregular, erect, branches arising from upper surface of main body, tips of branches conical; 25 mm from base to tip, 22 mm broad and 10 mm thick; surface granular, minutely conulose; texture - tough but compressible, resilient; colour - pale white in spirit; Oscules -small, scattered throughout body, 1 mm diameter.

Skeleton - Choanosomal skeleton differentiated into axial and extra axial skeleton, axial compression of spongin fibres cored by styles, extra axial fibres plumose towards surface.

Megascleres - (1) styles slightly curved or straight, sharply pointed, 0.55-0.90 mm long, 0.025-0.033 mm wide.

Microscleres - absent.

Distribution : In India : Andamans, Gulf of Mannar.

Remarks : This species was known only from Gulf of Mannar (Dendy, 1905 and Thomas, 1985). Present record is the first record from Andaman and Nicobar Islands.

46. ***Axinella acanthelloides*** sp. nov.
(Fig. 46. a&b; Plate VIII.B)

Material examined : Holotype, P3482/1, one ex., 27 km South-east of Cinque Island, Andamans, 05.01.1888, Coll. R.I.M.S. "Investigator"

Description : Sponge stalked, irregular, bushy form; branches arising from a main rachis which continued from basal stalk, 30 mm from base to tip, 25 mm broad, 5 mm thick; branches erect, 5 mm long, 2 mm thick, forming bush-like appearance; surface hispid, texture - soft, compressible; colour - pale grey in spirit; Oscules - not prominant but small pores throughout body.

Skeleton - Choanosomal skeleton with axial compression of spongin fibres cored by styles and oxeas; extra axial skeleton plumo-reticulate, ectosome with extra axial spicules protruding through surface.

Megascleres - (1) Styles slightly curved or straight, sharply pointed, 0.25-0.85 mm long, 0.013-0.020 mm wide, (2) Oxeas slightly curved, 0.28-0.42 mm long, 0.013-0.017 mm wide.

Microscleres - absent.

Remarks : This species belong to *Axinella* based on the fact that skeleton is divisible into axial and extra axial parts and is devoid of microscleres. *A. carteri* (Dendy, 1889), *A. tenuidigutata* Dendy, 1905, *A. symmetrica* (Dendy, 1905), *A. crassistylifera* (Dendy, 1905)

and *A. bubarinoides* Dendy, 1922 have only styles as megascleres. *A. labyrinthica* Dendy, 1889 has styles and strongyles as megascleres. *A. halichondroides* Dendy, 1905 has either oxeas or styles as megascleres. *A. agariciformis* (Dendy, 1905) and *A. durissima* (Dendy, 1905) have styles and oxeas as megascleres and raphides as microscleres. Whereas in this species megascleres are styles and oxeas but microsclere is absent. This species show similarities with *A. donnani* (Bowerbank, 1873), *A. lamellata* (Dendy, 1905), *A. manus* Dendy, 1905 and *A. ceylonensis* (Dendy, 1889) in having styles and oxeas as megascleres but differ from them in having the bushy shape of the body and in the measurement of the spicules.

Etymology : This species is named for its bushy shape like the genus *Acanthella* (spiny bush) and suffix oides is used.

Genus ***Bubaris*** Gray, 1867
Bubaris Gray, 1867, p.492.

Diagnosis : Axinellida having an axial or basal concentration of vermiform strongly associated with extremely long styles at right angles to axis of substrate; microscleres, if present, raphides.

Type species : *Hymerhaphia vermiculata* Bowerbank, 1866.

Distribution : Atlantic Ocean, Indian Ocean, Mediterranean Sea.

47. ***Bubaris columnata*** Burton, 1928
(Fig. 47 a-c; Plate VIII C)

1928. *Bubaris columnata* Burton, p. 130, pl. II, fig.1.

Material examined : Holotype re-examined, P317/1, One ex., Andaman Sea, Lat. 13°17' North, long 93°7' East, 165 m, 13.4.1898, Coll. R.I.M.S. "Investigator"

Description : Lamellar and sessile, 45 mm long from base to tip, 3 mm wide lamella; lamellae composed of a number of stout columns of vermicular strongyles rising vertically from base and end in upper margin of sponge; surface strongly hispid, harsh to touch; colour grayish yellow in spirit, Oscules - not visible clearly and ostial pores also not visible.

Skeleton - consisting of two portions, an axial portion formed of ascending columns of strongyles and a radial formed of a single layer of styles coating axial portion, with their bases loosely embeded in outer layers of axial skeleton and their apices projecting slightly beyond ectosome.

Megascleres - (1) Strongyles, vermicular, smooth, 0.5-0.075 mm long, 0.015-0.025 mm wide, (2) styles, two types; one type usually with an abrupt curve or 'crook' at base, 0.22-0.48 mm long, 0.012 to 0.025 mm wide; other type long, smooth, straight or gently curved, 0.95-1.00 mm long, 0.022-0.04 mm wide and responsible for hispid surface.

Microscleres - absent.

Distribution : Andamans.

Remarks : Burton (1928) first described the species from the Andamans and it remains endemic so far. Present work is the restudy of the type specimen.

Family HALICHONDRIIDAE Vosmaer, 1887

Diagnosis : Principal megascleres diactines, mainly oxeas, accesory styles may be added occasionally; a marked system of subdermal spaces sets the dermal skeleton off from the randomly arranged endosomal skeleton; sponges encrusting to massive, some genera bear upright processes.

Distribution : Cosmopolitan.

Key to genera of family HALICHONDRIDAE Known from Andaman and Nicobar Islands

1a. Megascleres oxeas and styles ..... ***Amorphinopsis***

1b. Megascleres oxeas only ..... ***Spongosorites***

Genus ***Amorphinopsis*** Carter, 1886

Diagnosis : Encrusting; surface with stellate spicule pattern; ectosomal skeleton wih a distinct tangential reticulation composed of thick bundles of exeotes, often with blunt terminations, occasionally stylote, «echinated» by small styles; peripheral regions of skeleton characteristically include smaller oxeotes and styles than larger choanosomal megascleres, choanosom halichondroid, without any compression of axial region, extra axial skeleton poorly developed with some discernible plumose tracts of styles (occasionally oxeas) near periphery, microscleres - absent.

Type species : *Amorphinopsis excavans* Carter, 1886.

Distribution : Indo-Australian region.

48. ***Amorphinopsis foetida*** (Dendy, 1889) n. comb.
(Fig. 48 a-c; Plate VIII D)

1889. *Hymeniacidon foetida* Dendy, p. 87, pl. 4. fig. 5.

1914. *Amorphinopsis megarrhaphea* Hallman, p. 330, pl. 17, fig. 485.

1937. *Prostylissa foetida* Burton, p. 37, pl. 7, fig. 45, Rao, 1941, p. 452; Thomas, 1985, p. 324, pl. vi, fig. 27.

Material examined : P3471/1, 3 ex., North Andaman, 10.12.1890, Coll. J.Wood-Mason.

Description : Sponge thick encrusting, with Oscules on tubular projections, diameter of base 20 mm, 27 mm from base to tip; surface hispid under lens, texture compact, hard and fragile; colour - light gray when dry, Oscules - scattered on the tubular projections with or without oscular tube, diameter 1-2 mm.

Skeleton - dermal skeleton composed of large oxeas in radial form and associated with styles; meshes polygonal with pores 0.35mm in diameter; main skeleton irregular with oxeas in bands and scanty spongin.

Megascleres - (1) Oxeas slightly curved and sharply pointed, 0.4-0.9 mm long, 0.01-0.03 mm wide, (2) Styles slightly curved and pointed, 0.15-0.20 mm long, 0.008-0.009 mm wide.

Microscleres - absent

Distribution : In India : Andamans, Gulf of Mannar, Minicoy Island.

Elsewhere : Australian region (Hallman, 1914).

Remarks : Presently the genus *Prostylissa* is synonymised with the genus *Amorphinopsis* (Hooper and Van Soest, 2002). In view of this present species is recognised as *Amorphinopsis foetida* (Dendy, 1889) as a new combination. This species shows some similarities with family Raspailiidae but it is placed in the family Halichondridae due to total lack of any vestigial radial organisation and the association of oxeas in a halichondroid pattern together with styles more common near the surface placed it under the genus *Amorphinopsis*. From Andaman and Nicobar Islands region, this species is recorded for the first time in the present investigation.

Genus ***Spongosorites*** Topsent, 1896

Diagnosis : Main skeleton composed of dense, irregular network of oxeas while in the dermal part similar slender spicules form vertical brushes.

Type species : *Spongosorites placenta* Topsent, 1896

Distribution : Indo-Australian region, Philippines, Red Sea, Atlantic and Mediterranian Sea.

Key to species of genus *Spongosorites* Known from Andaman & Nicobar Islands

1a. One type of oxeas as megascleres ..... *S. helichondrioides*

1b. Two distinct type of oxeas as Megascleres ..... *S. andamanensis* sp. nov.

49. ***Spongosorites halichondrioides*** (Dendy, 1905) n. comb.
(Fig. 49 a & b; Plate VIII E)

1905. *Trachyopsis halichondrioides* Dendy, p. 147; pl. 10, fig. 10: Burton, 1928, p. 118, Thomas, 1985, p. 300, pl. V, fig. 15.

1921. *Halichondira aplysinoides* Dendy, p. 39, pl. 3, figs, 3-5, pl. 12, fig. 9.

1961. *Halichondria rugosa* Bergquist, p. 185, fig. 9a,b.

Material examined : P3469/1, one ex., Invisible bank, Andamans, 2.1.1887, Coll. R.I.M.S., "Investigator"

Description : Massive form attached on coral stone, largest sponge 21 mm long, 15 mm wide and 6 mm high; surface irregular; consistency - soft; colour - light gray in spirit; Oscules - at upper portion of the body, 2-3 mm in diameter.

Skeleton - irregular reticulation of oxeas and fibres, with wisps of spicules directed towards surface and in some places projects out of surface; smaller oxeas present in dermal part, in brushes.

Megascleres - (1) Oxeas, 0.35-0.85 mm long, 0.01-0.03 mm wide.

Microscleres - absent.

Distribution : InIndia : Andamans, Gulf of Mannar and Palk Bay.

Elsewhere : Malay Archipelago (Burton, 1928), Ceylon (Dendy, 1905, Burton, 1928), Indian Ocean (Dendy, 1921), Chatham Island (Bergquist, 1961).

Remarks : Burton (1928) recorded the species from Andamans as *Trachyopsis halichondroides*. At present *Trachyopsis* genus is synomymised as *Spongosorites* (Hooper and Van Soest, 2002). In view of this present species is recognised as *Trachyopsis halichondroides* (Dendy, 1905) as a new combination

50. ***Spongosorites andamanensis*** sp. nov.
(Fig. 50 a & b; Plate VIII F)

Material examined : Holotype, P3483/1, one ex., Chiriyatapu, South Andaman, 24.01.1992, Coll. G. C. Ghosh.

Description : Sponge massive, cushion-shaped, with some tube-like projections; 25 mm long, 20 mm wide, 16mm high; texture - soft, fleshy; surface - smooth but harsh in touch; colour - whitish gray in spirit; oscules - small, present at tip of tube-like projections.

Skeleton - Choanosomal skeleton of large oxeas arranged irregularly and grouped in

spongin-enforced tracts directed parallel to surface; ectosomal skeleton of thin and small oxeas arranged paratangentially.

Megascleres - Oxeas of two types; large oxeas slightly curved or straight, 0.45-0.65 mm long, 0.014-0.04 mm wide; small oxeas slightly curved, 0.15-0.26 mm long, 0.006-0.013 mm wide.

Microscleres - absent.

Remarks : This species has typical *Spongosorites* skeleton. In *S. aplysinoides* (Dendy, 1922), *S. cavernos* (Topsent, 1896), *S. halichondrioides* (Dendy, 1905) and *S. solida* Topsent, 1896 oxeas as megascleres are of a single size but in this species oxeas as megascleres are of two sizes. This species is close to *S. stalagmites* Hentschel in its skeletal structure and spicules but differs in having small tube like outgrowths and the measurement of the spicules.

Etymology : This species is named for its type locality, Andamans.

Order HAPLOSCLERIDA Topsent

Diagnosis : Megascleres diactinal (oxeas or strongyles); microscleres, if present, sigmas, toxons, or rarely microxeas; skeleton reticulate of isodictyal pattern with rectangular or triangular meshes, which can be unispicular, multispicular or constructed entirely of fibre without spicules; spongin always present, varying in amount.

Suborder HAPLOSCLERINA Topsent, 1928

Definition : Marine Haplosclerida with an anisotropic Choanosomal skeleton; spicules smooth oxeas or strongyles of a single size category. (Hooper and Van Soest, 2002)

Family CHALINIDAE Gray, 1867

Diagnosis : Megascleres oxeas, uniform, small size; microscleres typically absent but in some sigmas or toxons may present; spicules organised into an isodictyal skeleton, always consolidated by spongin, either at the intersection of the spicule meshes or in the form of fibres; sponges range from encrusting or massive to branching or tubular in form.

Distribution : Cosmopolitan.

Genus ***Haliclona*** Grant. 1836

1836. ***Haliclona*** **Grant**

Definition : Chalinidae with unispicular secondary lines. (Hooper and Van Soest, 2002)

Subgenus *Gellius* Gray, 1867

1867. *Gellius* Gray, p. 538

2002. *Haliclona (Gellius)* Hooper and Van Soest, p. 859.

Diagnosis : Chalinidae in which spongins bind the oxeote spicules end to end to form delicate networks of reticulate skeleton; microscleres stigmas, toxas or raphides or a combination of these; special dermal skeleton composed of an irregular network of bands of spicules present.

Distribution : Indian Ocean.

Type species : *Isodictya jugosa* Bowerbank, 1866

Key to species of subgenus *Haliclona (Gellius)* Known from Andaman & Nicobar Islands

1a. Flaggellate sigmata microscleres present ..... *H.(G.) flagellifer*

1b. Flagellate sigmata microscleres absent ..... *H.(G.) megastoma*

51. *Haliclona (Gellius) flagellifer* (Ridley and Dendy, 1886) n. comb (Fig. 51 a-c; Plate IX A)

1886. *Gellius flagellifer* Ridley and Dendy, p. 345; Dendy, 1924; Burton, 1928, p. 114.

Material examined : P289/1, one ex., Andaman Sea, Lat. 13°15' 30" North, Long. 93°26' East, 911 m, 21.12.1897, Coll. R.I.M.S. "Investigator"

Description : Sub-spherical, loose and cavernous structure, colour - pale yellow in spirit, texture-soft and friable, Oscules - single oscule at the apex.

Skeleton - Dermal skeleton composed of an irregular network of bands of spicules; main choanosomal skeleton composed of oxea arranged in a reticulate fashion.

Megascleres - Oxeas only, large and straight, 0.28-0.36 mm long, 0.012-0.014 mm wide.

Microscleres - Sigmata only, two types of sigmata, flagellate sigmata characteristic spicule of the species, less in number, chord length 0.08-0.09 mm and the other type of sigmata usual types, chord length 0.05-0.07 mm.

Distribution : In India : Andamans.

Elsewhere : Cosmopolitan (Burton, 1928).

Remarks : This species was recorded from Andamans by Burton (1928) as *Gellius flagellifer* Ridley and Dendy, 1886. Presently the genus *Gellius* Gray.1867 becomes the subgenus of the genus *Haliclona*, Grant,1836 (Hooper and Van Soest, 2002). In view of this present species is recognised as *Haliclona (Gellius) flagellifer* (Ridley and Dendy, 1886) as a new combination. The present study is the second report of the species from the same locality.

52. *Haliclona (Gellius) megastoma* (Burton, 1928) n. comb.
(Fig. 52 a-c; Plate IX B)

1928. *Gellius megastoma* Burton, p. 115

Material examined : Holotype re-examined, P292/1, one ex., Andamans, 238-531 m, Coll. R.I.M.S. "Investigator"

Description : Subspherical about 1.25 cm high and base 2 cm long, 1.5 cm wide, composed of two or more lobes, surface glabrous but slightly uneven, consistency soft and friable, colour -greenish yellow in spirit, Oscules - at appex of each lobe a single large oscule leading into a deep cloacal tube running vertically downwards to base of sponge, 4-5 mm in diameter.

Skeleton - main skeleton composed of oxea lying in a very irregular manner throughout choanosome and arranged in irregular halichondrioid form, dermal skeleton composed of an irregular network of bands of spicules.

Megascleres - Oxea only, usually slightly curved, with obtusely pointed ends, often incipiently strongylote, 0.50-0.55 mm long, 0.022-0.025 mm wide.

Microscleres - Sigmas, usual form, chord length 0.03 mm.

Distribution : Andamans.

Remarks : This species was first described from Andamans by Burton (1928) as *Gellius megastoma*. Presently the genus *Gellius* Gray, 1867 becomes the subgenus of the genus *Haliclona*, Grant, 1836 (Hooper and Van Soest, 2002). In view of this present species is recognised as *Haliclona (Gellius) megastoma* (Burton, 1928) as a new combination. Burton (1928) first described this species from Andamans and it remains endemic so far. The present observation is the restudy of the type specimen.

Family NIPHATIDAE van Soest, 1980

Diagnosis : Encrusting, massive, fan-shaped, vase-shaped and branching growth forms, often with chimney-like oscular processes. Ectosomal skeleton dense multispicular, three-dimensional, paratangential reticulation of diactinal spicules (oxeas or strongyles), usually

more compact than choanosomal skeleton; upright brushes of spicules characteristically found at surface in many species. Choanosomal skeleton, reticulation of ascending and transverse - connecting spongin fibres, cored by multispicular tracts of oxeas; interstitial spicules also common; microscleres, if present, sigmas or microxeas.

Genus ***Gelliodes*** Ridley, 1884

1884. *Gelliodes* Ridley, p. 421

Diagnosis : Niphatidae with spiculation of oxeas and sigmas, Fibres usually well developed and with good coating of spongin.

Type species : *Axos fibulata* Carter, 1881

Distribution : Indo-Australian region and Red Sea.

53. ***Gelliodes fibulatus*** (Carter, 1881)
(Fig. 53 a-c; Plate IX C)

1881. *Axos fibulatus* Carter, p. 383, pl. 18, fig. 4.

1882a. *Phorbas fibulata* Carter, p. 288.

1884. *Gelliodes fibulata* Ridley, p. 427, pl. 39, fig. 1; pl. 41, fig. b; Ridley and Dendy, 1887; p. 47, pl. 12, fig. 2; Topsent, 1897, p. 470, 1932, p. 114; Hentschel, 1912, p. 393; Burton, 1928, p. 115; Burton, 1934, p. 549; Levi, 1961a, p. 141, fig. 16; Dawydoff, 1952; Desqueyroux-Faundeze, 981, p. 744, fig. 56, 11,7.

1928. *Sigmaxinissa fibulata* Burton, p. 115.

1986. *Gelliodes fibulatus* Hooper, p. 184, figs. 11-12, pl. 1E; Thomas, 1991, p. 309.

Material examined : P3470/1, 3 ex., North Rutland Island, Andamans, 22.1.1924, Coll. R.I.M.S. "Investigator"; 8545/6, 2 ex., Andamans, 24.12.1890, Coll.J. Wood Mason; 8629/6, 4 ex., Andamanss, 66 m, 30.3.1897, Coll. R.I.M.S " Investigator"; 9309/6, 4 exs., Andamans, from corals. 13.1.1926, Coll. R.I.M.S. "Investigator"

Description : Several pieces, clathrous, mass of slender branches, 3-21 mm in diameter; surface highly conulose with some strong sharp slender spines, 3-7 mm long, conuls 5 mm high; colour-pale white in spirit, Oscules - 1-5 mm in diameter, less in number and distributed throughout the sponge body.

Skeleton - ectosomal region containing regular reticulation of multispicular tracts, through which protrude ascending primary and secondary choanosomal spicules tracts forming spines; Choanosomal fibres with heavy spongin, cored by multispicular tracts of megascleres, from which diverge multispicular secondary tracts at various angles; Choanocyte chambers oval.

Megascleres - (1) Oxeas straight or gradually curved, smooth, abruptly pointed apices or sharply pointed tips, 0.14-0.28 mm long, 0.010-0.012 mm wide.

Microscleres - sigmas abundant, invariably 'C' shaped, chord 0.012-0.016 mm.

Distribution : In India : Andamans.

Elsewhere : Bass Strait, Victoria (Carter, 1881); Torres Strait, North Queensland (Burton, 1934); Northern territory (Hooper, 1986); Ambon and Aru Is., Indonesia (Topsent, 897, Hentschell, 1912); Vietnam (Levi, 1961a); New Caledonia (Desqueyroux-Faundez, 1984); Australian region (Hooper, 1986); Papua and New Guienea (Thomas, 1991).

Remarks : Burton (1928) recorded this species from Andamans as *Sixmaxynissa fibulata.* The present specimens as well as the specimens of *Sigmaxinissa fibulata* Burton, 1928 have the same characters as that of *Gelliodes fibulatus* Ridley, 1884. So author synonymise *Sigmaxinissa fibulata* of Burton (1928) with *Gelliodes fibulatus* Ridley,1884.

Family PHLOEODICTYIDAE Carter, 1882

Diagnosis : Encrusting, massive, lobate or spherical and tubular growth forms burried in substrate, usually with fistules on upper surface bearing apical oscules, occasionally excavating coralline substrates; ectosomal skeleton multilayered, irregular, tangential reticulation of diactinal spicules (oxeas or strongyles), forming a distinct, usually detachable, parchment like crust, choanosomal skeleton irregular reticulation of diactinal spicules forming multispicular tracts, typically producing a pulpy effect, with or without spongin fibres, together with an irregularly dispersed isotropic reticulation of single spicules scattered between these major tracts; microscleres, may centrangulate sigmas and toxas.

Genus *Calyx* Vosmaer, 1887

Diagnosis : Thin walled fans or vase-like growth form; fistules absent; ectosomal skeleton multilayered or single-layered spicule reticulation; choanosomal skeleton dominated by longitudinal multispicular tracts,anastomosing and intertwined, producing stringy texture, with single spicules dispersed between major tracts; microscleres may include sigmas and/ or toxas (van Soest, 1980).

Type species : *Calyx nicaensis* (Risso, 1826).

Distribution : Abundant in the world's oceans, including Magellan Province, Brasilia, West and South Africa, Mediterranean Atlantic, Antarctica, Subantarctic, New Zealand, west Indies and Andamans.

54. *Calyx clavata* Burton, 1928
(Fig. 54 a; Plate IX D)

1928. *Calyx clavata* Burton, p. 117

Material examined : Holotype re-examined, P299/1, one ex., off Cinque Island, Andamans, 20-311 m, Coll. R.I.M.S. "Investigator"

Description : Subcylindrical, broken specimens, length 10-15 mm long, 1.5-2.5 mm diameter; clavate and slightly stipitate, surface smooth; colour yellowish-white in spirit, Oscules - occupying a lateral position, 1mm in diameter, margins level with the general surface of the sponge.

Skeleton - Choanosomal skeleton consisting of confused reticulation of oxeas lying in choanosome, apparently with no course of direction but anastomose freely beneath surface and giving appearance of reticulate surface; dermal skeleton consisting of a very delicate but quite distinct layer of oxeas lying in ectosome parallel to general surface of body; ends of spicules cemented together by a small but distinct quantity of spongin.

Megascleres - Oxeas smooth, straight or slightly curved, 0.09-0.12 mm long, 0.003 mm wide.

Microscleres - absent.

Distribution : In India : Andamans.

Remarks : Burton (1928) described this species from the Andamans and it remains endemic so far. Present observation is the restudy and redscription of the type specimen.

Family PETROSIIDAE van Soest, 1980

Diagnosis : Typically massive, vase-shaped or volcano-shaped sponges, sometimes encrusting, bulbous and less commonly branching growth forms; texture stony, brittle, siliceous spicules more than spongin; ectosomal skeleton isotropic reticulation of single spicule or spicule tracts forming a crust, giving the surface a smooth appearance; choanosomal skeleton more or less a regular isotropic reticulation of multispicular trcts, without distinction between primary or secondary tracts, bound together with minimal spongin, forming oval meshes; microscleres may include microxea and microstrongyles; reproduction oviparous.

Genus ***Xestospongia*** de Laubenfels, 1932

Diagnosis : Ectosomal skeleton indistinct; choanosomal skeleton confused isotropic reticulation of multispicular tracts, generally lacking spongin, and sometime with single spicules scattered throughout mesohyle between major spicule tracts, stony exture; oxeote spicules in one size category only.

Type species : *Xestospongia diprosopia* (de Laubenfels, 1930).

Distribution : West Indies, Cape Verde Islands, Boreal Pacific, Mediterranean, Atlantic, Boreal E. Atlantic, West Africa and Antarctica and Andamans.

55. *Xestospongia testudinaria* (Lamarck, 1815)
(Fig. 55 a & b; Plate IX E)

1815. *Alcyonium testudinarium* Lamarck, p. 167,

1882b. *Reniera crateriformis* Carter, p. 115, Carter, 1887, p. 71.

1884. *Reniera testudinaria* Ridley, p. 409.

1889. *Petrosia testudinaria* Dendy, p. 77; pl. iii, figs. 1-3; Dendy, 1905, p. 144, fig. 1; Hentschel 1912, p. 403; Topsent 1820, p. 7; Wilson, 1925, p. 399, pl. XL, Fig. 6; Burton, 1937, p. 22, pl. 1, fig. 10; Thomas 1985, p. 246, pl. II, fig. 9; Thomas,1991, p. 311, fig. 1f; George & George, 1987.

2000. *Xestospongia testudinaria* Hooper *et al.*

Material examined : P3472/1, 6 ex., Port Blair, Andamans; 30.7.1915, Coll. S.W.Kemp.

Description : Many broken pieces, largest one 34 mm long, 25 mm wide and 11 mm high, outer surface ridged vertically; surface smooth, texture soft and breaking at little pressure; colour-pale brown in dry, Oscule - at the inner surface, present in groups, 0.5-1 mm diameter.

Skeleton - Both dermal and main skeleton well developed, consisting of stout plurispicular reticulation.

Megascleres - (1) Oxeas, stout, slightly curved, 0.15-0.45 mm long, 0.015-0.023 mm wide, (2) Strongyles less in number, 0.17-0.38 mm long, 0.015-0.025 mm wide.

Microscleres - absent.

Distribution : In India : Andamans; Gulf of Mannar and Palk Bay; Pearl Bank area, Tuticorin.

Elsewhere : Sattahip region, Thailand (Lamarck, 1814), Bodhgaya Island and Pulau Sipadan, Sabah (George & George, 1987); Indonesia (ZMA database); Singapore (Q.M/RZC collection); Mergui Archipelago (Carter, 1887), Indo-Pacific (Ridley, 1884), Ceylon (Dendy, 1905); Indonesia (Hentschel, 1912); Philippine (Wilson, 1928), Papua and New Guienea (Thomas, 1991).

Remarks : This is the first record of the species from the Andamans.

Order DICTYOCERATIDA Minchin, 1900

Diagnosis : Spicule skeleton lacking and replaced by a spongin fibre skeleton often of great complexity; always constructed upon an anastomosing pattern, involving recognizable primary and secondary fibre; thin tertiary fibres may be added in a few genera; diplodal or euryplous choanocyte chambers present; mesohyle cells low in diversity.

Distribution : Tropical and subtropical waters.

Family THORECTIDAE Bergquist, 1978

Definition : Dictyoceratida with laminated skeletal fibres and diplodal choanocyte chambers.

Subfamily PHYLLOSPONGIINAE, Bergquist, Sorokin and Karuso, 1999

Definition : Thorectidae consisting of foliose, lamellate or folio-digitate growth forms, with tertiary fibres in the skeleton (except in one genus)

Genus ***Phyllospongia*** Ehlers, 1870

1870. *Phyllospongia* Ehlers, p. 22.

Diagnosis : Spongiidae of lamellar shape, frondose calyculate or branched, never massive; with smooth, granular or grooved surface,and numerous oscula, ciliated chambers, spherical, with special efferent canals; fibres of the supporting skeleton slender; primary skeleton of fibres cored with sand grains.

Typespecies : *Spongia papyracea* Esper, 1806

Distribution : Cosmopolitan.

56. ***Phyllospongia foliascens*** (Pallas, 1766)
(Fig. 56; Plate IX F)

1766. *Spongia foliascens* Pallas, p. 395.

1889. *Phyllospongia foliascens* Lendenfeld, p. 196, pl. 5, fig. 3; Thomas, 1973b, p. 14, pl. 1, fig. 4, pl. 6, fig. 1,2,4; Bergquist, 1965, p. 131, Figs. 3a,b; Thomas 1979a, p. 14, fig. 2c; George and George, 1987; Zeng *et al.*, 1991, p. 421.

Material examined : P3473/1, two ex., Port Blair, Andamans, 28.07.1915, Coll. S.W.Kemp.

Description : Sponge thin foliaceous, stalked funnel-shaped, thickness 2-3mm, diameter 95-150 mm. Surface corrugated and ornamented by ridges and pits, covered externally by transparent dermal membrane, reinforced by fins and grains, Oscule situated at inner side of the speciemens, diameter 0.5-0.9 mm.

Skeleton - Spongin fibres coarser and more definitely cored by foreign material. Siliceous or calcareous spicules absent.

Distribution : In India : Andamans, Minicoy Island.

Elsewhere : Russia (Pallas, 1766), Palau Archipelago (Bergquist, 1965), Bodgaya Islands and Pulau Sipadan, Sabah (George and George, 1987), South China sea, Taiwan (Zeng *et al.* 1991).

Remarks : *Phyllospongia foliascens* was described by many authors in many names from different localities. Lendenfeld (1889) gave a long list of synonymy by merging 15 species under the species *Phyllospongia foliascens*, which were having very minor differences. Bergquist (1965) again gave a list of synonymy which is followed now. The present observation is the first record of the species from Andamans.

Class CALCAREA Bowerbank

Diagnosis : Exclusively marine sponges with a skeleton formed of spicules of calcium carbonate laid down as calcite; spicules do not occur in pronounced size categories comparable to the megascleres and microscleres of the demosponges and hexactinellidans.

Subclass CALCINEA Bidder

Diagnosis : Calcarea in which free blastulae larvae become solid by cellular ingression to produce a parenchymula like structure, the coeloblastula; choanocyte nuclei basal in the choanocyte and the flagellum arising independently of the choanocyte nucleus; triactinal spicules mainly equiangular when present.

Order CLATHRINIDA Hartman

Diagnosis : Choanocytes not confined to isolated chambers, but live the central cavity (spongocoele) of the tubes that make up the complicated sponge from cortical region not developed; equiangular and equiradiate triradiate spicules present.

Family. CLATHRINIDAE Minchin, 1900

Diagnosis : Clathrinida with tubular organisation; a continuous choanoderm lining all internal cavities; growth by longitudinal median divisions and anastomosis of tubes to form large units called the cormus; common corted and well-defined inhalant and exhalant system absent (Hooper, 1996a).

Genus ***Clathrina*** Gray, 1867

1867. *Clathrina* Gray. p. 557.

Diagnosis : Sponge body remains a simple tublar unit, cormus, with thin walls enclosing a central cavity which opens apically by a single osculum; Spicules equiangular and equiradiate triradiate.

Type species : *Grantia clathrus* Schmidt, 1864.

Distribution : Cosmopolitan.

57. *Clathrina coriacea* (Montagu,1818)
(Fig. 57 a; Plate X A)

1864. *Grantia clathrus* Schmidt, p. 24, pl. iii, fig. 3.

1866. *Leucosolenia contorta* Bowerbank, p. 29.

1868. *Guancha blanca* Miklucho-Maclay, p. 221, pl. iv, figs. I A, B.

1868. *Nardoa canariensis* Miklucho-Maclay, p. 230.

1872. *Ascaltis cerebrum* Haeckel, p. 54, pl.viii, figs. 1-14, pl. x, fig. 2.

1886. *Leucosolenia blanca* Lackschewitsch, p. 300.

1886. *Leucosolenia canariensis* Lackschewitsch, p. 300, pl. vii, fig. 1.

1886. *Leucosolenia clathrus* Lackschewitsch, p. 299,

1963. *Clathrina coriacea*, Burton, p. 183, (Synonymy)

Material examined : P3474/1, three exs., 18 Kms East of Port Blair, Andaman, 488 m, 2.1.1887, Coll. R.I.M.S. "Investigator"

Description : Sponge irregular, sessile, encrusting; surface smooth; vents not apparent; texture softt; colour-white in pirit.

Spicules - triradiate spicules regular,rays 0.07-0.09 mm long, 0.005-0.006 mm wide.

Distribution : In India : Andamans.

Elsewhere : Cosmopolitan.

Remarks : The present observation is the first record of the species from Andaman and Nicobar Islands.

Family LEUCETTIDAE De Laubenfels, 1936

Diagnosis : Sponges encrusting, massive or lobose or solitary and pyriform, cuplike or subspherical in shape; sessile or stipitate in habit; choanocyte chambers subspherical and scattered in the choanosome; a cortex more or less developed choanosomal spicular skeleton scattered among the choanocyte chambers, forming a three dimensional polyhedral pattern.

Genus *Pericharax* Polejaeff, 1884

Diagnosis : Leucettidae with tangential ectosomal and endosomal skeleton; large central cavity with a chamberlayer supported by large, irregularly scattered radiates, to which small radiates and diacts may be added; oscules apical; firm texture.

Type species : *Pericharax heterorhaphis* Polejaeff, 1884.

Distribution : Cosmopolitan.

58. ***Pericharax heteroraphis*** Polejaeff, 1884
(Fig. 58 a-c; Plate X B)

1884. ***Pericharax carteri*** var. ***heteroraphis*** Polejaeff, pl. ii, fig. 5, pl. vii, fig. 8.

1913. ***Pericharax heteroraphis*** Dendy, p. 13, pl. 1, figs. 8, pl. 5, fig. 1, 2; Burton & Rao, 1932, p. 304, George & George, 1987.

1932. ***Pericharax canaliculata*** Burton and Rao, p. 304, pl. 18, fig. 1.

Material examined : 8961/6, One ex., off Rutland Island, Andamans, 64 m, 7.2.1888, Coll. R.I.M.S., "Investigator"

Description : Sponge solitary, massive; surface smooth but with irregular folds; vent-apical; texture firm; colour-white in spirit.

Skeleton - Ectosomal skeleton a tangential layer of triradiates; coanosomal skeleton formed of tangential layer of quadriradiates.

Spicules - (1) Triradiates subregular, rays 0.085-0.115 mm long, 0.004-0.006 mm wide, (2) Large triradiate 0.45-2.3 mm long, 0.035-0.048 mm wide, (3) Quadriradiates, facial rays 0.15-0.19 mm long, 0.015 mm wide, apical rays 0.060-0.085 mm long, 0-0.012 mm wide.

Distribution : In India : Andamans.

Elsewhere : Cosmopolitan.

Remarks : Burton and Rao (1932) recorded the species as *Pericharax heteroraphis* for the first time from Andamans. Burton (1963) synonymised the species under *Leuconia barbata* on the basis of presence of radiate spicules. However, Burton (1963) is not greatly accepted. The author reexamined the specimens of Burton and Rao collected from the Andamans and incorporated detailed description of the species.

Class HEXACTINELLIDA Schmidt, 1870

Diagnosis : Exclusively marine sponge with a skeleton made up basically of six rayed siliceous spicules occurring individually or fused together by supplementary secretions of silica to form a rigid lattice-like or reticulate skeleton; both megascleres and microscleres always present.

Subclass AMPHIDISCOPHORA Schulze, 1886

Diagnosis : Microscleres amphidiscs, never hexasters; megascleres skeleton composed of discrete spicules which never fuse to form a rigid network and occur in the form of hexactines of fewer than six rays but not less than two rays; sponges of elaborate shape,

never fixed firmly to a hard substratum but anchored into the sediment by a basal spicules tuft; choanocyte chambers disposed in irregular diverticula and poorly set off from the reticular membrane.

Order AMPHIDISCOSIDA Schrammen, 1924

Diagnosis : Amphidisc microscleres of birotulate form, symmetrical at both ends; all recent species included into this order.

Key to families of order AMPHIDISCOSIDA Known from Andaman and Nicobar Islands

1a Uncinate and scepters spicules present ..... PHERONEMATIDAE

1b Uncinate and scepters spicules absent ..... HYALONEMATIDAE

Family HYALONEMATIDAE Gray, 1857

Diagnosis : Amphidisc spicules in the limiting membrane and pentact pinules in the dermal and gastral surface, uncinate spicules and scepters absent; typically of spheroidal or ovoidal form with a tuft of long basal spicules continued axially through the entire body and forming the columella.

Key to genera of family Hyalonematidae Known from Andaman and Nicobar Islands

1a Presence of stauractine acanthophores ..... ***Lophophysema***

1b Absence of stauractine acanthophores ..... ***Hyalonema***

Genus ***Hyalonema*** Gray, 1832

Diagnosis : Hyalonematidae with lower end funnel-shaped, somewhat spherical body, of which a long and slender root tuft of four teethed anchors; no uncinates; marginalia diacts pointed above with spined distal ray; commonly known as 'glass sponge'

Type species : *Hyalonema sieboldi* Gray, 1835

Key to species of genus *Hyalonema* Known from Andaman and Nicobar Islands

1a. Micro-oxyhexactines with straight rays 2

1b. Micro-oxyhexactines with curved rays 4

2a. Rays of micro-oxyhexactines spiny ..... *H. indicus*

2b. Rays of micro-oxyhexactines smooth 3

3a. Large curved oxydiactines present ..... *H. rapa*

3b. Large curved oxydiactines absent ..... *H. aculeatum*

4a. Rays of micro-oxyheaxactines spiny ..... *H. affine*

4b. Rays of micro-oxyhexactines smooth 5

5a. Silica pearl present ..... *H. martabanense*

5b. Silica pearl absent 6

6a. Macramphidisc tuberculous ..... *H. masoni*

6b. Macramphidisc not tuberculous ..... *H. lamella*

59. ***Hyalonema aculeatum*** Schulze, 1894
(Fig. 59 a-f; Plate X C)

1894. ***Hyalonema aculeatum*** Schulze, p. 19, Taf. III, figs. 1-14, Schulze 1902, p. 31, pl. II, figs. 1-14.

1894. ***Hyalonema heideri*** Schulze, p. 23, Taf. III, figs. 15-22.

Material examined : 5353/7, one ex., Andamans, near North Sentinel Island, 458 m, 7.2.1888, Coll. R.I.M.S., "Investigator"

Description : Spongebody tulip-shaped,considerably atenuated lower end from which a root tuft 1-2 cm long, 0.5-1 mm thick lying in prolongation of axis of sponge; broader uper end covered by a dome-shaped continuation of dermal membrane; prostalia lateralia confined to broad upper part of body; colour - grayish in spirit; Oscules - excurrent canals opening directly on upper surface at gastral cone.

Skeleton - spicules of basal root-tuft continued through body as an axis or columella and projecting above gastral cone; parenchymal network quadratic or rather cubic, formed of oxyhexactines and oxydiactines; dermal framework of dermal pinules; amphidisc and hexactines scattered throughout body.

Megascleres - (1) Oxyhexactines large and stout; rays straight, smooth and gradually attenuated towards sharp pointed ends, length of rays 0.5-0.7 mm, (2) Oxydiactines straight or slightly curved with remnants of four atrophied rays in the centre as four crosswise arranged tubercles, 0.5-2 mm long, 0.01-0.02 mm thick, (3) Ambuncinates straight with spines, four spines arranged crosswise in centre and other spines scattered, pointed backwards towards middle, 0.75-1 mm long, 0.010-0.012 mm thick, (4) Anchors of basal tuft large, smooth or covered with stout spines; four terminal diverging and recurved teeth, the transverse

rays with central canal, forming a cross, (5) Dermal pinules pentactine, four basal rays forming a rectangular cross, pointed and slightly spined in their distal part, 0.03-0.045 mm long; vertical ray with basal part of 0.02-0.03 mm free from spines and remaining 0.05-0.06 mm with a crown of spines; crown of spines 0.03-0.04 mm broad and gradually attenuated towards upper pointed ends, (6) Macramphidiscs with a bell-shaped terminal disc with eight marginal teeth at both ends; shaft covered with scattered, small protruberances and with four or eight stout rounded tubercles at centre, 0.16-0.25 mm long, 0.010-0.012 mm thick, discs 0.065-0.075 mm in diameter and marginal teeth 0.07 mm long.

Microscleres - (1) Micramphidiscs numerous, two hemispherical discs with 10-12 marginal teeth at both ends; shaft slender with irregularly scattered small spines, 0.01-0.03 mm long; discs 0.005-0.01 mm in diameter, (2) Microxyhexactines numerous, straight, rays smooth, 0.07-0.08 mm long.

Distribution : In India : Andamans.

Elsewhere : Bay of Bengal.

Remarks : Schulze (1894) first described the species from Andamans. The present account is the restudy and re-description of the species from the same locality. Schulze (1894) described the species *Hyalonema heideri* which differs from *Hyalonema aculeatum* by having larger size of macramphidisc and presence of larger prostalia lateralia in *H. heideri*. But in course of thorough studies of the characters of two type specimens it is evident that both are the same species with minor variations only. Hence the authors synonymised *H. heideri* with *H. aculeatum*.

60. ***Hyalonema affine*** Marshall, 1875
(Fig. 60 a-e; Plate X D)

1875. *Hyalonema affine* Marshall, p. 224; Schulze, 1902, p. 27, pl. VII.

1887. *Hyalonema stylocalyx apertus* Schulze, p. 59.

1887. *Hyalonema apertum Schulze*, p. 214, pl. 38 and 39.

1894. *Hyalonema mahrenthali* Schulze, p. 4, Taf. VIII.

1899. *Hyalonema affine reticulatum* Schluze, p. 112.

Material examined : 5929/7, One ex., Andamans, near North Sentinel Island, 458 m, 07.02.1888, Coll. R.I.M.S., "Investigator"; 5930/7, One ex., Andamans, near Ross Island, 485 m, 25.4.1888, Coll. R.I.M.S., "Investigator"

Description : Spongebody caliculate or trumpet-shaped, central part of body slightly compressed; lower end conical and truncate; whole outer surface uniformly covered with a quardratic dermal reticulation, inner surface of wall surrounding funnel -shaped gastral cavity perforated by circular apertures of various size and distributed irregularly; from the

conical, basal part of sponge a long and slender root tuft or peduncle protruding for attachment to substratum; Oscules - bulge outward at upper end, four unequal excurrent openings arranged crosswise.

Skeleton - peduncle composed of about 30 stout basalia spicules, its upper half spirally twisted and lower half loose and not spirally twisted; parenchymal network consisting of oxydiactine spicules; dermal framework consisting of large dermal pinules; amphidiscs, micro-oxyhexactines spicules scattered throughout body.

Megascleres - (1) Oxyhexactines large, stout; smooth rays 0.6-1.2 mm long, (2) Basalia spicules of 2-5 mm thick and length from point of insertion of spongebody to broken lower end nearly 45 cm, (3) Pinules average 0.15 mm high; four rays forming their basal cross straight, stout, rough, 0.025 mm long; smooth basal part of radial main ray 0.015 mm long, 0.005 mm thick, remaining portion with terminally pointed spines, spines average 0.01 mm long, (4) Macramphidiscs with terminal hemispherical teethed discs; shaft irregularly tuberculous, 0.15-0.2 mm long, 0.008-0.01 mm wide; discs average 0.04 mm in diameter.

Microscleres - (1) Micramphidiscs numerous, short hemispherical terminal disc with 10-12 marginala teeth, 0.02-0.03 mm long, shaft slender and thickened at centre, (2) Microxyhexactines with strongly bent rays covered with numerous recurved spines, 0.035-0.040 mm long; (3) Microhexactines with straight rays covered with strong spines diverging vertically, 0.025-0.03 mm long.

Distribution : In India : Andamans.

Elewhere : Indo-Pacific region.

Remarks : This species differs from other congeneric species of Andamans by the presence of parenchymal microxyhexactines with curved and spined rays.

61. *Hyalonema indicum* Schulze, 1894
(Fig. 61 a-e; Plate X E)

1894. *Hyalonema indicum* Schulze, p. 24, Taf. IV, Figs. 1-13, Taf. V, Fig. 1-14, Schulze, 1902, p. 10, pl. III, figs. 1-13, pl. IV, figs. 1-14.

1894. *Hyalonema pirum* Schulze, p. 27, af. III, Figs. 14-18.

1894. *Hyalonema heymonsi* Schulze, 29, Taf. IV, figs. 14-18.

1902. *Hyalonema indicum andamanense* Schulze, p. 10.

1902. *Hyalonema indicum laccadivense* Schulze, p. 10.

Material examined : Holotype re-examined, 5340/7, One ex., Andamans, Lat. 12 59' North, Long. 93 23' 10" East, 1250m, 13.11.1890, Coll. R.I.M.S., "Investigator"

Description : Spongebody tulip-shaped, 7 cm long, 4 cm broad, abruptly truncated terminally, root tuft projecting from the lower attenuated end of body, cylindrical, upper spirally-twisted part of it covered with continuous polythoa-crust, spicules comprising it isolated and diverge slightly below, colour -light clay in spirit; Oscules - Oscular sieve-plate circular, flat and raised towards margin, pores of sieve-plate numerous, more or less circular and 1-2 mm diameter.

Skeleton - Principal skeleton not fairly well preserved, its meshes small and quadratic, parenchyma formed of oxydiactines; pinules and amphidisc spicules forming dermal skeleton.

Megascleres - (1) Oxydiactines numerous, smooth, straight or slightly curved, centrally inflated portion bearing four tubercles arranged crosswise; very variable in size, 1-2 mm long,0.005-0.020 mm thick, (2) Oxyhexactines less in number; rays nearly equally long, smooth, gradually attenuated towards sharp pointed end, 0.030-0.040 mm thick, (3) Oxypentactines forming an important part of supporting skeleton, basal rays shorter than radial ray, radial ray 0.040-0.060 mm long, (4) Basalia spicules of root tuft long, 0.5 mm thick, either smooth or covered in greater part of their length with very minute spines, (5) Pinules slender, variable in length; four basal rays sharp-pointed, pretty stout, terminal parts covered with tubercles of small spines, 0.04-0.05 mm long; radial ray 0.5-0.6 mm long, basal part of it 0.04-0.05 mm long and 0.006-0.007 mm wide, side smooth, remaining distal part broad and spined, (6) Macramphidiscs numerous, hemispherical terminal discs with 6-8 broad and spade-like marginal teeth; shaft bearing rounded tubercles forming a ring round its centre and sparsely and irregularly scattered over other parts, 0.15-0.16 mm long and terminal discs 0.06-0.07 mm diameter. (7) Mesamphidiscs numerous in the wall of excurrent canals; shaft bearing blunt, irregularly distributed spines, 0.05-0.13 mm long; terminal disc with strongly curved, slender, long 8 marginal teeth, 0.03-0.04 mm in diameter.

Microscleres - (1) Micramphidiscs, abundant in dermal membrane and in oscular sieve-plate, 0.03-0.05 mm long; terminal discs hemispherical with 10-12 narrow marginal teeth, shaft slender, (2) Microxyhexactines abundant in parenchyme; rays straight; covered with small tubercles forming rough surface, 0.05-0.06 mm long, 0.003 mm wide at base, (3) Microxystauractines less in number, rays straight tuberculate, 0.050-0.065 mm long, 0.003 mm wide at base.

Distribution : Andaman sea & Laccadive sea (Schulze, 1902).

Remarks : Schulze (1902) described two subspecies as *Hyalonema indicum laccadivense and Hyalonema indicum andamanense* recorded from Laccadives and Andamans respectively, depending upon the differences in the shape and size of dermal pinules and dimension and abundance of the macramphidiscs.But these characters are merely superficial and not sufficient enough to differentiate them, hence the author described them as a single species *Hyalonema indicum* in the present study.

62. *Hyalonema lamella* Schulze, 1900
(Fig. 62 a-e; Plate XI A)

1900. *Hyalonema lamella* Schulze, p. 15, Taf. III; Schulze, 1902, p. 15, pl. 19.

Material examined : 5970/7, One ex., Andamans, 160 m, 29.12.1887, Coll. Marine Survey.

Description : Spongebody 2.7 cm long, 2.1 cm broad and 1.5 cm thick, rather harsh, brittle lamella, 10-15 mm thick, lamellae covered on their external surface by a fairly even, velvet-like dermal layer, reticular structure of which very indistinct; traces of marginalia left hardly visible to naked eye; Oscules – indistinct and not visible to naked eye.

Skeleton - supporting skeleton of interior chiefly consisting of parenchymal oxydiactine megascleres, most of them aggregated in loose bundles forming a network traversing the sponge in every direction; both surface of lamella uniformly covered with slender pentactine spicules; macramphidisc absent in dermal memberane but scattered throughout parenchyma; oxyhexactine microscleres numerous in parenchyma, walls of subdermal cavities and incurrent canals originating from them; micramphidiscs scarce and scattered irregularly in dermal and gastral membrane and in choanosome.

Megascleres - (1) Oxydiactines straight or slightly curved, smooth, gradually attenuated towards pointed ends; 1-2 mm long 0.005-0.020 mm wide, occasionally 5 mm long, (2) Pinules pentactine, four basal rays forming a rectangular cross, 0.05 mm long terminal parts covered with short and oblique spines directed outwards; free radial ray bearing rather short slightly divergent spines, longest in the middle of its spiny part, decreasing in size towards its apex and also towards its smooth and spineless basal part, 0.2-0.6 mm long, (3) Macramphidiscs 0.3-0.4 mm long; shaft thinnest in the middle where a ring of sharp spines present, remaining part smooth; terminal discs flat, with eight broad spade-like marginal teech, 0.12 mm in diameter and 0.06 mm thick, (4) Mesamphidisc ellipsoidal, abundant, 0.04-0.06 mm in length; shaft slender and covered with numerous small and sharp spines; terminal discs, with 8-10 narrow marginal teeth of 0.01 mm long.

Microscleres (1) Micro-oxyhexactines with smooth rays of medium thickness, numerous in parenchyme, 0.08-0.12 mm in diameter, (2) Micramphidiscs less in number and scattered irregularly in the dermal gastral membrane, 0.015-0.020 mm long; terminal discs hemispherical with numerous marginal teeth.

Distribution : In India : Andamans, Cape Comorin.

Remarks : Hyalonema lamella was first described by Schulze (1900) from Cape Comorin and afterwards there is no record of this species. This is the first record of the species from the Andamans.

63. *Hyalonema martabanense* Schulze, 1900
(Fig. 63 a-j; Plate XI B)

1900. *Hyanlonema martabanense* Schulze, p. 12, Tab. III; Schulze, 1902, p. 21, pl. 18.

Material examined : P3475/1, One ex., Andamans, 1171 m, 2.9.1897, Coll. Marine Survey.

Description : Spongebody cone-shaped, 8cm long and broader upper end 4 cm in diameter, lateral surface crushed, irregularly pitted and covered with a dermal reticulation, terminal face velvety considerably depressed in the centre and raised towards the margin to form a low ring-wall with sharp projecting edge; Oscule - Irregularly scattered apertures, 2-3 mm wide, present on the terminal face.

Skeleton - Large oxydiactines with blunt end arranged longitudinally just below dermal membrane; similar but smaller amphioxeas either isolated or aggregated in strands or bundles forming a network with wide meshes traversing the sponges in all directions; pentactine pinules lining the larger canals and the choanocyte chambers; whole upper, terminal face covered with marginalia like oxydiactine pinules; macramphidisc and micro -oxyhexactines irregularly scattered in parenchyme.

Megascleres - (1) Oxydiactines slightly curved, smooth, spindle-shaped with more or less blunt ends, 5-10 mm long, 0.15-0.25 mm wide, (2) Amphioxeas straight or slightly curved, smooth, a slight inflation in the centre, 0.40-0.80 mm long, 0.03-0.05 mm wide, (3) Pentactine pinules numerous; four straight, slightly tuberculous basal rays, 0.04-0.05mm long; distal ray 0.175-0.250 mm long, stout, pointed and covered with short spines, (4) Diactine pinules straight pointed at both ends, less in number; 0.05-0.06 mm long, free distal ray covered with very oblique spine, and inner proximal ray much shorter, smooth or slightly tuberculous towards its pointed ends; these spicules resembling in every respect the oxydiactine marginalia of other Hyalonema species, (5) Macramphidiscs fairly abundant and irregularly scattered in parenchyma; 0.5-1.0 mm long, shaft smooth, or scattered spines, in the centre of shaft a whorl of 4-8 small sharp tubercules; terminal discs hemispherical broader than high and 0.12-0.16 mm in transverse diameter, 8 narrow marginal teeth terminally lancet-shaped; the other variety of macramphidisc smaller in size, 0.08-0.10 mm long, terminal disc with 5-6 broad spade-like marginal teeth, shaft cylindrical covered with more or less rounded tubercles, (6) Mesamphidiscs principally present in the walls of larger canals, 0.04-0.07 mm long; shaft slender, cylindrical, spines, four crosswise arranged spines in the centre; terminal discs bell-shaped with 10 narrow long marginal teeth, (7) Acanthophores numerous in the elevated margin surrounding the entrance into the penduncle cavity, stauractines and diactines of various sizes, covered with stout spines, (8) Spheres an interesting structure of concentric layers of silica, scattered irregularly particularly below the gastral membrane, 0.12 mm in diameter.

Microscleres - (1) Micro-oxyhexactines abundant in parenchyme, 0.1mm in diameter; rays smooth or slightly roughened, medium stout, very disctinctly and uniformly bent in their

distal half, (2) Micramphidiscs numerous in dermal and gastral membrane, 0.02-0.04 mm long; marginal teeth of terminal disc not distinct.

Distribution : In India : Andamans.

Elsewhere : Gulf of Martaban (Schulze, 1900).

Remarks : Schulze (1900) described the species *Hyalonema martabanense* from Martaban Bay. This is the first record from the Andamans with detailed description.

64. *Hyalonema masoni* Schulze, 1894
(Fig. 64 a-j; Plate XI C)

1894. *Hyalonema masoni* Schulze, p. 31, Taf. VI; Schulze, 1900, p. 8; Schulze, 1902, p. 13, pl. V.

Material examined : ZEV913/7, One ex., Andaman Sea, Lat. 13°50'30" North, Long. 93°26'8? East, 911 m, 21.12.1897, Coll. R.I.M.S. "Investigator"

Description : Spongebody slender, slightly-inflated funnel shaped; 12 cm high and 6.5 cm diameter at upper free margin of funnel; from centre of floor of funnel cavity a slender cone, 15 mm high and 5 mm thick at base, rising vertically; lateral wall of funnel 5-10 mm thick at base and gradually becoming thinner and terminating with a circular, sharp margin; outer surface smooth and inner surface perforated by numerous more or less ciruclar apertures; a root tuft or peduncle, 6 mm diameter, composed of spirally inter-twisted spicules, each about 0.5 mm thick, protruding from basal, attenuated end of spongebody; body rather stiff, clay-coloured interior and rust-red tinge coloured outside in spirit; Oscule - present in inner surface of funnel-shaped body, numerous, more or less circular, 1-5 mm diameter, decreased in size towards upper, free margin of funnel-wall, oscular sieve-plate absent.

Skeleton - Large diactines oxyhexatines prevalent in parenchyme, dermal and gastral membrane; walls of larger excurrent canals supported by oxypentactines, pinules and macramphidiscs forming dermal layer and uniformly developed on all parts of surface; margin of funnel composed of diactine marginalia; mesamphidisc, micramphidisc and microhexactines abundant and scattered throughout parenchyme.

Megascleres - (1) Diactines more in number smooth, pointed at both ends, 1.5 mm long, 0.025 mm wide, (2) Oxyhexactines less in number, either terminate with sharp pointed or with slight rough inflations, smooth, rays 0.3 mm long, 0.01 mm wide at base, (3) Oxypentactines stout, smooth, numerous, basal rays present outward and vertical ray directed inward, vertical ray longer than basal rays, basal ray 0.3 mm long and vertical ray 0.5 mm long, 0.015 mm wide, (4) Pinules of both dermal and gastral layer resembling in appearance with italian poplar trees; basal rays stout, slightly roughened, 0.018-0.020 mm long; proximal smooth part of radial ray 0.015-0.025 mm long and spined terminal part 0.06-0.08 mm long, bud-shaped upper end containing a medium sized central cone, (5) Diactinel marginalia resembling main ray of pinules; proximal part smooth and sharp pointed, distal part covered

with oblique spines, bushy; at centre of spicule four hemispherical protuberances arranged crosswise; 0.025 mm long, (6) Macramphidiscs 0.2-0.4 mm long; shaft 0.012-0.015 mm thick bearing tubercles, four longer tubercles arranged crosswise in the centre; terminal disc hemispherical with 8 spade-like marginal teeth, 0.1-0.2 mm broad, 0.07-0.08 mm high, (7) Mesamphidisc scarce, 0.1 mm long; terminal discs with eight marginal spade-like teeth 0.04 mm long and shaft tuberculous in the central part.

Microscleres - (1) Micramphidiscs numerous, 0.02-0.04 mm long; marginal teeth not distinct, (2) Microhexactines with smooth, curved rays 0.04-0.06 mm long, abundant in the parenchyme, (3) Microhexactines with straight and tuberculous rays 0.045-0.06 mm long.

Distribution : In India : Andaman Sea.

Elsewhere : Bay of Bengal (Schulze, 1894).

Remarks : Schulze (1894) described *Hyalonema masoni* from Bay of Bengal and again he described this species in the year 1900 from Andamans. This species was not recorded further, only the detailed description of the species from Andamans is given in this account.

65. ***Hyalonema rapa*** Schulze, 1900
(Fig. 65 a-j)

1900. *Hyalonema rapa* Schulze, p. 15, Taf. I; Schulze, 1902, p. 18, pl. XVII.

Material examined : P 3497/1, one ex., Stn. 315, south of Andaman Is., 10°6′N, 92°29′E, 1290 m, 12.04.1903, Marine Survey.

Description : Spongebody slender; conical, pretty tough, 80 mm long, upper truncated end 20 mm broad; a root tuft or penducle, 120 mm long, 5 mm thick composed of 20-30 spicules of less than 0.5 mm thick, twisted, protruding from lower attenuated end; terminal face covered by a tough skin with irregular depressions appeared velvet-like; whitish gray colour in spirit, Oscule - very less in number present on the truncated end, 0.5-1.0 mm in diameter.

Skeleton - Very large, strongly curved diactines and moderate size diactines forming parenchymal skeleton, oxyhexactines and oxypentactines spicules sparsely scattered between diactine spicules; pinules forming dermal and gastral layer and also walls of larger excurrent canals; macramphidiscs irregularly scattered in internal parenchyme; mesamphidiscs pretty numerous between basal crosses of canalar pentactine pinules; microxyhexactine and micramphidiscs spicules scattered in different region in varying numbers; few acanthophores present in lower attenuated end of body.

Megascleres - (1) Oxydiactines of very large and conspicuous, curved or abruptly bent, smooth; 5-15 mm long, 0.5-0.7 mm thick; (2) Oxydiactines of slender, straight or slightly curved, smooth or two to four protuberances in middle, 0.3-0.8 mm long, 0.008-0.020 mm thick, (3) Oxyhexactines less in number, smooth, 05.-0.8mm in diameter, (4) Oxypentactines

less in number, stout and smooth, 0.5.-0.8 mm diameter, (5) Dermal pinules numerous; four basal rays, forming a rectangular cross terminally pointed and finely granulated, 0.04-0.05 mm long; free radial ray 0.140-0.165 mm long, proximal one-third portion smooth, distal two-thirds uniformly attenuated towards sharp pointed end and covered with rather short, slightly divergent spines which attaining greatest length at the lower end and gradually decreasing in size upwards, (6) Canalar pinules very similar with dermal pinules except the length of radial ray not more than 0.12 mm, (7) Gastral pinules considerably longer, 0.35 mm and more long but otherwise similar, (8) Oxydiactine marginalia of rounded oscular margin bearing short spines on their distal free part, (9) Macramphidiscs numerous, irregularly scattered in parenchyme, 0.3-0.75 mm long; shaft smooth or covered with irregularly distributed, sharp tubercles; terminal discs hemispherical, 0.1-0.2 mm long, 8 marginal teeth of inconsiderable breadth terminating with lancet-shaped points,(10) Mesamphidiscs numerous, occurring between basal crosses of canalar pentactine pinules, 0.05-0.06 mm long; shaft cylindrical of medium thickness, covered with irregularly scattered sharp tubercles; terminal discs deeply bell-shaped, 10 narrow and pointed marginal teeth extending nearly parallel to shaft, (11) Acanthophores present at lower, attennuated end of body, few in number; 2-6 stout and usually slightly curved rays.

Microscleres - (1) Micro-oxyhexactines present in different regions in varying numbers, 0.12-0.14 mm diameterr; rays straight fairly stout, nearly smooth, sharp pointed and terminally slightly curved or angularly bent, (2) Micramphidiscs very variable in number found in dermal and gastral memberane and a parenchyme; 0.02-0.04 mm long, terminal discs hemispherical with 10-12 marginal teeth.

Distribution : In India : Andamans.

Elsewhere : Bay of Bengal (Schulze, 1900).

Remarks : Schulze (1900) first described the species from Bay of Bengal. After that it is recorded from no where else, This is the first record of this species from the Andamans.

Genus *Lophophysema* Schulze, 1900

1900. *Lophophysema* Schulze, p. 19.

Diagnosis : Spongebody of tuft swelling, presence of stauractine acanthophores and large curved oxydiactine spicules.

Type species : *Lophophysema inflatum* Schulze, 1900.

66. *Lophophysema inflatum* Schulze, 1900
(Fig. 66 a-i; Plate XI D)

1900. *Lophophysema inflatum* Schulze, p. 19, Taf. IV, V; Schulze, 1902, p. 38, pl. XX, XXI.

Material examined : ZEV914/7, One ex., Andaman sea, Lat. 13°50'30" North, Long. 90°26'8" East, 911 m, 21.12.1897, Coll. R.I.M.S. Investigator.

Description : Spongebody consisting of two parts, upper part cylindrical mass and lower conical basal part differentiated by an annular, prominent ridge of 1 cm high and 23 cm in diameter; opening of cone of basal part truncated, slightly concave and surrounded by a tuberculous ring wall a few millimeter high and 3 cm in diameter from where root tuft torn off from the sponge, several stumps of basalia-spicule protruding from it for a distance of a few centimeter, surface of lower cone forming a sort of network with very irregular round cavities; the upper cylindrical part large and soft, reticulated amd forming slightly depressed beehive-like structure; dark gray colour in spirit; Oscule - present throughout upper cylindrical part forming the meshes of reticulation, numerous, rounded, 8-10mm wide; whole of this reticulation considered as oscular sieve-plate; incurrent opening or ostia present in lower conical part.

Skeleton - Membranes of incurrent and excurrent system covered with pentactine canalar pinules; numerous oxydiactines singly or aggregated in strands occupying parenchyme of lamellae between incurrent and excurrent systems; stout oxypentactine hypodermalia frequent everywhere below dermal membrane; oxydiactine marginalia, projecting from annular ridge, forming a single or double row; macramphidiscs scattered singly throughout parnechyme; acanthophores occurring in vicinity of point of insertion of root tuft; baslia, forming a slender central cone, extending upwards through body of sponge for a distance of 15 cm; micro-oxyhexactines abundant in parenchyme and micramphidiscs abundant in membranes lining canals.

Megascleres - (1) Oxydiactines numerous, slender, straight or slightly curved, smooth or two opposite or four corosswise arranged tubercles with axial canals in the middle, over 1mm long, (2) Oxypentactine hypodermalia stout, smooth, taking part in supporting soft part, (3) Pentactine pinules slender, basal rays smooth or slightly roughened and uniformly attenuated towards pointed end, 0.04-0.05 mm long; free main ray terminally covered with oblique spines, 0.1-0.28 mm long, (4) Oxydiactine marginalia 0.6 mm long; the proximal embedded ray smooth, gradually attenuated towards pointed end, 0.1-0.2 mm long; distal free ray also gradually attenuated and pointed, covered with rather short, oblique spines, 0.4-0.5 mm long; from centre of spicule four pretty high pointed protuberances arranged crosswise, (5) Parenchymal diactines rounded at one or both ends and assume shape of styles or amphistrongyles accordingly, (6) Macramphidiscs few in number, 0.2-0.25 mm long; terminal discs broad hemispherical, 8 broad and spade-like marginal teeth, (7) Acanthophores with stout rays, covered with thick spines terminally or throughout body, stauractines most frequent, (8) Basalia knitting needle-shaped, smooth, 15 cm long, 1mm thick.

Microscleres - (1) Micro-oxyhexactines abundant, rays either covered with very minute spines or merely rough, 0.06-0.08 mm long, (2) Micramphidisc abundant, 0.020-0.045 mm long, terminal discs with 10-12 marginal teeth, hemispherical.

Distribution : Andamans.

Remarks : Schulze (1900) described *Lophophysema inflatum* from the Andaman Sea. This species is not recorded afterwards. The detailed description of the species is given in the present account.

Family PHERONEMATIDAE Gray, 1870

Diagnosis : Sponges varying in shape from thick walled vasiform, upright lamellae to columnar forms; uncinate spicules and scepters present; supporting spicules of choanosome hexactines or pentactines or both; marginal and pleural prostals occur as scepters projecting from dermal surface; terminal anchor at end of basal spicules bidentate, arranged like flukes of a ship's anchor; tufts of spicules not spirally twisted and not forming a compact axial columella.

Key to genera of family PHERONEMATIDAE
Known from Andaman and Nicobar Islands

1a. Hexactines with six fully developed rays present ..... ***Pheronema***

1b. Hexactines with six fully developed rays absent ..... ***Semperella***

Genus ***Pheronema*** Leidy, 1868

Diagnosis : Cup or bowl-shaped body; body thick walled with a large spongocoel, Osculum guarded by spicules or marginal prostals, glassy spicules projecting from body surface in tufts called 'Pleural prostals' giving appearance of glass wool; microscleres amphidisc; broad, illdefined root tufts made of silica serving for attachment to the substratum.

Distribution : Atlantic Ocean, Mediterranean Sea and Indian Ocean.

67. ***Pheronema raphanus*** Schulze, 1894.
(Fig. 67 a-j; Plate XI E)

1894. *Pheronema raphanus* Schulze, p. 8, Tab. 1, Schulze, 1902, p. 5, pl. 1.

1894. *Pheronema circumpalatum* Schulze, p. 13, Tab. II.

Material examined : 9945/6, One ex., West Andamans, 436-531 m, Coll. R.I.M.S. "Investigator"; 5921-5926/6, 6 exs., Lat. 13°27' North, Long. 93°14'30" East, 741 m, 21.12.1896, Coll. R.I.M.S., "Investigator" 5912-5919/7, 8 ex., Andamans, 741 m, Marine Survey.

Description : Spongebody 2.4 cm high and 2.2 cm in diameter,radish in shape, upper surface occupied by a plain or lightly concave sieve plate, sides bulge considerably in their upper part; from lower portion of body a root-tufts or spiculebundles arising for attachment

to substratum; colour –brownish gray in spirit, Oscules - situated on upper flat portion of body, oscular margin nearly circular.

Skeleton - supporting spicules oxypentactines and large uncinates; prostalia marginalis and prostalia lateralis formed of diactines; root-tuft formed of basalia, the two-teethed anchors; pinules forming a network with quadratic meshes in which lying macramphidiscs, micramphidiscs, microuncinates and microhexactine spicules.

Megascleres - (1) Oxypentactines very variable in size, largest 15 mm long, rays smooth with sharp pointed ends, (2) Uncinates of two sizes; large uncinates diactines, straight or slightly curved, 4-6 cm long and 0.02-0.06 mm thick, proximal one third portion smooth and remaining two third portion covered with small, sharp, conuli-like tubercles; small uncinates 2-2.5 mm long and 0.015-0.018 mm thick, (3) Anchors two teethed, thickness of central inflated part of anchor 0.06mm, anchor-teeth broad and flattened, chord 6-8 mm long, (4) Pinules present in groups of 70-140; four basal rays 0.05-0.07 mm long, 0.005-0.006 mm thick, proximally cylindrical and smooth, distally slightly inflated and covered with sharp tubercles; distal ray vertical to plane of four basal rays, proximal part smooth 0.011-0.012 mm long, 0.008-0.009 mm thick, distal part conical or carrot-shaped covered with curved spines, 0.06-0.12 mm long and 0.035-0.045 mm broad, (5) Amphidiscs large with bell-shaped terminal discs; shaft 0.25-0.35 mm long and 0.011-0.012 mm wide with a few rounded tubercles in central part; discs with eight broad, terminally rounded marginal teeth, 0.07-0.08 mm in diameter.

Microscleres - (1) Micramphidiscs with rough shaft, 0.03-0.04 mm long; bell-shaped discs with 8-12 marginal teeth and 0.008 mm in diameter, (2) Microuncinates covered with short, oblique spines and 0.4-0.5 mm long, 0.005-0.007 mm thick, (3) Microhexactines scattered throughout sponge body in varying quantities, 6 rays equal, smooth or slightly roughened, straight, 0.15-0.18 mm long, 0.002-0.003 mm thick at base of ray.

Distribution : In India : Andamans.

Elsewhere : Atlantic Ocean, Mediterranian sea and Indian Ocean.

Remarks : *Pheronema raphanus* was recorded for the first time by Schulze (1900) from the Andaman and Nicobar Islands. Again during present studies of sponges from Andaman and Nicoabar Islands the same species from the same locality is described in details.

Genus ***Semperella*** Gray, 1868

1868. *Semperella* Gray, p. 540.

Diagnosis : Root-tuft as thick as inferior end of spongebody and appearing as a direct continuation of spongebody, incurred areas covered by fine quadratic reticulation, supporting skeleton chiefly composed of oxypentactines, uncinate spicules present; true hexactines and true diactines absent.

Type species : *Semperella schulzei* Semper.

68. *Semperella cucumis* Schulze, 1894
(Fig. 68 a-h; Plate XI F)

1894. *Semperella cucumis* Schulze, p. 45, Taf. IX; Schulze, 1902, p. 41, pl. VIII.

Material examined : Holotype re-examined, 9941/6 and 5347/7, two ex., off west coast of Andamans, 435-530 m, Coll. Marine Survey.

Description : Spongebody cucumber-shaped, with a slight 'S'-shaped curvature and a circular transverse section 12-40 cm long and 2-8 cm broad; in upper end slightly truncate, of a somewhat loose and tuft appearance and root-tuft protruding from lower terminal face, as thick as inferior end of spongebody and appearing as a direct continuation of body, root tuft 10-20 cm long, 2-5 cm thick, composed of bundles of spicules each of 2-5 mm thick, which arising 5-10 mm apart from lower face of sponge and embedded in silt of sea bottom; Oscules - rounded, partly arranged in irregular transverse rows or low spirals and partly scattered irregularly; incurrent areas covered with fine quadratic reticulation.

Skeleton - Whole body consisting of a complicated network of tubes, more or less circular in transverse section and 5-10 mm wide, their walls 0.5-2 mm thick and supported by numerous strands of stout megascleres; supporting skeleton, composed of megascleres, forming a rather loose system of rope or band-shaped spicule - bundles up to 2 mm thick and traverse tube-walls in a more or less regular manner; in whole of axial part of sponge, up to a distance of 1cm from lateral surface, nearly all bands of megascleres arranged longitudinally; only here and there oblique transverse bands connecting longitudinal ones; in distal part of sponge spicule-bands anastomosing here and there and mostly extending in a radial direction; towards interior, these superficial radial bundles bending round and becoming longitudinal bundles; towards upper narrow end of sponge axial longitudinal bundles approaching surface much more closely, superficial region occupied by radial bundles becoming thin and finally longitudinal bundles reaching surface itself.

Megascaleres - (1) Oxypentactines forming spicule bundles of supporting skeleton; two basal rays lying in one of axis very long; two lying in another little shorter 0.1-0.2 mm long, 0.008-0.012 mm thick; fifth ray considerably shorter, (2) Pentactines forming oscular sieves resting on distal margins of tube walls; one ray of considerable length, slender at base, but thickened in its distal part; other four rays very short and terminally rounded, forming a cross and extending paratangentially just below surface, (3) Oxypentactine hypodermalia supporting dermal raticulation and oscular sieve-plate, four pretty long paratangential rays forming a cross and a radial ray shorter than basal rays, all rays pointed and often slightly inflated near end, (4) Uncinates present in spicule bundles of tube walls, 3-4 mm long, (5) Marginal diactines straight and slender, met within distal ends of tube walls just below surface; rhabds minutely spined and gradually attenuated towards proximal, pointed end; distal end abruptly thickened and bearing four pointed spines, arranged crosswise, (6) Anchor-

spicules of basal root tuft bidentate, sharp lateral n margins of two opposite spade-like anchor teeth serrated distally by numerous projecting lateral teeth and protruding outwards and upwards, (7) Pinules present in dermal membrane and oscular sieve plate, numerous, 0.2-0.4 mm long; basal rays stout, straight distally covered with tubercles or short spines, forming a rectangular cross, 0.06-0.08 mm long; main radial ray covered with stout, obliquely-diverging spines, resembling an Italian poplar tree, basal part free from spines 0.03-0.04 mm long, 0.006-0.01mm thick, (8) Macramphidiscs present in dermal membrane and in oscular sieve-plate, large, stout and numerous, 0.35-0.45 mm long; terminal discs hemispherical with 8 broad spade-like terminally rounded marginal teeth; shaft pretty stout, knotty, but without any conspicuous portuberance in centre, 9)Stauractines irregularly scattered between pentactines, numerous exactly similar to the basal crosses of pentactines, (10) Oxidiactines of spindle -shaped most frequent in dermal raticulations and walls of incurrent and excurrent cavities, simple, straight, cylindrical central part smooth pointed, terminal conical parts covered with oblique protuberances and spines pointed outwards.

Microscleres - (1) Micramphidics frequent, 0.02-0.04 mm long; terminal discs hemispherical, 10-12 marginal teeth, 0.006-0.012 mm broad; shaft slender slightly tuberculous.

Distribution : Andamans.

Remarks : In *Semperella cucumis* true hexactines, diactines and mesamphidisc megascleres are absent. *Semperella cucumis* is the endemic species to Andamans. It was earlier described by Schulze (1894) from Andamans. Afterwards there is no record from anywhere else. Present study is the re-examination of the type specimens.

Subclass HEXASTEROPHORA Schulze, 1886

Diagnosis : Hexactinellida in which Amphidiscs invariably absent, but hexasters nearly always present; commonly firmly fixed by its base to a hard substratum.

Key to orders of subclass Hexasterophora Known from Andaman and Nicobar Islands

1a. Parenchymal megascleres fused to form rigid skeleton ..... HEXACTINOSIDA

1b. Parenchymal megascleres free ..... LYSSACINOSIDA

Order HEXACTINOSIDA Schrammen, 1903

Diagnosis : Parenchymal skeleton rigid as a result of fusion of hexactines; basic mode of fusion by enclosure of two rays laid side by side with secondary deposits or silica; single rays united to other beams or to nodes of other fused spicules and synapticula linking beams or ray laterally forming dictyonal framework; dermal and gastral spicules usually connected by tissue only, rarely by cementation of synapticula.

Key to families of order HEXACTINOSIDA
Known from Andaman and Nicobar Islands

1a. Scopules present 2

1b. Scopules absent ..... FARREIDAE

2a. Dictyonal skeletal network irregular quadrangular or triangular meshes ..... TRETODICTYIDAE

2b. Dictyonal skeletal network hexagonal meshes honeycomb like ..... APHROCALLISTIDAE

Family APHROCALLISTIDAE Gray, 1867

Diagnosis : Tubular or Caliculate sponge with lateral diverticula; dictyonela net hexagonal meshes honeycomb like skeletal framework betwen cavities comprising irregular meshes; dermal spicules hexactines or pentactines with toothed distal rays; gastral spicules like the dermal or rhabdodiactines; hexasters of oxyhexasters, tylohexasters, onychohexasters or discohexasters; scopules and uncinates always present.

Genus ***Aphrocallistes*** Gray, 1858

1858. *Aphrocallistes* Gray, p. 114

Diagnosis : Dermalia hexactines with a pinule-like distal ray; microscleres parenchymalia oxyhexasters; hexagonal structure of diactinal network.

Type species : *Aphrocallistes beatrix* Gray., 1858

Key to the species of Genus *Aphrocallistes*
Known from Andaman and Nicobar Islands

1a. Spongebody dichotomously branched ..... *A. ramosus*

1b. Spongebody not dichotomously branched 2

2a. Onychasters present ..... *A. bocagei*

2b. Onychasters absent ..... *A. beatrix*

69. ***Aphrocallistes beatrix*** Gray, 1858
(Fig. 69 a-g; Plate XII A)

1858. *Aphrocallistes beatrix* Gray, p. 114; Schulze, 1887, pp. 311-313, pl. LXXXIV, fig. 9, 10; Schulze, 1895, pp. 68-76, Taf. VI, fig. 1-13, Schulze, 1900, pp. 38-39; Schulze, 1902, p. 87, pl. XV, figs. 1-13; Dendy & Burton, 1926, p. 226.

Material examined : ZEV 919/7, two ex., Lat. 13°15' North, Long. 93°10' East, 362 m, 9.12.1896, Coll. R.I.M.S. Investigator"; P232/1 one ex., between North and South Sentinal Islands, Andamans, 403-439 m, 12.4.1888, Coll. R.I.M.S.,"Investigator" ZEV 820/7, One ex., Andamans, 430-531 m, 11.04.1898, Coll. .I.M.S "Investigator" P 233/1, one ex., Port Blair, Andamans, 205 m, 13.04.1888, coll. R.I.M.S."Investigator"; 5332/7, one ex. West of Andamans, 238-458 m, 07.02.1888, Coll. R.I.M.S., "Investigator"; 8565/6, one ex., off Port Blair, 496 m, Coll. Marine Survey (Dr. Giles); ZEV 279-80/7, one lot, Andaman sea, 13 16 30 N., 93 8 E, 144 m 23.11.1896, Coll. Marine Survey.

Description : Spongebody slender, erect, inversely conical, 4-6 cm high; from sides of body numerous beehive-shaped or hemispherical diverticula protruding, arranged in irregular longitudinal rows; the processes of lower end of body extended to form tubes, 1-2 cm long and 3-4 mm broad and those of upper end of body much shorter and dome-shaped apex; Oscules - at upper end a rather irregular, round oscular aperture, 1mm in diameter, covered with a sieve-plate.

Skeleton - Dictyonal net forming a regular and uniform hexagonal honey-comb; hexactinal dictyonalia joined in a peculiar manner to form a rather irregular net or latticework triangular meshes and irregularly polyradiate nodes.

Megascleres - (1) Dermal oxyhexactines slender with free distal ray, terminally thickened in a club-shaped manner and covered with slender spines or thorns of medium length which diverging obliquely and curved towards end of ray; 0.1-0.2 mm long; tangential rays simple, straight, slightly tuberculous at blunt ends and about as long as distal ray; proximal ray similar in shape but generally longer, (2) gastral rhabdose diactines stout, straight with club-shaped thickened ends covered with small pointed tubercles, two or four rounded portuberances in middle, 1 mm long; (3) Scopules numerous, arranged vertically to surface and variable in shape, 4-6 branches lying between proximal, radial ays of dermal hexactines and nearly reaching surface; shaft simple straight attenuated towards pointed end and rough terminally, 0.3-0.5 mm long, branches either straight; or bent, smooth or spined, diverging towards end, some with terminal transverse disc bearing marginal teeth, some with simple knob-like structure at end, 0.03-0.05 mm long, (4) Uncinates varying in length and thickness, met with dictyonal honeycomb, frequently arranged vertically to surface and usually penetrating whole thickness of body-wall, spines very oblique and pointed inwards, 0.5-0.8 mm long.

Microscleres - (1) Micro-oxyhexactines irregularly scattered throughout parenchyme, 0.1-0.15 mm in diameter; centres usually considerably thickened; rays stout, straight, gradually attenuated, bluntly pointed and irregularly coverred with more or less numerous, small tubercles or vertical spines, (2) Hexasters irregularly scattered through chamber-layer, subgastral and ubdermal region; but absent in gastral and dermal membrane; main ray 0.008 mm long, 0.002 mm thick and on margin of thickened end 3, 4 or 6 branch-rays arising; branch rays 0.025-0.030 mm long, gradually attenuated to a sharp pointed end, (3) Hemioxyhexasters derivative of regular hexasters, two opposite main-rays longer than four other, branch rays of latter reduced to three or two or absent altogether; 0.08-0.15 mm long.

Distribution : In India : Andamans.

Elsewhere : Bay of Bengal (Schulze, 1902), Malacca (Gray, 1858).

Remarks : Gray (1858) first described the species *Aphrocallistes beatrix* from Malacca. Schulze (1900) recorded the same species as the first record from Andamans. The present account is the restudy and re-description of the species from the Andamans and Schulz's (1900) material has presently been reexamined.

70. *Aphrocallistes bocagei* Wright, 1870
(Fig. 70 a-g; Plate XII B)

1870. *Aphrocallistes bocagei* Wright, p. 77, pl. I; Schulze, 1887, p. 305, pl. 83-86; Schulze, 1895, p. 78, Taf. VIII; Schulze, 1900, p. 39; Schulze, 1902, p. 93, pl. XVI.

Material examined : ZEV 926/7, One ex., Andamans, Lat. 13°17' North; Long. 93°7' East, 165 m, 13.4.1898, Coll. R.I.M.S. "Investigator"; 5337/7, one ex., Andamans, 351 m, Coll. R.I.M.S "Investigator"; 5328/7, one ex., S.W. of North Sentinel Island, 238-458 m, 7.2.1888, Coll. R.I.M.S. "Investigator"; 5332/7, One ex., West Andamans, 436-531 m, Coll. R.I.M.S."Investigator"; 5333/7 one lot, between North and South Sentinel Island, 403-439 m, Coll. R.I.M.S. "Investigator"; ZEV 925/7, one ex., Andamans, 238-458 m, Coll. Marine Survey.

Description : Spongebody slender, erect, caliculate or funnel-shaped, 3-10 cm high; radial tubular diverticula arising from sides of body increase in size towards upper end of sponge in contrast to larger towards base in *A. beatrix*; some of diverticula dichotomously divided, most of them however simple and straight or slightly curved; nearly all diverticula reach other diverticula belonging to different calices and impinging on them either terminally or laterally, whereupon they grow together and thus all calices firmly united to form a solid continous structure; Oscule - in some diverticula a terminal, circular oscule present; each calyx having one or two transverse seive-plate which however not regularly placed in interstices of verticeles of diverticula.

Skeleton - Dictyonal net forming typical hexagonal honeycomb; hexactinal dictyonalia join to form irregular polyradiate nodes and the tuberculous conical beams protuding from it towards dermal and gastral suface.

Megascleres - (1) Dermal oxyhexactines slender; distal ray pinule-like, smooth in basal third and covered with thin not very numerous spines bent obliquely outwards, decreasing in size towards end of ray, in the distal two thirds, 0.1-0.2 mm long; other tangential and proximal rays straight, slightly tuberculous and as long as distal ray, (2) Gastral diactines supporting gastral membrane, thick, tuberculous, straight and terminally blunt, 1-2 mm long, (3) Gastral stauractines also supporting gastral membrane, four rays, thick, tuberculous, straight and terminally blunt with spines, (4) Uncinates long, lying vertical to outer surface, distal ends nearly reaching surface; spines very oblique, pointed inwards, (5) Scopules

present in dermal layer, numerous, arranged vertically to surface, variable in shape; shaft simple, straight, attennuated towards pointed end, rough terminally, 0.4-0.5 mm long; 4-6 radial rays either straight or bend, smooth or spined, diverging towards end, either with terminal marginal teeth bearing disc or with knob-like structure, 0.04-0.05 mm long.

Microscleres - (1) Micro-oxyhexactines present in parenchymal layer, slender, all rays covered with fine, vertical spines, 0.1-0.2 mm in diameter, (2) Hexasters scattered in varying number irregularly through parenchyme; with six equal main rays forming with each other right angles; some rays unbranched and some rays terminally crowned with groups of branch-rays; 0.05-0.08 mm in diameter, (3) Onychasters present in parenchymal layer, greatly vary in length and curvature of their fine terminal clades; 0.06-0.09 mm in diameter, (4) Hemioxyhexasters elongated, two opposite main rays differentiated and terminally divided into four, five or more diverging branch rays, and four other lateral main rays remained undivided, 0.15-0.20 mm long and branch rays 0.020-0.035 mm long.

Distribution : In India : Andamans, West coast of India, Cape Comorin.

Elsewhere : Bay of Bengal, Arabian Sea, Angrias bank.

Remarks : Schulze (1900) recorded this species from Andamans for the first time. Present account is the re-description of the same species from Andamans and adjoining areas.

71. ***Aphrocallistes ramosus*** Schulze, 1886
(Fig. 71 a-g; Plate XII C)

1886. *Aphrocallistes ramosus* Schulze, p. 75; Schulze, 1887, p. 319; Schulze, 1895, p. 76, Taf. VII, Fig. 14; Schulze, 1902, p. 97, pl. XV, fig. 14.

Material examined : 5324/7, One ex., about 30m, West of Cape Bluff, Middle Andaman, 878-1006 m, 13.4.1889, Coll. R.I.M.S. "Investigator"

Description : Spongebody tubular, dichotomously branched, circular in transverse section diameter 8 mm and above; by repeated bifurcation and breaking off of every second branch, a zigzag-shaped tube, 8-15 mm wide produced from angular bends of which stumps of branches broken off, extending obliquely upwards; in upper parts branches generally not broken off and preserved with their dichotomous ramification; largest specimen 10 cm high; Oscules - at upper end of branch, due to breaking off branches oscular apertures not seen in all branches.

Skeleton - Dictyonal net forming a regular and uniform hexagonal honeycomb, hexactinal dictyonalia joined to form an irregular net triangular meshes and irregularly polyradiate nodes; robust, rough gastral diactine beams supporting dictyonal net.

Megascleres - (1) Dermal oxyhexactines slender with free distal ray pinnule-like, 0.1-0.2 mm long; tangential rays and proximal rays straight, slightly tuberculous at blunt ends, about as long as distal ray, (2) Gastral diactines stout, straight or bent rough with strongylous ends,

1-2 mm long, (3) Scopules arranged vertically to surface and variable in shape; 4-6 diverging branches straight, never strongly bent, smooth or spined with terminal disc or knob-like structure, 0.03-0.04 mm long; shaft simple, straight attenuated towards pointed end and rough terminally, 0.4-0.5 mm long, (4) Uncinates arranged vertically to surface and usually penetrating whole thickness of body-wall, large, spines very oblique and pointed inwards.

Microscleres - (1) Parenchymal oxyhexactines 0.1-0.15 mm in diameter, centres thickened, rays stout, straight, gradually attenuated bluntly pointed ends, irregularly covered with more or less numerous, small tubercles or vertical spines, (2) Hexasters irregularly scattered throughout parenchymal layer, varies in number in different specimen, main ray 0.008 mm long and 0.002 mm thick; from margin of main ray 3, 4 or 6 branch rays arising, 0.025-0.030 mm long with sharp pointed ends, branch rays not terminate with claws, (3) Hemioxyhexasters also scattered in parenchyme, two opposite main rays longer than the four others, branch rays reduced to three or two in some spicules 0.12-0.16 mm long.

Distribution : In India : Andamans.

Elsewhere : Bay of Bengal, Philippines (Schulze, 1886), Japan (Schulze, 1886).

Remarks : Schulze (1886) first described the species from Philippines and Japan. Subsequently Schulze (1900) recorded it from the Andamans. In the present study the specimens from Andamans are restudied and redescribed.

Family TRETODICTYIDAE Schulze, 1886

Diagnosis : Dictyonal skeletal framework marked by the development of an extensive system of canals (schizorhyses) occupied by a labyrinth of flagellated chamber-lined passages; skeletal framework consisting of somewhat irregular quadrangular meshes or triangular meshes with numerous multiradiate nodes; hexaster microscleres of varius modfication; uncinates and scopules present.

Genus *Hexactinella* Carter, 1885

1885. *Hexactinella* Carter, p. 280

Diagnosis : Dictyonal skeletal framework consisting of irregular network of stout bars; megascleres of Pentacts, scopules, uncinates of diacts; microsclers oxyhexasters.

Type species : *Hexactinella ventilabrum* Carter, 1885

Distribution : Indo-Pacific region and Mediterranean sea.

72. ***Hexactinella minor*** Dendy and Burton, 1926
(Figs. 72 a-e; Plate XII D)

1926. *Hexactinella minor* Dendy and Burton, p. 227, figs. 1.

Material examined : Holotype re-examined, P226-7/1, 8 miles West of Interview Island, Andamans, 82-494 m. Coll. R.I.M.S. "Investigator"

Description : Spongebody reticulate plate or lamella like, 3-4 mm thick; irrgular complex of laterally fused tubes with fenestrated walls 1mm thick.

Skeleton - consisting of rather irregular network of stout bars, 0.05 mm diameter, with roughened surface; slender, terminally thickened spines projecting from nodes at dermal and gastral surface; framework growing centripetally by addition of slender-rayed hexacts on its gastral aspects; other skeletal spicules pentacts, scopules diacts and oxyhexasters.

Megascleres : (1) Pentacts of dermal surface with four basal ays and a radial or vertical ray; four basal rays lying tangentially, roughened, attenuated towards pointed ends, 0.25-0.30 mm long, 0.015-0.018 mm wide; fifth radial ray vertical to plane of four basal rays pointed and directed inwards, roughened or spined, longer than four basal rays; sometimes a sixth ray like a knob present, (2) Scopules arranged radially at both dermal and gastral surface; number of prongs variable, upto nine; prongs usually roughened and slightly knobed terminally; shaft smooth or rough, slender, tapering to a fine points, 0.65-0.80 mm long, (3) Diacts abundant, slender arranged radially at right angles to two surfaces, smooth, tapering gradually to a fine point at each end, 0.4-0.5 mm long.

Microscleres - (1) Oxyhexasters with slender primary rays, each ray bifurcating into two secondaries; secondaries gradually and finely pointed, about equal in length of primaries; all rays quite smooth; 0.07-0.08 mm in diameter.

Distribution : Andamans.

Remarks : Dendy and Burton (1926) first described this species from Andamans. After that it is not recorded from elsewhere. This account is the restudy and re-description of the type specimens.

Order LYSSACINOSIDA Zittel, 1877

Diagnosis : Cuplike vasiform tubular with a broad or stalk -like base; sponges seldom branching and rarely lamellar in shape; either firmly fixed to substratum or attached in loose bottoms by way of anchoring spicules or rarely by way of digitate processes from base of body; Parenchymal megascleres usually free in tissues but sometimes secondarily fused to form a bifid framework, beginning at the base of body and extending upward to a varying height; Uncinates always absent.

Key to families of order LYSSACINOSIDA Known from Andaman and Nicobar Islands

1a. Spongebody thin walled tube ..... EUPLECTELLIDAE

1b. Spongebody caliculate or sac-shaped ..... ROSSELLIDAE

Family EUPLECTELLIDAE Gray, 1867

Diagnosis : Spongebody thin-walled tubes and always possessing sword-shaped hexactines in dermal membrane;ectosomal skeleton consisting of relatively large hexactinal dermals with the proximal ray, the longest; hypodermal spicules absent; parenchymal megascleres hexactines with rays varying from six to two; hexasters of various forms, including floricoms, graphiohexasters, oxyhexasters and onychohexasters.

Subfamily EUPLECTELLINAE Schulze, 1886

Diagnosis : Euplectellidae with lophophytose method of fixation.

Genus *Euplectella* Owen, 1841

1841. *Euplectella* Owen, p. 3

Diagnosis : Spongebody tubular with a root tuft, a terminal sieve plate and numerous parietal apertures; parenchymal oxyhexasters usually present in interior and floricoms always on surface.

Key to species of genus *Euplectella* Known from Andaman and Nicobar Islands

1a. Parenchymal graphiocoms spicule present ..... *E. simplex*

1b. Parenchymal graphiocoms spicule absent ..... *E. regalis*

73. *Euplectella regalis* Schulze, 1900 (Fig. 73 a-h, Plate XII E)

1900. *Euplectella regalis* Schulze, p. 24, Taf. VI, Figs. 1-9; Schulze, 1902, p. 61, pl. XXII, figs. 1-9.

Material examined : ZEV915/7, One ex., Andaman sea, Lat. 13°27' North, Long. 93°14'30" East, 741 m, 21.12.1896, Coll. R.I.M.S., "Investigator"

Description : Spongebody rather soft, straight, slightly inflated tube with circular transverse section; terminal sieve-plate only slightly converse and surrounded by a collar 5mm high; slightly attenuated lower end of body continued into a root tuft, composed of a felted mass of spicules; total length inclusive of oof tuft about 40cm and maximum transverse diameter

of central part 7 cm; upper end 7 cm, lower end 6 cm and root tuft 4.5 cm broad; wall of sponge tube 2-3 mm thick and perforated by numerous circular parietal apertures with smooth margin, arranged in longitudinal and transverse rows, crossing each other at right angles, 1-2.5 mm wide; Oscules - terminal convex sieve plate watch glass shaped with oscules, irregularly polygonal, more rarely rounded, 2-5 mm wide; on the outer surface of wall small round pores, entrance of incurrent canals, 0.5 mm wide, visible everywhere through the tender dermal membrane.

Skeleton - Spicular fibres of main supporting skeleton arranged longitudinally and transversely and cross each other at right angles, chiefly composed of stauractines, comitalia; diagonal spicular fibres forming two system of spirals in tube wall crossing each other at right angles, composed of long and thin triactines and diactines, arranged in such a manner that they cut off corners of rectangular meshes of primary network, leaving the central part free and forming a parietal aperture; where tube wall passed into terminal sieve-plate, stout stauractines replaced by nearly equally thick, smooth triactines, pentactines or even hexactines; all these supporting spicules firmly united by secondarily opposed masses of silica; Funnel-shaped lower end of body supported by joined fibres; spicules supporting terminal sieve-plate not joined by silica and composed by oxydiactines, thin comitalia forming bundles, accompanying and enclosing principalia, shorter stout oxyhexactines and oxypentactines frequent; elongated proximal rays of rather stout, sword-shaped hexactine hypodermalia supporting parenchyme.

Megascleres - (1) Stauractines with rays upto 0.2 mm thick, longitudinal rays straight and upto 5 cm long, transverse rays curved accordingly with curvature of tube wall and upto 3 cm long, (2) Comitalia thin, smooth, long triactine and diactines; triactines with two long opposite rays lying in a straight line and a third ray vertical to the other two; diactines terminating with club-shaped thickenings pointed at end, and rough or covered with short spines, (3) Hexactine hypodermalia sword-shaped, parantangential and proximal rays smooth and terminally rough or covered with stout spines, 0.20-0.25 mm long; free distal rays covered with short spines for greater part of their length, 0.30-0.40 mm long (4) Hypogastralia simple, smooth oxypentactines with more or less elongated, radial and four equal basal rays, lying tangentially in gasteral membrane, length and thickness subject to considerable variations, (5) Oxypentactine canalaria similar in shape and position with hypogastralia but not so large, (6) Basalia spicules of root tuft with club-shaped anchors with several smooth, recurved numerous teeth; simple pentactine anchors absent.

Microscleres - (1) Oxyhexasters about 0.1mm in total diameter scattered here and there sparsely; each short and slender main ray bearing 3 or 4 slender slightly diverging branch ray, (2) Sigmatocome singly scattered in vicinty of outer surface and in dermal membrane, very few in number, slender, 0.08mm in diameter; main ray cylindrical, 0.008 mm long, terminally divided into 6-8 thin branch rays arranged in a vertical and curved in an 'S' shaped manner, together forming a calyx of mdeium breadth, (3) Floricoms adhering to pointed and roughened end of distal ray of hypodermal hexactine spicules, 0.08-0.10 mm in diameter and 7-8 branches on each main ray; branch rays terminating in not sharply defined terminal discs, curved in a hand-like manner, with about 7 small, marginal teeth.

Distribution : Andamans.

Remarks : *Euplectella regalis* is first recorded by Schulze (1900) from the Andamans. This species is endmic to this region. Redescription of the same specimens from the Andamans is dealt with in the present observation.

74. *Euplectella simplex* Schulze, 1895
(Fig. 74 a-f)

1895. *Euplectella simplex* Schulze, p. 15, Taf. X; Schulze, 1902, p. 51, pl. X.

Material examined : P3499/1, one ex., between North and South Sentinel Island, 403-439 m, 24.4.1889, Coll. R.I.M.S "Investigator"

Description : Spongebody tubular, extended a little in middle and very slightly constricted above, upper end for some distance cylindrical; 3-11 cm long and 5-25 cm broad; wall of sponge tube pretty thin, and perforated by numerous, circular parietal apertures, arranged fairly regularly in longitudinal and transverse rows; collar surrounding terminal sieve plate absent; below basal sieve plate being free root tuft devoid of soft parts; Oscule - triangular to hexagonal meshes 1-2 mm wide at terminal sieveplate vertical to axis of sponge and strongly converse; basal sieveplate, transverse, septum-like continuation of lateral tube-walls and bent outwards, convex towards base of attachment.

Skeleton - Main supporting skeleton consisting of a tube -shaped network of spicular fibres, arranged longitudinally transversely and intersecting each other at right angles; spicular fibres 3-6 mm apart and 0.3-0.5 mm thick, longitudinal fibres lie nearer to outer and transverse fibres nearer to inner surface of tube wall; besides these fibres, thin fibres crossing longitudinal and transverse ones under an angle of 45 and so arranged as to cut off corners of square meshes in the primary network composed of longitudinal and transverse fibres and giving them an octagonal shape; all meshes of parietal network free from spicular fibres and only covered by soft tissue; this skeleton net glued together by silica.

Megascleres - (1) Stauractines stout and long, most conspicuous spicules of supporting skeleton, 6-8 cm long 2-3 cm wide; rays smooth, found and gradually attenuated towards sharp-pointed end, 0.08-0.10 mm diameter; centre lying in nodes of skeleton-net; longitudinal ray straight and lateral rays ring or hoop-shaped and forming cylinder surface, (2) Comitalia much thin and very long, present in groups of 10-30 with each principal spicule; longest rays of comitalia situated longitudinal and transversely, mostly parallel to rays of stout principalia, most comitalia triactines and diactines, occassionally pentactines and hexactines; radial comitalia-ray conically pointed and slightly inflated and roughened just below their end, (3) Parenchymal oxyhexactines large numerous, four rays parallel and two rays vertical to inner and outer surface of tube-wall; 0.4-0.5 mm diameter; rays round, smooth, straight or slightly curved, 0.008-0.010 mm thick near centre and gradually attenuated towards sharp pointed ends, (4) Hypodermalia stout, sword-shaped hexactines, rays unequal in length and terminally roughened; distal radial ray and four paratangential rays lying below dermal membrane about 0.25 mm

long; proximal radial ray pointing inward and penetrating parenchyme, 1-1.2 mm long and its pointed and roughened end nearly reaching main skeleton net, (5) Hypogastralia similar to hypodermalia but much shorter and destitute of proximal, radial ray and pentactines, (6) Graphiocoms present in superficial layer of outer parenchyme, branch-ray brushes 0.2 mm long and 0.015 mm thick, (7) Basalia spicules of root tuft arising from longitudinal spicular fibres of main skeleton-net and several centimeter long; two kinds of basalia, both anchor-shaped but essentially different; first kind smooth rayed pentactines in shape of tetradentate anchors; second kind diactines, appearance of a long shaft, pointed at upper end and not so thick as main ray of pentactine anchors, shaft covered by curved spines directed backwards, distal end club-shaped from where arising 6-10 spade -like teeth bent upwards.

Microscleres - (1) Floricom attached to protruding, distal ray of each sword-shaped hypodermal oxyhexactines; six main rays, each main ray having 7-9 branch rays, arranged like calyx of a flower; thickened terminal disc of branch rays having about 8 fairly stout marginal teeth on outer border; whole floricom 0.1- 0.12 mm in diameter.

Distribution : In India : Andamans.(Schulze,1895)

Elsewhere : Bay of Bengal (Schulze, 1895).

Remarks : Schulze (1895) first described the species from Andamans. The present account is the redescription of the same species from the same locality.

Family ROSSELLIDAE Schulze, 1885

Diagnosis : Sponges caliculate or sac-shaped body and autodermalia without pinule-like distal ray; supplementary secondary oscules present in addition to the main terminal oscule; ectosomal skeleton composed of small, rough dermal pentactines, stauractines or rhabdodiactines and hypodermal pentactines or rhabdodiactines or both; parenchymal spicules hexactines and rhabdactines or the later only, distal rays of dermal spicule similar to remaining rays and not markedly spined; hexasters in the form of oxyhexasters and discohexasters or either of these.

Subfamily LANUGINELLINAE Schulze, 1885

Definition : Rossellidae with strobiloplumicomes as microscleres.(Hooper and Van Soest, 2002)

Genus LOPHOCALYX Schulze, 1887

Diagnosis : Rossellidae with stauractine auto dermalia and dermal pentactines in ectosomal skeleton; Oxydiactines as parenchymal principalia, but oxyhexactine parenchymalia absent; radial rays of some of autodermalia freely protruding rom outer surface.

Type species : *ophocalyx philippensis* Schulze, 1887

75. ***Lophocalyx spinosa*** Schulze, 1900
(Fig. 75 a-h; Plate XII F)

1900. *Lophocalyx spinosa* Schulze, p. 35, Taf. VII. Schulze, 1902, p. 82, pl. XXIII

Material examined : ZEV 920/7, one ex., West Andamans, 436-531 m, Coll. R.I.M.S. "Investigator".

Description : Spongebody irregular, round mass, 3-4 cm diameter, with a large strongly curved, cylindrical, digitate process so bent round that distal part extending nearly parallel to central body of sponge; part of surface simply convex and smooth, other part tuberculose; an equatorial groove partly bounded on one side by a projecting ridge dividing these differently formed parts of surface from each other; from this limiting, marginal ridge and from protuberances of tuberculous region numerous straight or slightly curved spicules, 0.1 mm thick, protruded singly or in small bundles; for a distance of 2-3 cm beyond surface, these spicuels either simply pointed or terminated with tetradentate anchors; Oscules - no distinct oscule, but a few roundish apertures 2-3 mm wide, with smooth margin in the equatorial groove, and some small scattered openings covered by superficial membrane considered as excurrent apertures.

Skeleton - Oxydiactine parenchymal principalia traversed body singly or in bundles, in different directions, chiefly, however, parallel and vertical to surface; Oxypentactine hypodermalia forming chief skeleton of body as well as anchors; stauractine autodermalia forming curved spherical surface by its peculiar shape; oxyhexactine autogastralia forming gastral layer.

Megascleres - (1) Oxydiactines slender, smooth, slightly curved, 2.5-4 mm long, either simply pointed and smooth or slightly inflated and rough or tuberculous at ends with a distinct annular thickening in centre of spicules, (2) Oxypentactines with straight or slightly curved rays, pointed, and smooth; in some of these spicules four paratangential rays strongly and uniformly recurved to form an anchor, (3) Stauractine and pentactine autodermalia with peculiar curvature in a spherical surface; 0.15-0.20 mm in length and their rays distally rounded and densely covered on all sides with short spines, (4) Oxyhexatine autogastralia stout, sword-shaped, regularly arranged in a quadratic reticulation and uniformly distributed over walls of excurrent cavities; four tangential rays gradually attenuated to pointed end, slightly rough and about 0.1mm long; distal radial ray similar to tangential ray.

Microscleres - (1) Micro-oxyhexactines slightly rough with straight rays 0.1 mm diameter; (2) Hemioxyhexasters and true oxyhexasters; 0.1 mm in diameter; present near folded chamber layer, (3) Strobiloplumicom a peculiar hexasters present below superficial membrane, in subdermal as well as in subgastral tubercular region; 0.08 mm in diameter.

Distribution : Andamans.

Remarks : *Lophocalyx spinosa* was first recorded by Schulze (1900) from Andamans.

After that it is recorded from no where else. The present account illustrates the redescription of the same species from the same locality.

SUMMARY

Sponges in the holdings of the Zoological Survey of India at Calcutta collected from the intertidal zones of the Andaman and Nicobar Islands, sublittoral waters of the Andaman Sea and the Bay of Bengal adjacent to the Andaman and Nicobar Islands have been studied comprehensively. Majority of the nearly century old collections belong to the voyages of the R.I.M.S. "Investigator" (1884-1913) and contributions by Dr. S.W.Kemp (1915-30); the rest from the various survey parties of the Zoological Survey of India till the last decade.

Review of literature indicates paucity of information on the taxonomy and distribution patterns of the sponges in the Andaman and Nicobar Islands. In addition, they are scattered over a century, a few and far in between. Hence, in this work, an update with historical review including classificatory account, general morphology and other connected relevant details have been given. Following the classification methods of Hooper and Van Soest, 2002, a taxonomic study of 75 species belonging to 48 genera brought under 35 families is provided.

The description includes original names, synonymy, reference, locality, material examined, morphological characteristics, distribution, remarks and key to different taxa.

Four new species viz. *Spirastrella andamanensis* sp. nov., *Auletta adamanensis* sp. nov., *Axinella acanthelloides* sp. nov. and *Spongosorites andamanensis* sp. nov. are described.

Eighteen species are new records of occurrence (14 species of Demospongiae, 1 species of Calcarea and 3 species of Hexactinellida) *viz. Amorphinopsis foetida, Axinella tenuidigitata, Cliona ensifera, Cliona lobata, Cliona mucronata, Cliona quadrata, Cliona vastifica, Cliothosa hancocki, Mycale (Mycale) crassissima, Phyllospongia foliascens, Spirastrella inconstans, Tethya diploderma, Tethya robusta, Xestospongia testudinaria; Clathrina coriacea; Hyalonema lamella, Hyalonema martabanense and Hyalonema rapa.*

Fifteen endemic species of the Andaman and Nicobar Islands are studied and redescribed *viz. Bubaris columnata, Calyx clavata, Cliona kempi, Damiriopsis brondstedi, Discodermia gorgonoides, Haliclona (Gellius) megastoma, Kirkpatrickia spiculophila, Monanchora enigmatica, Poecillastra eccentrica, Thenea andamanensis* of Demospongiae and *Euplectella regalis, Hexactinella minor, Lophocalyx spinosa, Lophophysema inflatum and Semperella cucumis* of Hexactinellida.

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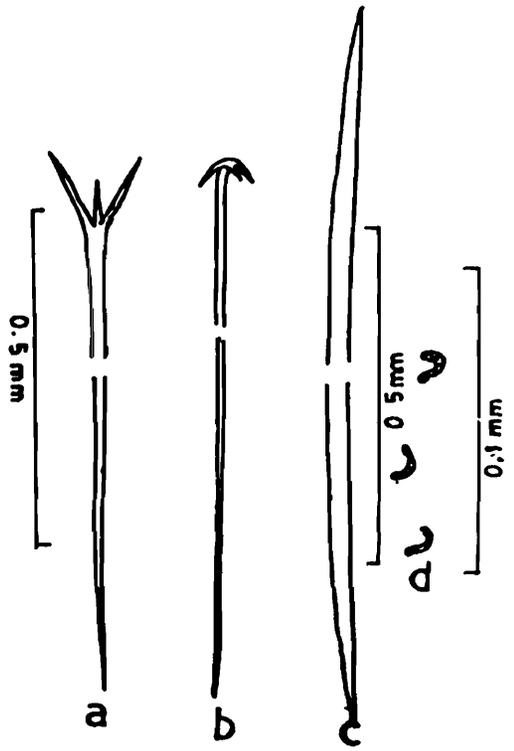


Fig. 1. *Cinachyra arabica*
a. protriaene b. anatriaene
c. oxea d. sigmaspires

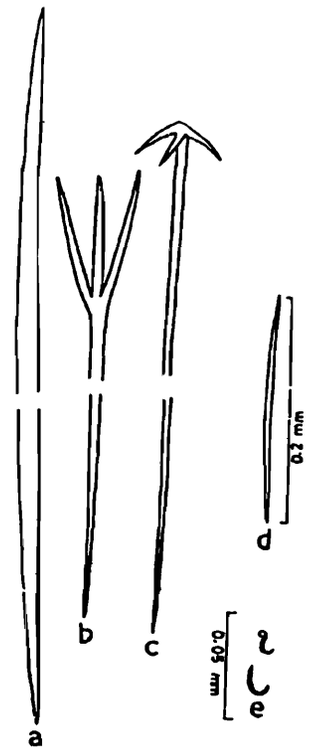


Fig. 2. *Cinachyra australiensis*
a. oxea b. protriaene c. anatriaene
d. microxea e. Sigmaspires

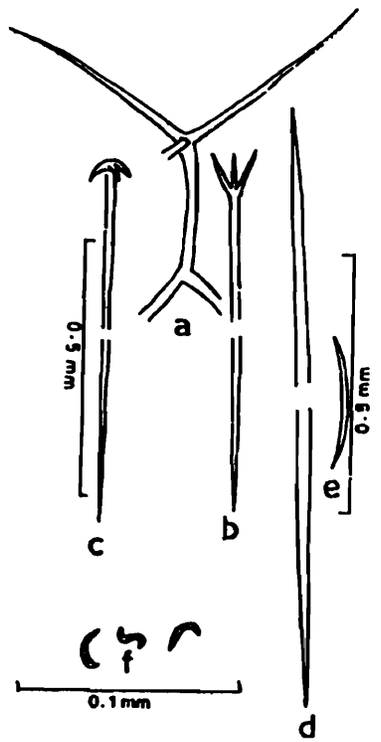


Fig. 3. *Paratetilla bacca*
a. orthotriaene b. protriaene c. anatriaene
d. oxea e. microxea f. sigmaspires

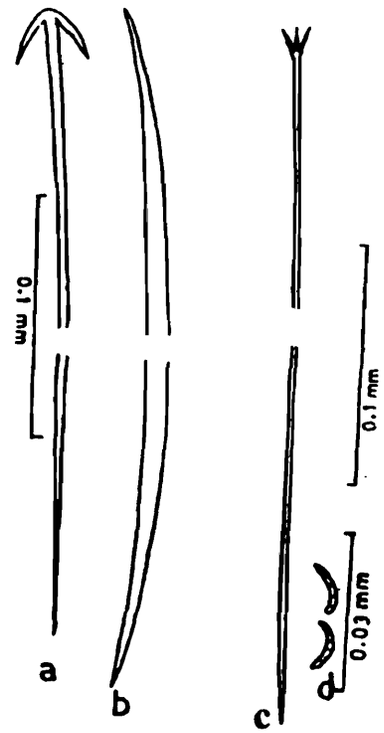


Fig. 4. *Tetilla dactyloidea*
a. anatriaene b. oxea c. protriaene
d. sigmaspires

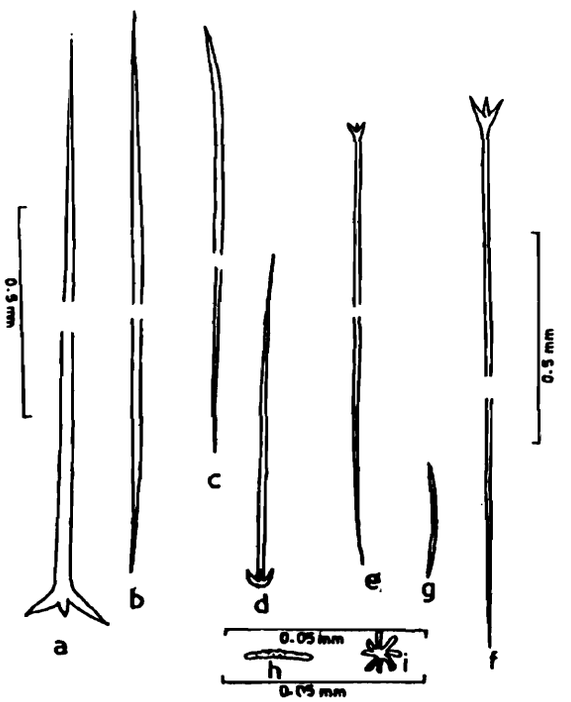


Fig. 5. *Ecionemia acervus*
a. orthotriaene b, c. oxeas d. anatriaene
e, f. protriaene g. microxea h. microstrongyle
i. strongylaster euaster

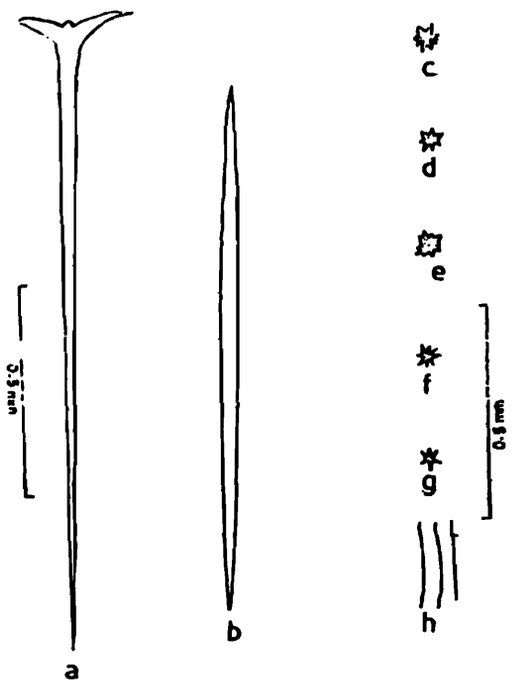


Fig. 6. *Rhabdastrella globostellata*
a. orthotriaene b. oxea c,d,e. spherasters
f,g. oxyastr h. raphides

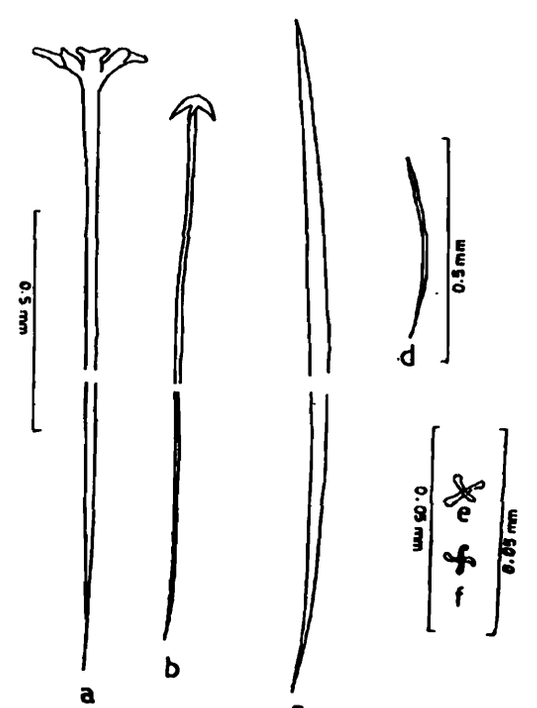


Fig. 7. *Stelletta clavosa*
a. dichotriaene b. anatriaene c. oxea
d. cortical oxea e..f. tylaster euasters

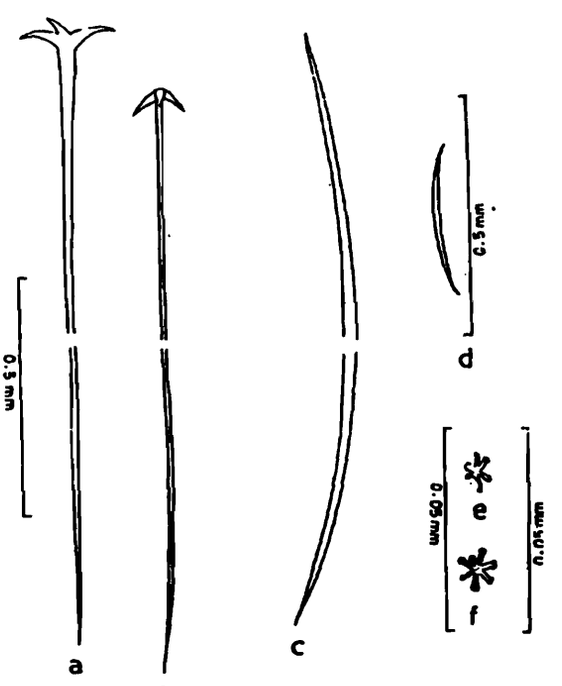


Fig. 8. *Stellata purpurea*
a. orthotriaene b. enatriaene c. oxea
d. cortical oxea e,f. tylaster euasters

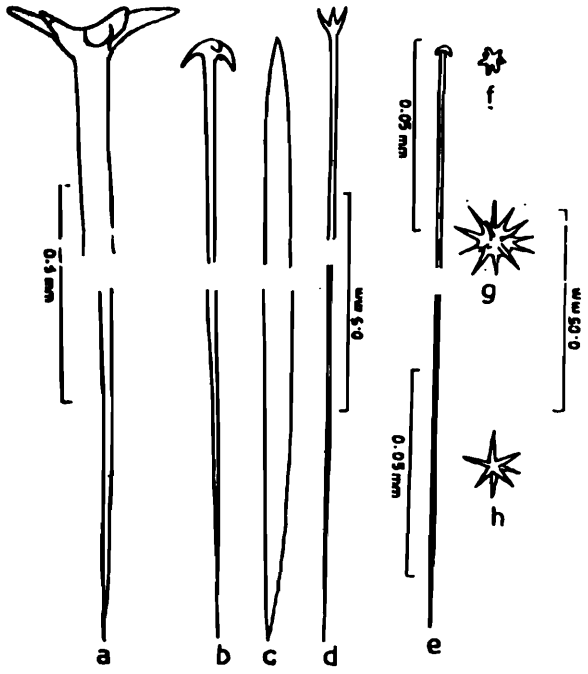


Fig. 9. *Stellata validisma*
a. dichotriaene b. anatriaene c. oxea
d. protriaene e. small anatriaene f. strongylaster
g. sphaeroxyaster h. oxyaster

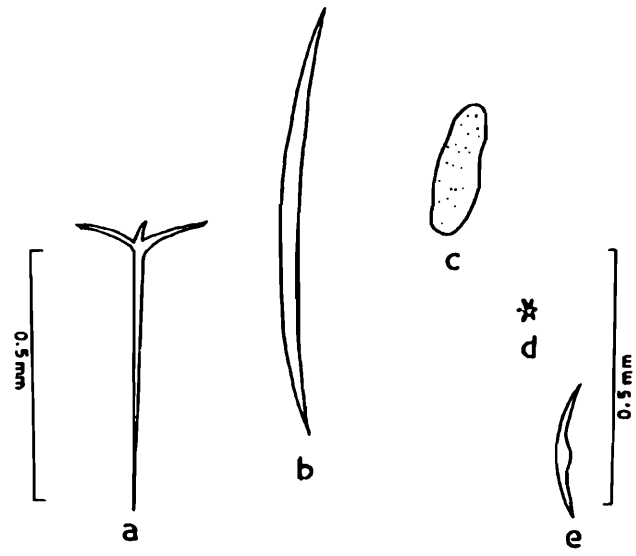


Fig. 10. *Erylus lendenfeldi*
a. orthotriaene b. emphioxea c. aspidaster
d. strongylaster euster e. microxea

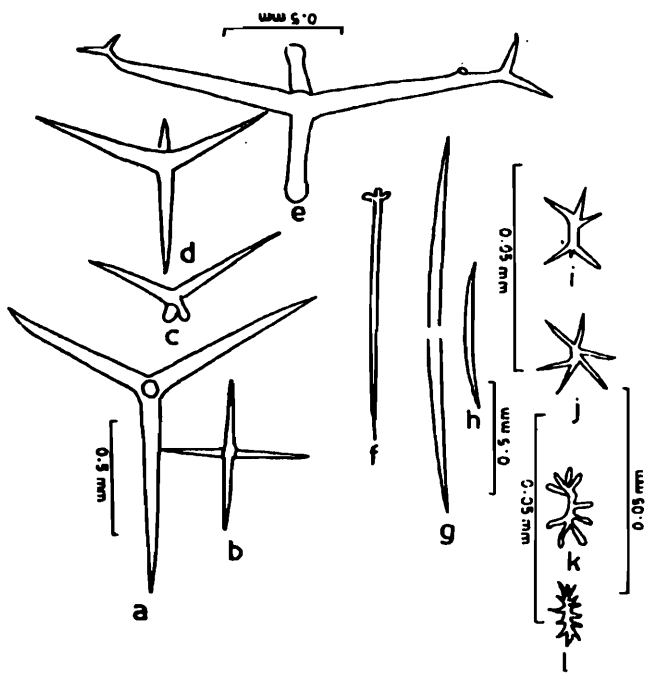


Fig. 11. *Poecillastra eccentrica*
a-c. calthrops d-f. triaenes g,h. oxeas
i,j. plesiasters k,l. Spirasters

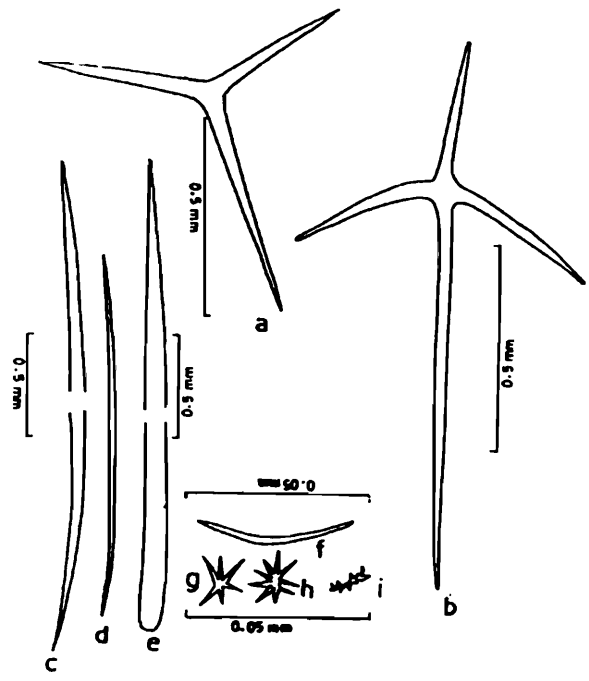


Fig. 12. *Poecillastra tenuilaminaris*
a. ealthrop b. orthotriaene c. large oxea
d. slender oxea e. style f. microxea
g,h. metasters i. spirasters

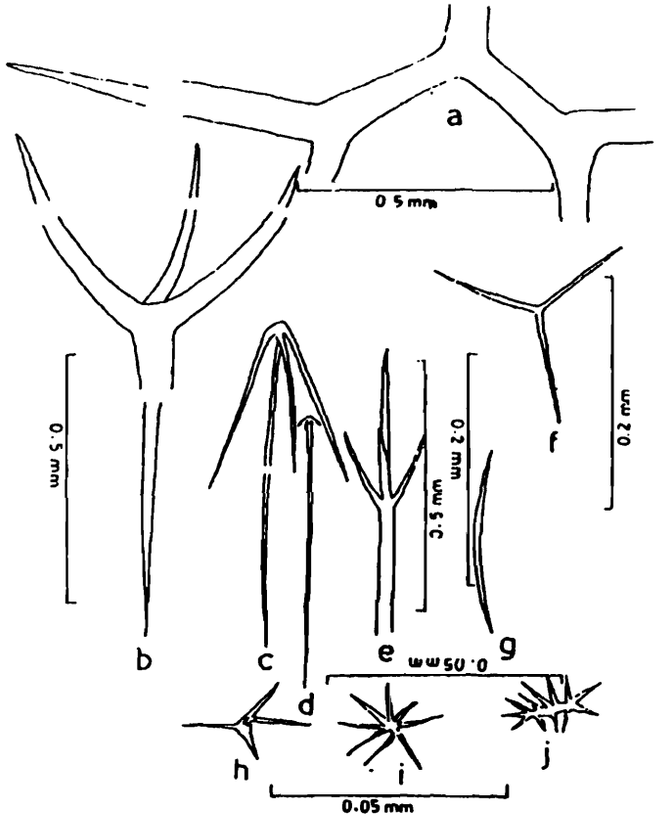


Fig. 13. *Thenea andamanensis*
a. dichotriaene b. protriaene c. large anatriaene
d. small anatriaene e. mesotiaene f. triact
g. microxea h. plesiaster i. metasters j. spiraster

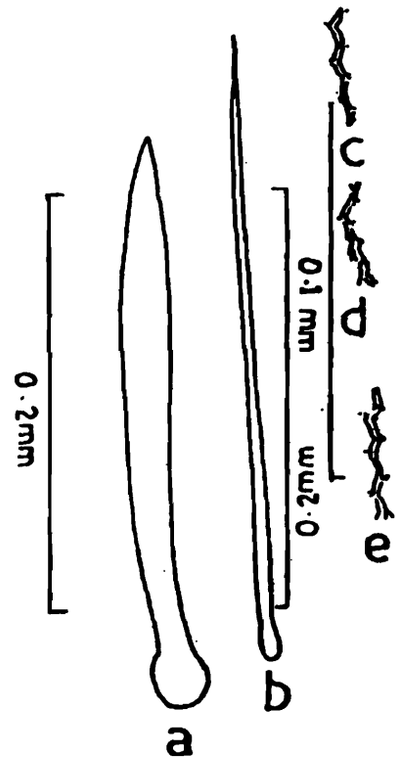


Fig. 14. *Cliona ensifera*
a. ensiform tylostyle b. slender tylostyle
c-e. spirasters

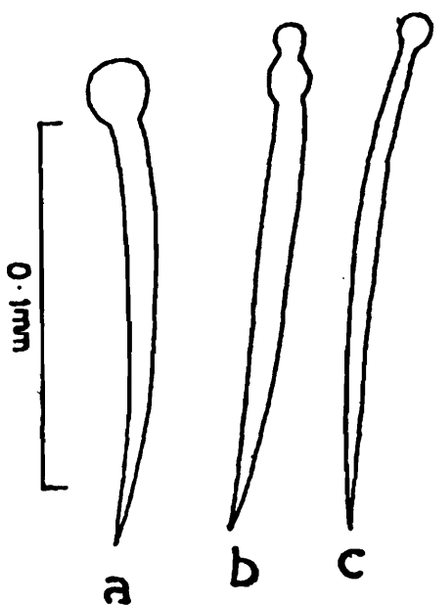


Fig. 15. *Cliona kempi*
a-c. tylostyles

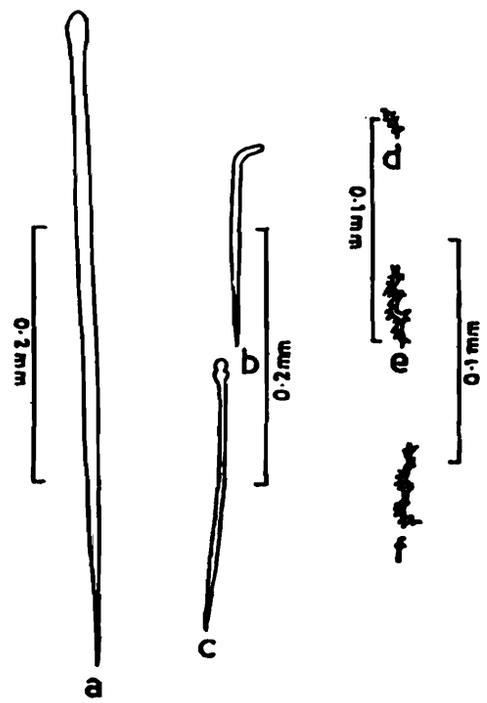


Fig. 16. *Cliona lobata*
a-c. tyiostyles d-f. spirasters

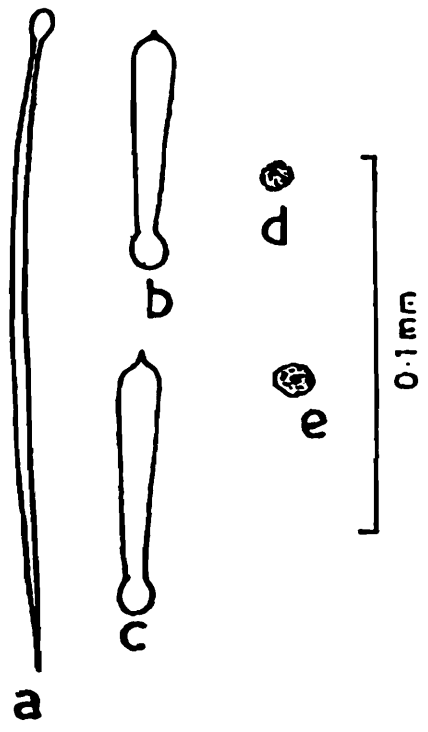


Fig. 17. *Cliona mucronata*
a. tylostyle b,c. mucronate microscleres
d,e. spherules

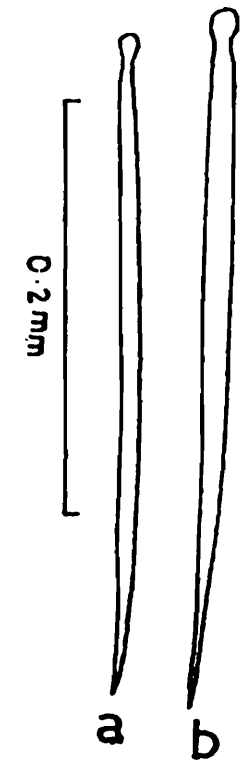


Fig. 18. *Cliona quadrata*
a,b. tylostyles

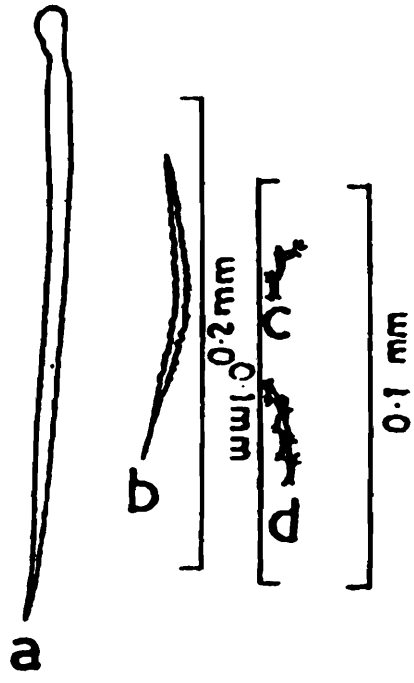


Fig. 19. *Cliona vastifica*
a. tylostyle b. oxea c,d. Spirasters

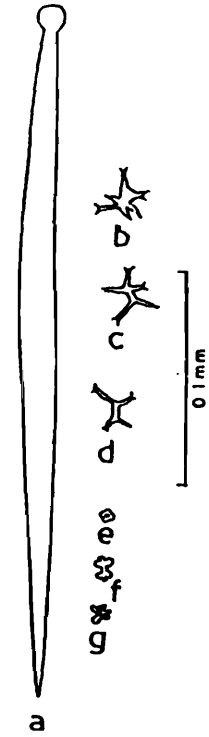


Fig. 20. *Cliothosa hancocki*
a. tylostyle b-d. slender amphiasters
e-g. nodular amphiasters

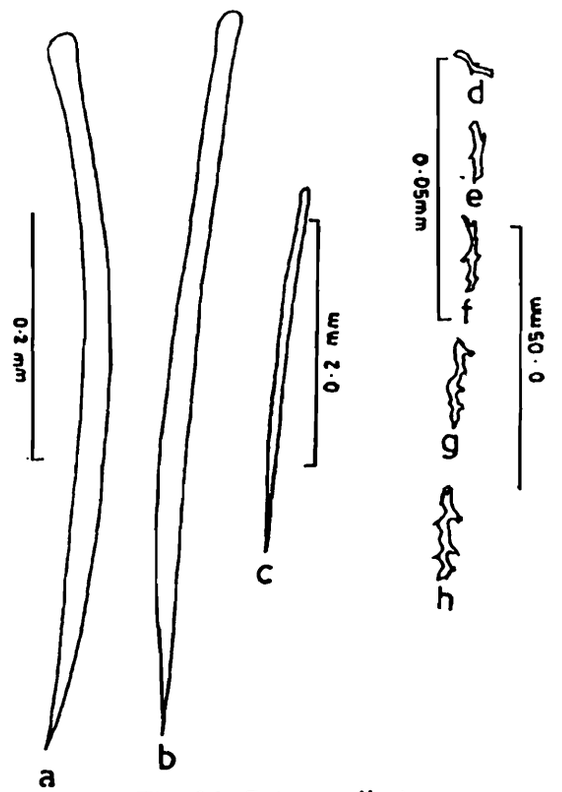


Fig. 21. *Spirastrella inconstans*
a-c. tylostyles d-h. spirasters

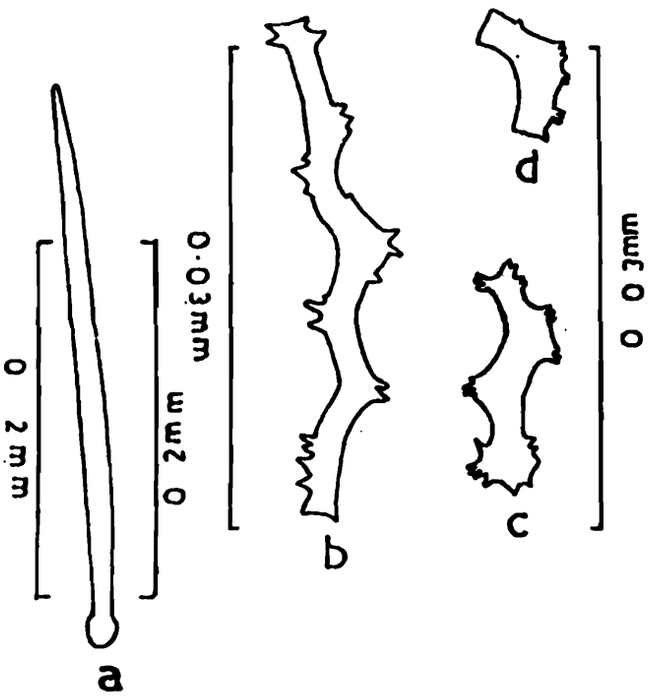


Fig. 22. *Spirastrella andamanensis* sp. nov.
a. tylostyle b-d. spirasters

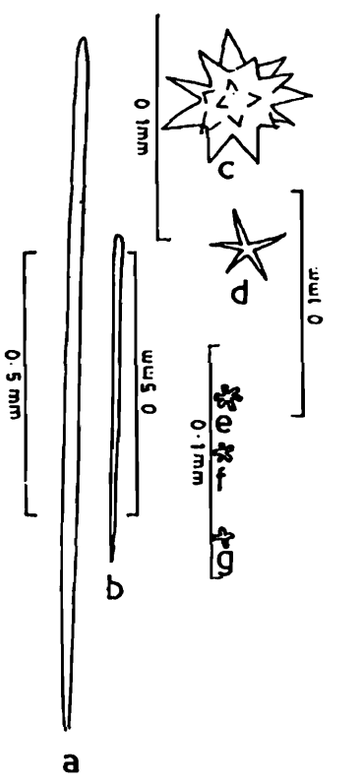


Fig. 23. *Tethya diploderma*
a,b. strongyloxeas c. spheraster
d. oxyaster e-g. tylasters

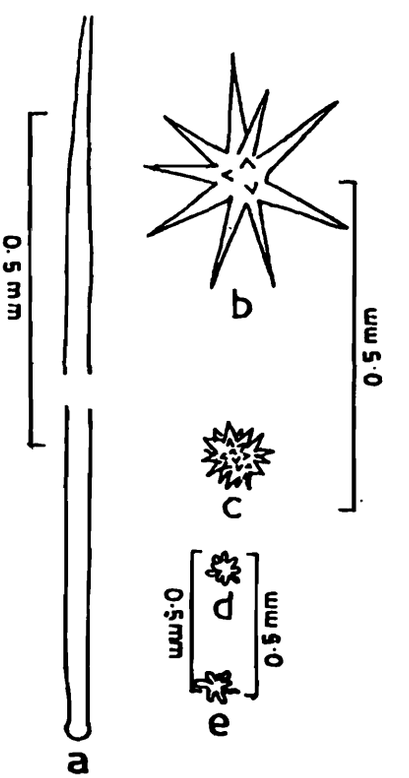


Fig. 24. *Tethya repens*
a. tylostyle b,c. spherasters
d-e. strongylasters

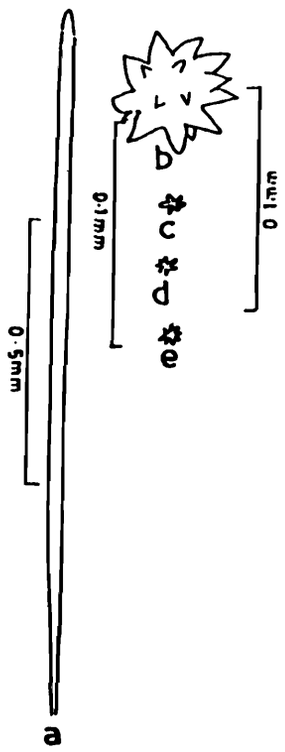


Fig. 25. *Tethya robusta*
a. strongyloxea b. spheraster
c-e. strongylasters

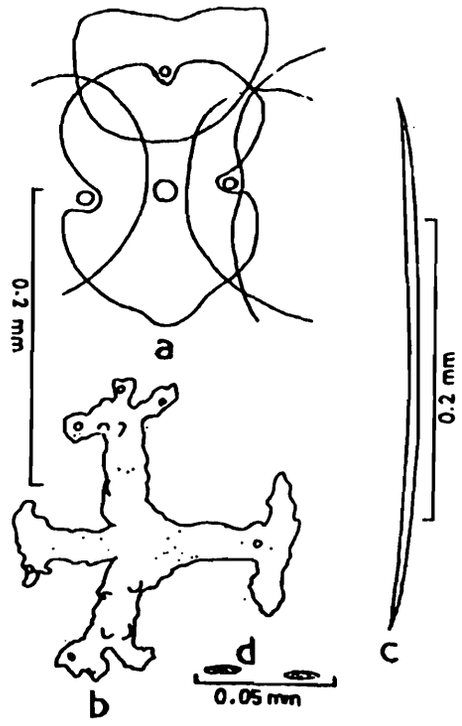


Fig. 26. *Discodermia gorgonoides*
a. discotriaene b. tetracrepid desma
c. oxea d. microstrongyle

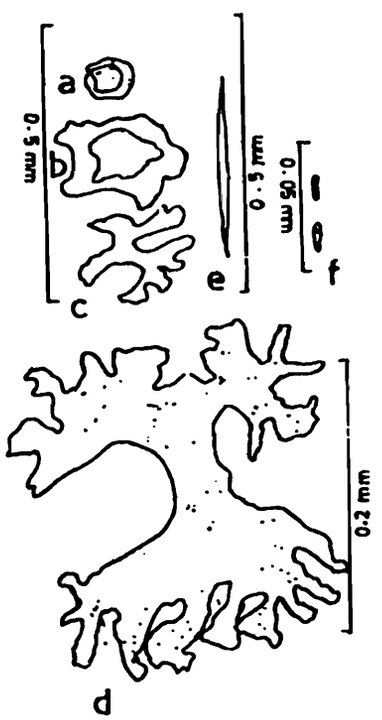


Fig. 27. *Discodermia papillata*
a,b. discotriaenes c,d. tetracrepid desma
e. microxea f. microstrongyle

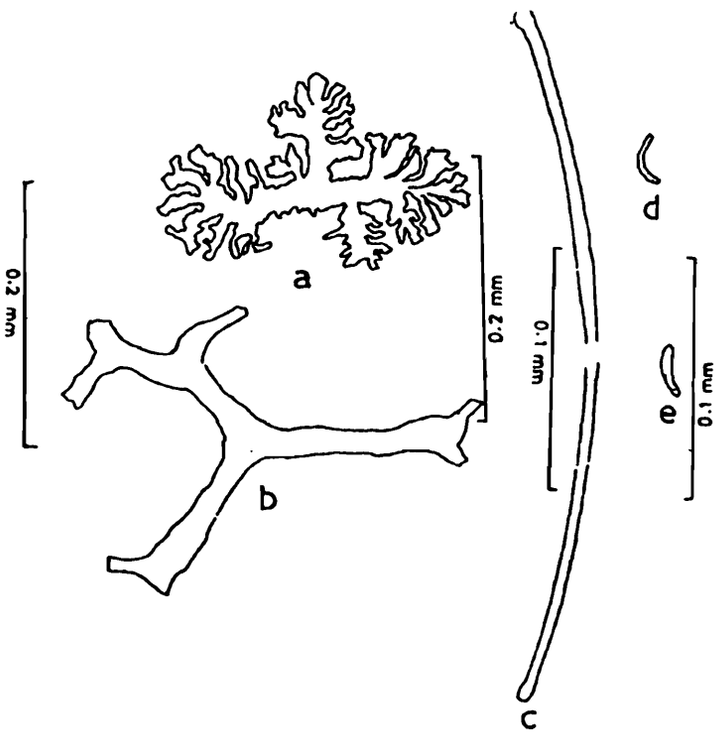


Fig. 28. *Theonella swinhoei*
a. phyllotriaene b. desma c. strongyle
d,e. microstrongyles

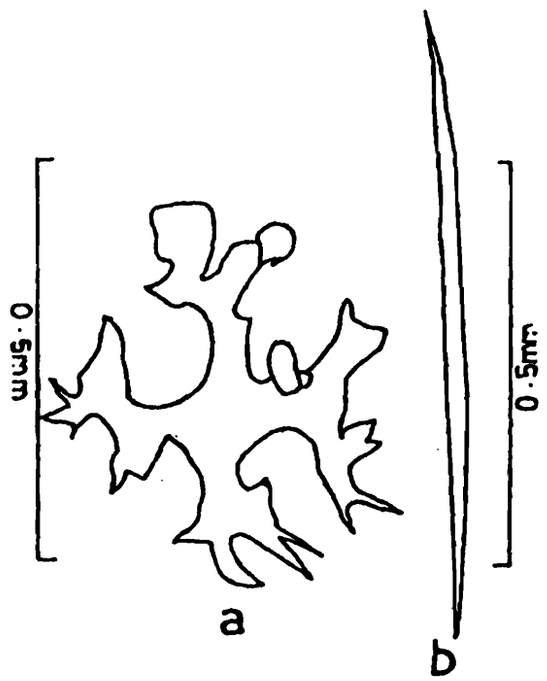


Fig. 29. *Petromica massalis*
a. desma b. Oxea

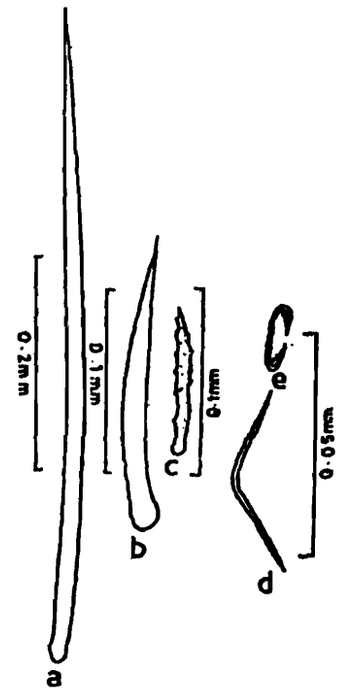


Fig. 30. *Clathria (Microciona) atrasanguinea*
a. subtylostyle of main skeleton
b. dermal subtylostyle c. acanthostyle
d. toxa e. isochela

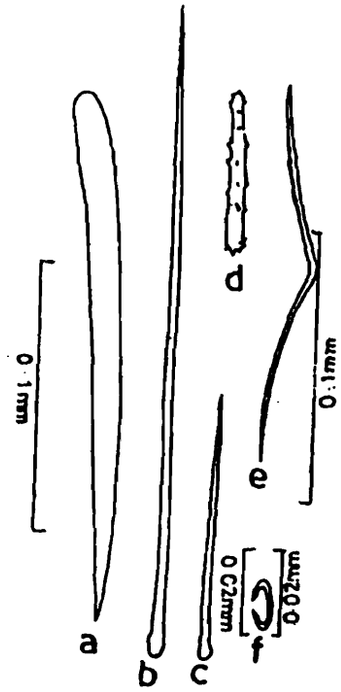


Fig. 31. *Clathria (Thalysias) vulpine*
a. style b. interstitial subtylostyle
c. dermal subtylostyle d. acanthostyle
e. toxa f. isochela

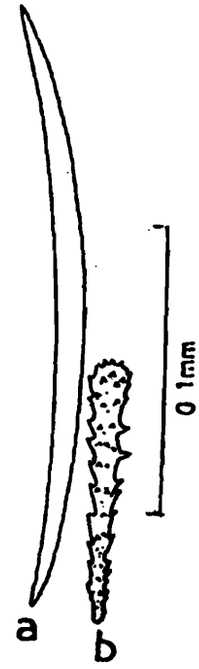


Fig. 32. *Echinodictyum asperum*
a. oxea b. acanthostyle

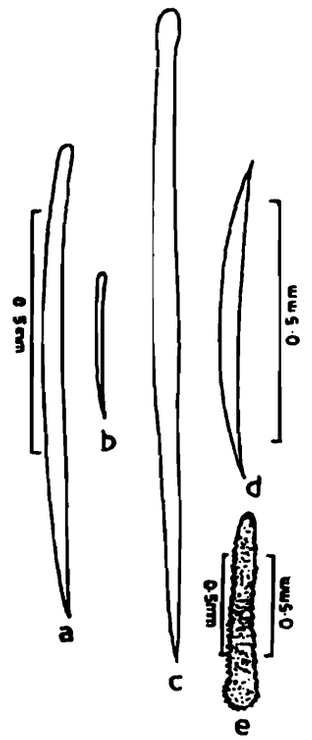


Fig. 33. *Raspailia (Raspailia) typica*
a. Large style b. Small style c. Subtylostyle
D. Oxea e. Acanthostyle.

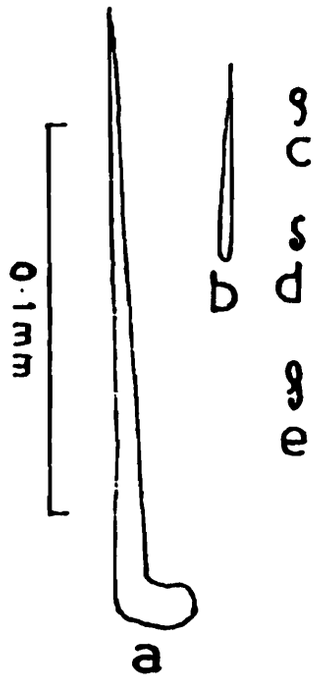


Fig. 34. *Rhabderemia prolifera*
a. rhabdostyle b. microstyle
c-e. sigmas

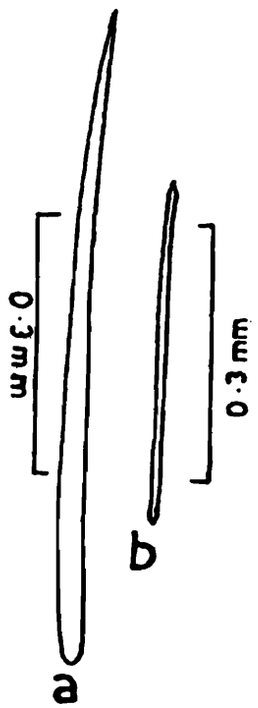


Fig. 35. *Kirkpatrickia spiculophila*
a. Style b. Tornote

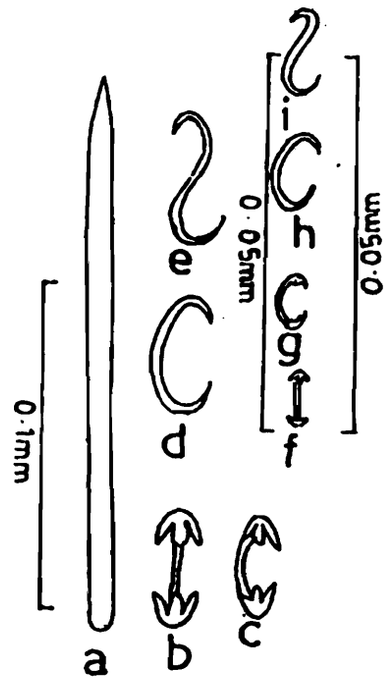


Fig. 36. *Psammochela elegans*
a. style b,c. large isochelae d,e. large sigmas
f,g. smal isochelae h,i. small sigmas

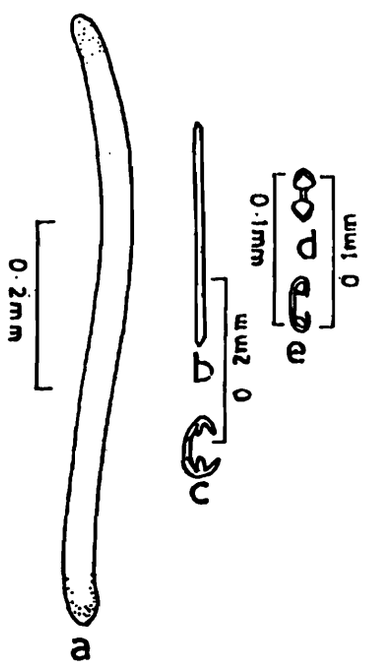


Fig. 37. *Damiriopsis brondstedi*
a. strongyle b. tornate c. tridentate isochela
d,e. palmate isochela

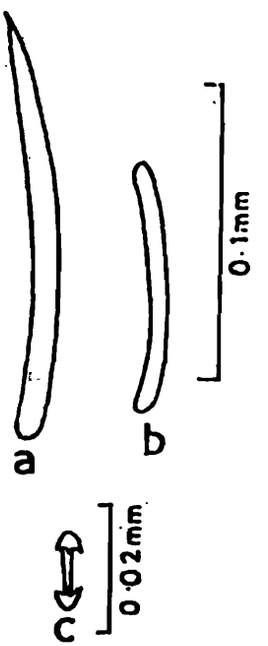


Fig. 38. *Iotrochota baculifera*
a. style b. strongyle c. birotulate

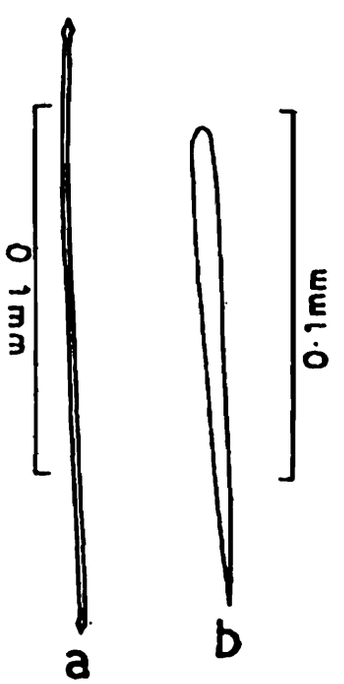


Fig. 39. *Monanchora enigmatica*
a. tornote b. Style

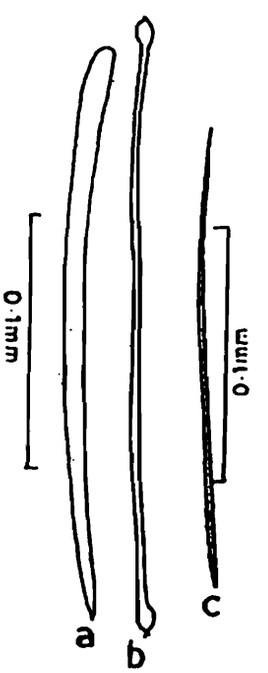


Fig. 40. *Tedania (Tedania) anhelans*
a. style b. tornote c. onychaete

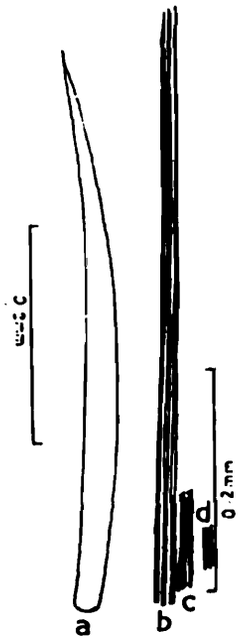


Fig. 41. *Biemna liposigma*
a. style b. large raphides
c. medium raphides d. small raphides

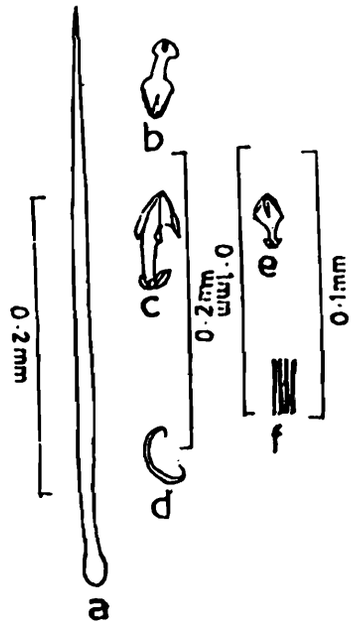


Fig. 42. *Mycale (Mycale) crassissima*
a. subtylostyle b,c. large anisochelae
d. sigma e. small anisochela f. raphides

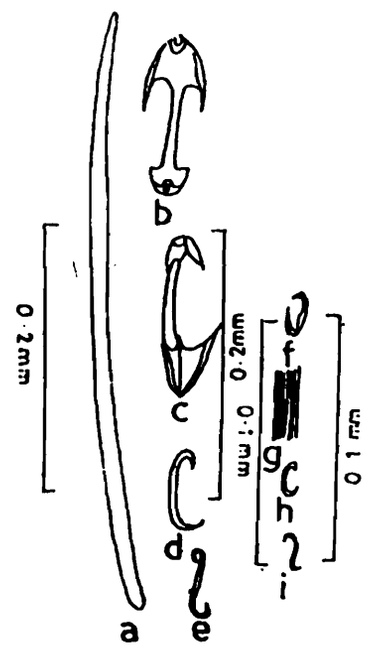


Fig. 43. *Mycale (Mycale) indica*
a. style b,c. large anisochalae d,e. large sigmas
f. small anisochela g. raphides h,i. small sigmas

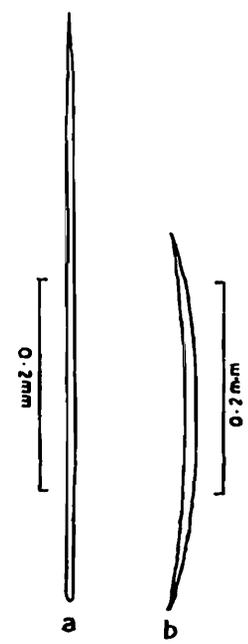


Fig. 44. *Auletta andamanensis sp. nov.*
a. style b. oxea

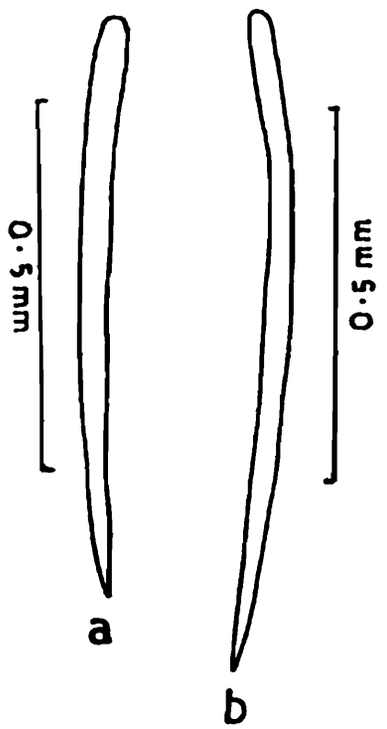


Fig. 45. *Axinella tenuidigitata*
a,b. styles

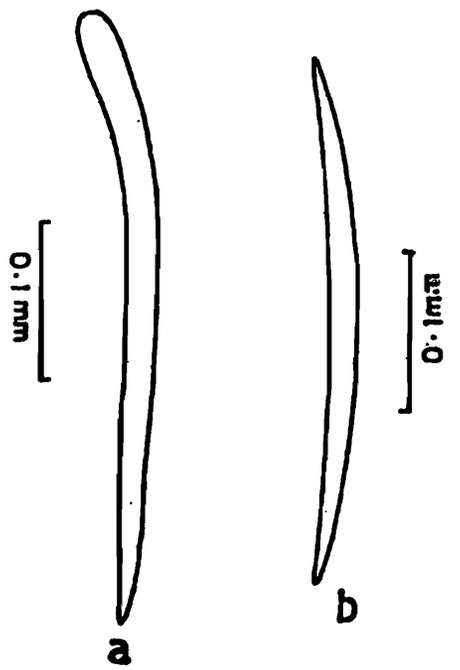


Fig. 46. *Axinella acanthelloides* sp. nov.
a. style b. oxea

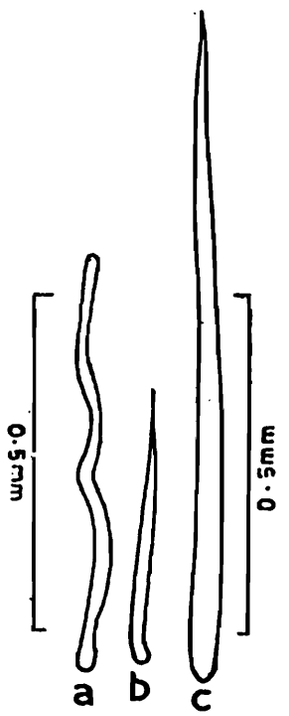


Fig. 47. *Burbaris columnata*
a. vermiform strongyle b. short style
c. long style

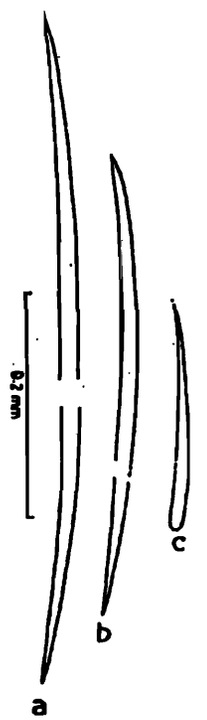


Fig. 48. *Amorphinopsis foetida*
a. large oxea b. small oxea c. style

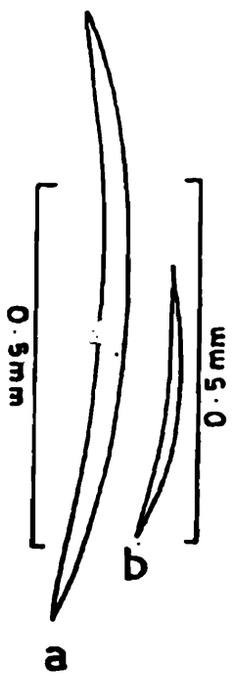


Fig. 49. *Spongosorites halichondrioides*
a,b. oxeas

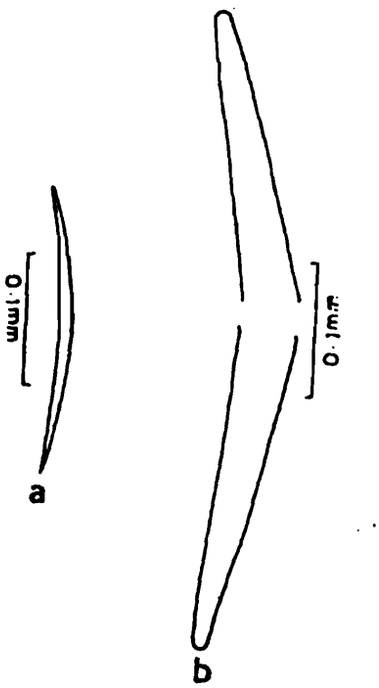


Fig. 50. *Spongosorites andamanensis* sp. nov.
a. small oxea b. large oxea

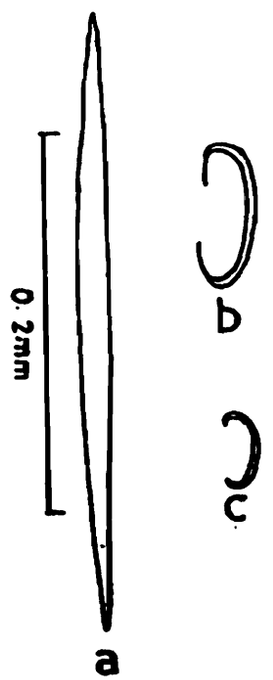


Fig. 51. *Haliclona (Gellius) flagellifer*
a. oxea b. flagellate sigma c. usual sigma

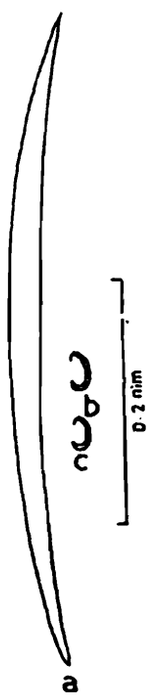


Fig. 52. *Haliclona (Gellius) megastoma*
a. oxea b,c. sigmas

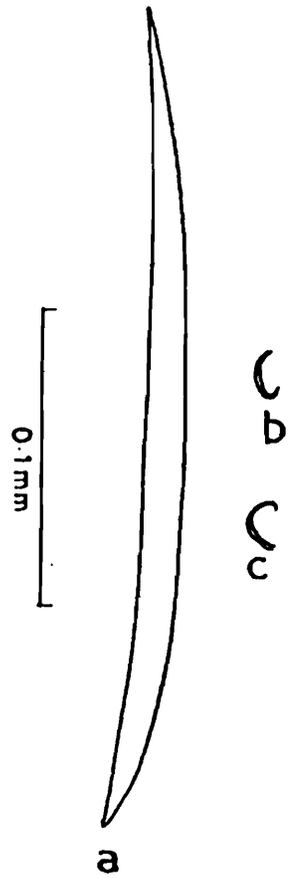


Fig. 53. *Gelliodes fibulatus*
a. oxea b,c. sigma

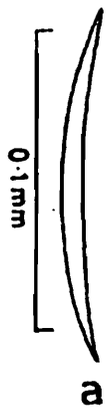


Fig. 54. *Calyx clavata*
a. oxea

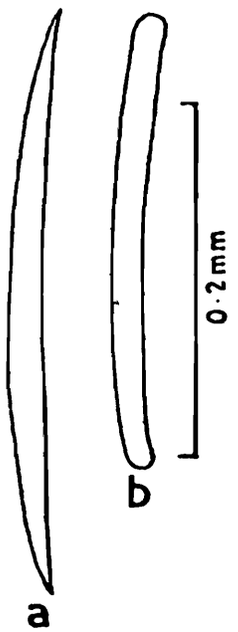


Fig. 55. *Xestospongia testudinaria*
a. oxea b. strongyle

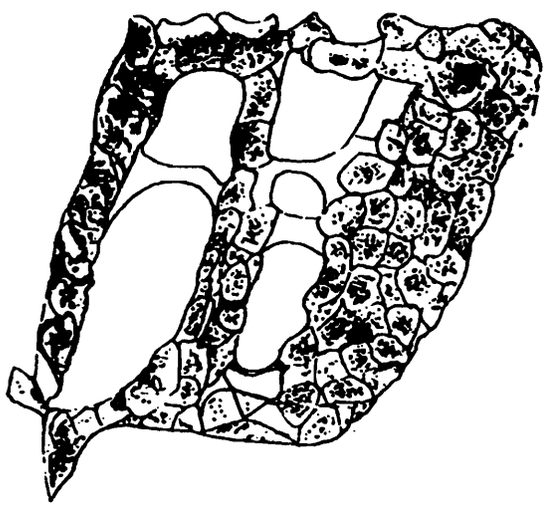


Fig. 56. *Phylospongia foliascens*
skeleton of spongin fibres

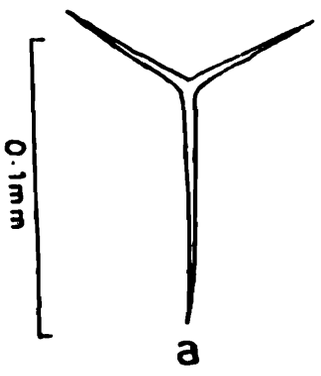


Fig. 57. *Clathrina coriacea*
a. triradiate

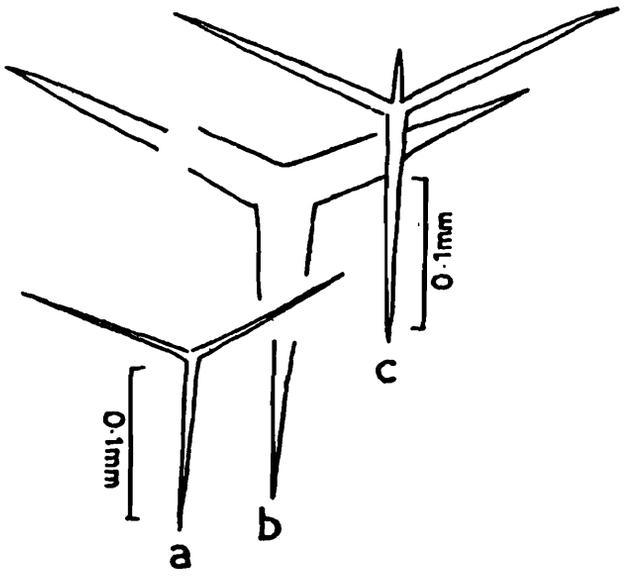


Fig. 58. *Pericharax heteroraphis*
a. ectosomal triradiate b. endosomal triradiate
c. quadriradiate

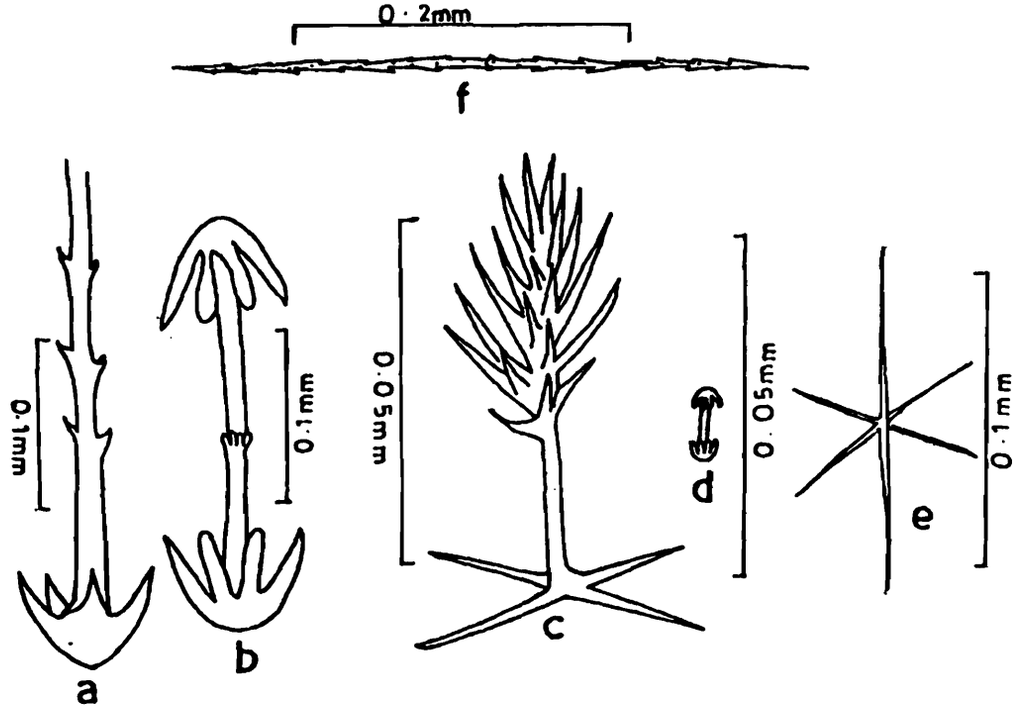


Fig. 59. *Hyalonema aculeatum*
a. lower end of anchor b. macramphidisc c. pinule
d. microamphidisc e. micro-oxhyexactine f. ambuncinate

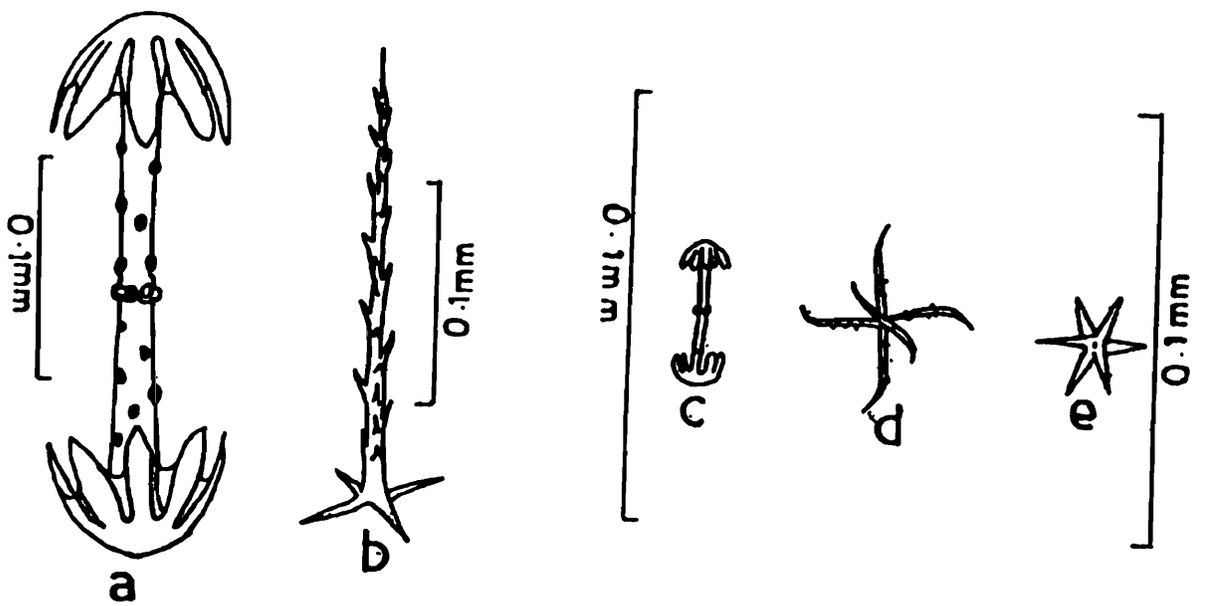


Fig. 60. *Hyalonema affine*
a. macramphidisc b. pinule c. micramphidisc
d. bent micro-oxyhexactine e. straight micro-oxhexactine

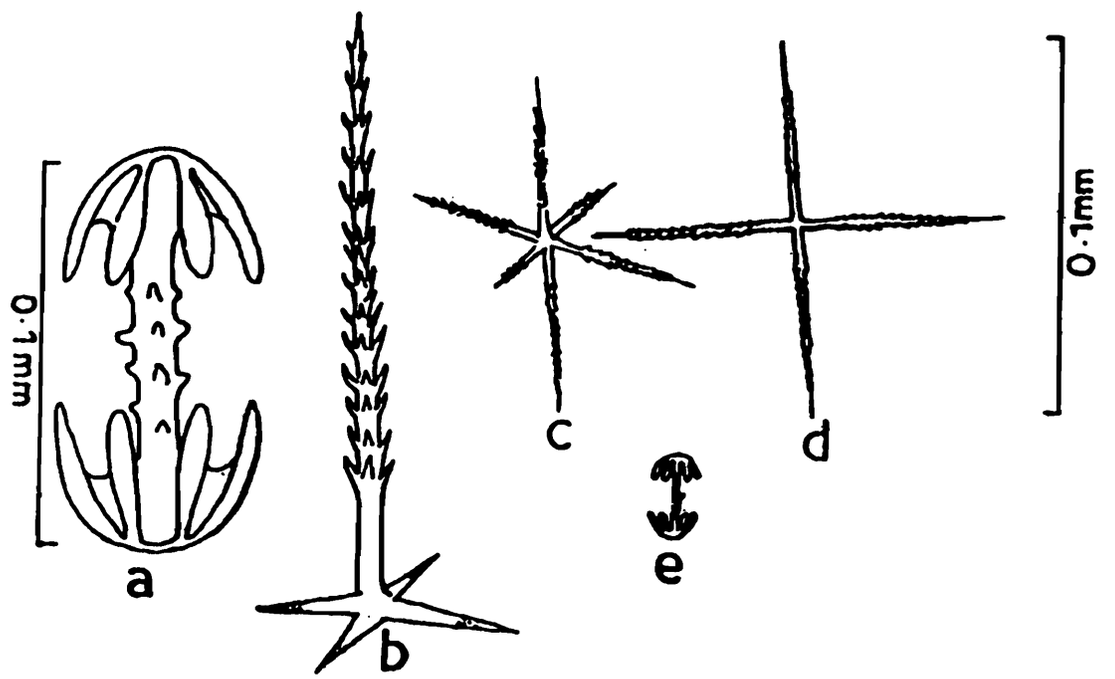


Fig. 61. *Hyalonema indicum*
a. macramphidisc b. pinule c. micro-oxyhexactine
d. micro-oxystauractine e. micramphidisc

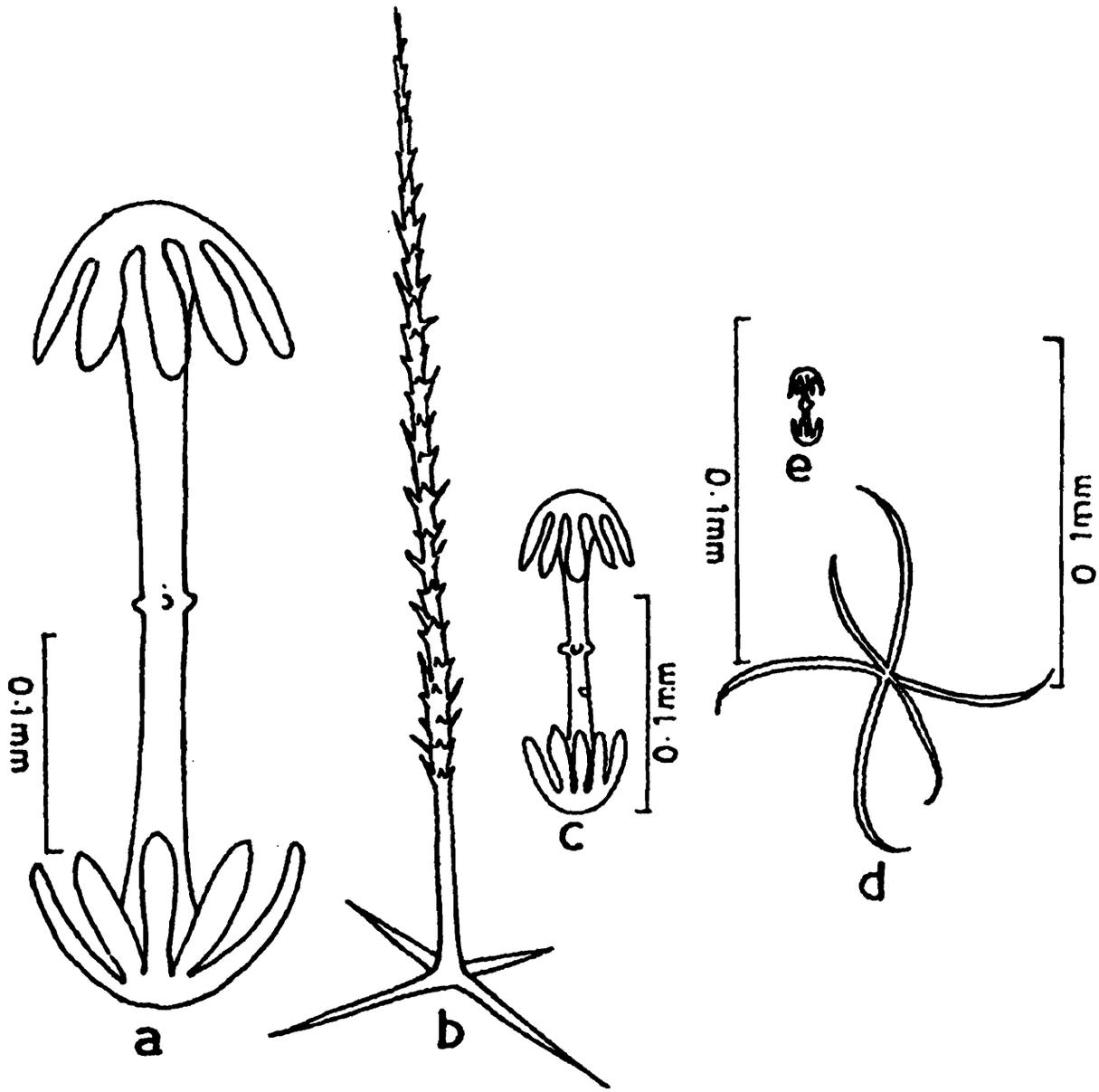


Fig. 62. *Hyalonema lamella*
a. macramphidisc b. pinule c. mesamphidisc
d. micro-oxyhexactine e. micramphidisc

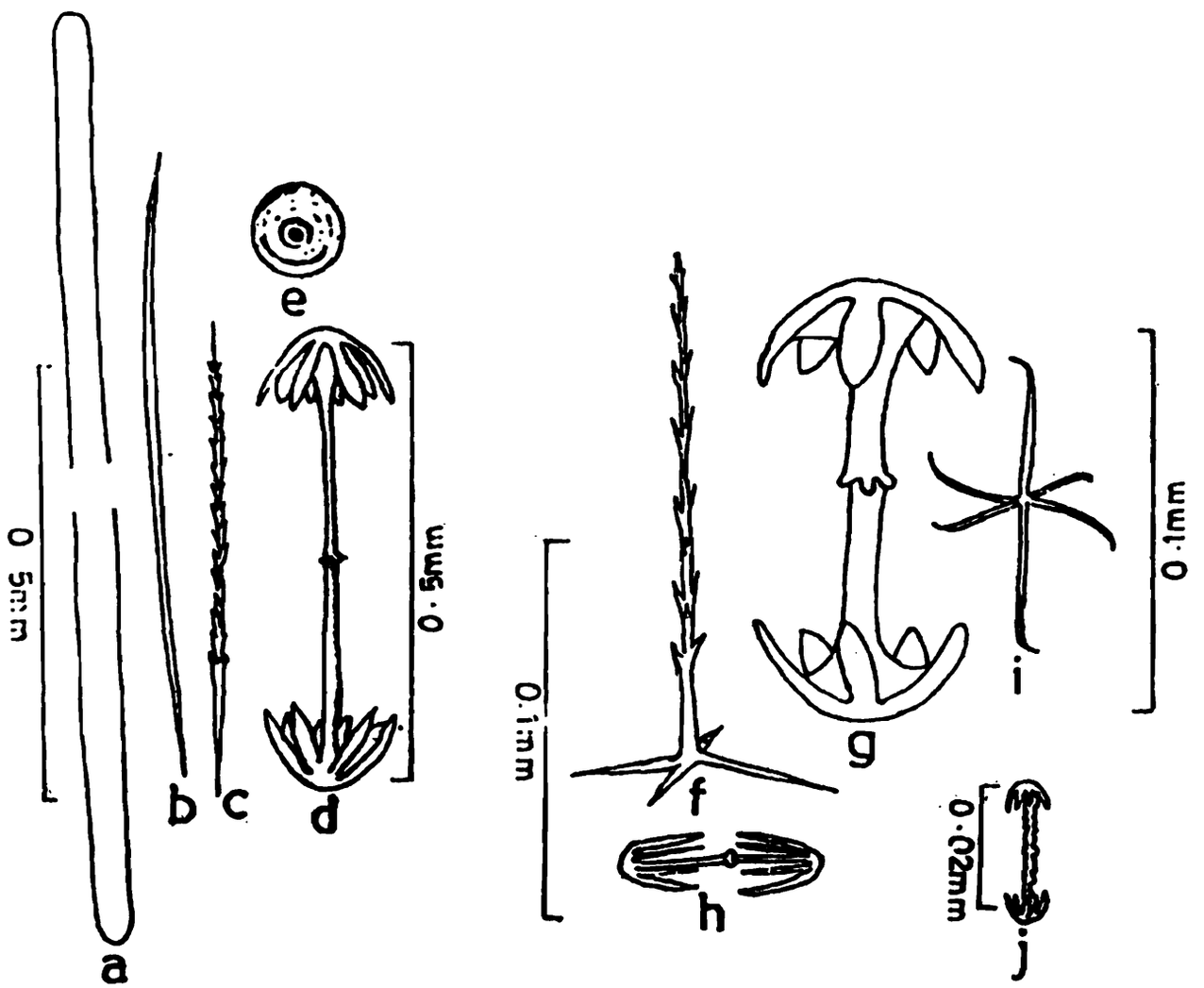


Fig. 63. *Hyalonema martabanense*
a. parenchymal diactine b. amphioxea c. diactine pinule
d. larger mecramphidisc e. spheres f. pentactine pinule
g. small macramphidisc h. mesamphidisc
i. micro-oxyhexactine j. micramphidisc

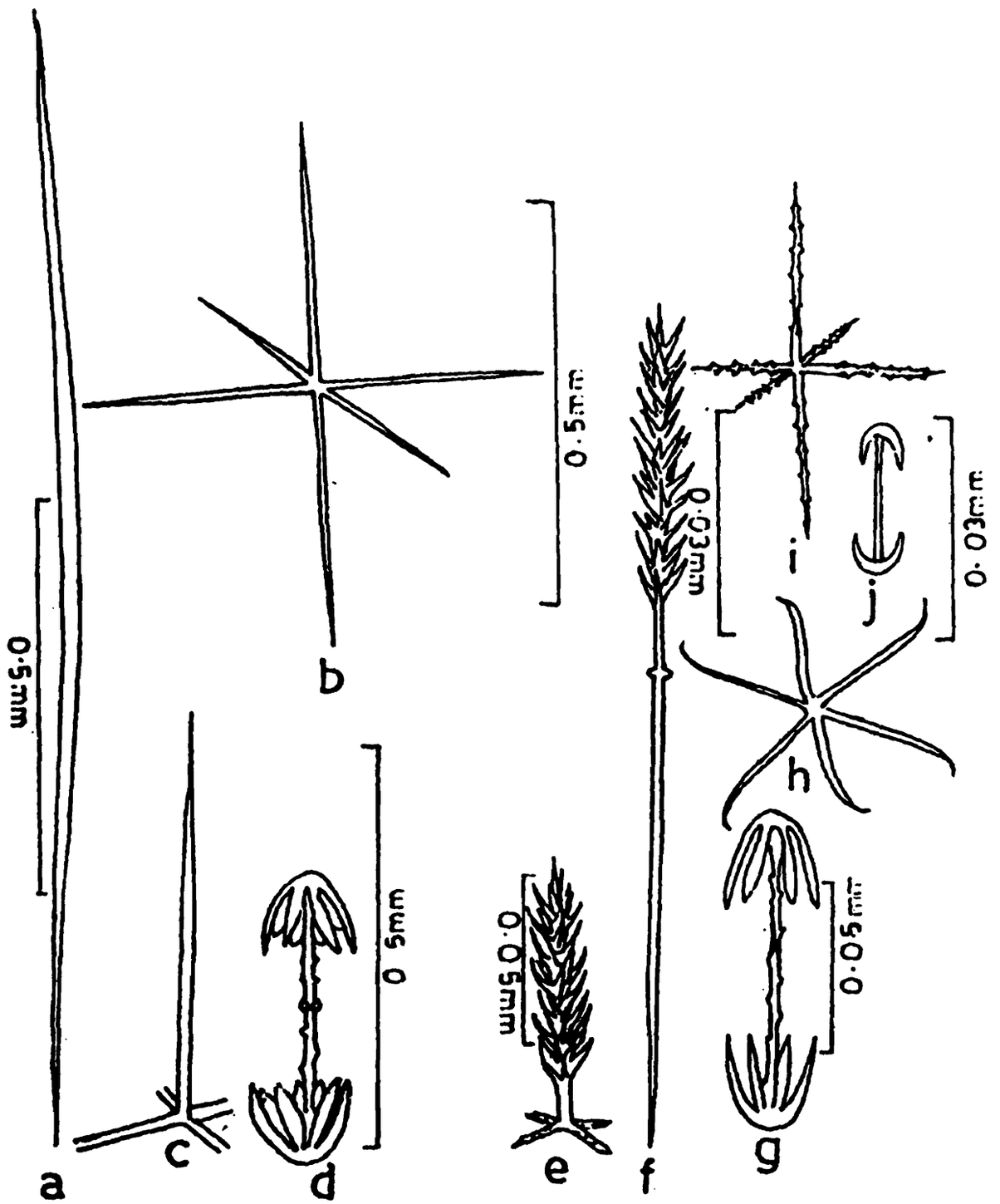


Fig. 64. *Hyalonema masoni*
a. diactine b. oxyhexactine c. oxypentactine d. macramphidisc e. pinule
f. diactinel marginalia g. mesamphidisc h. smooth micro-oxyhexactine
i. tuberculous micro-oxyhexactin j. micramphidisc

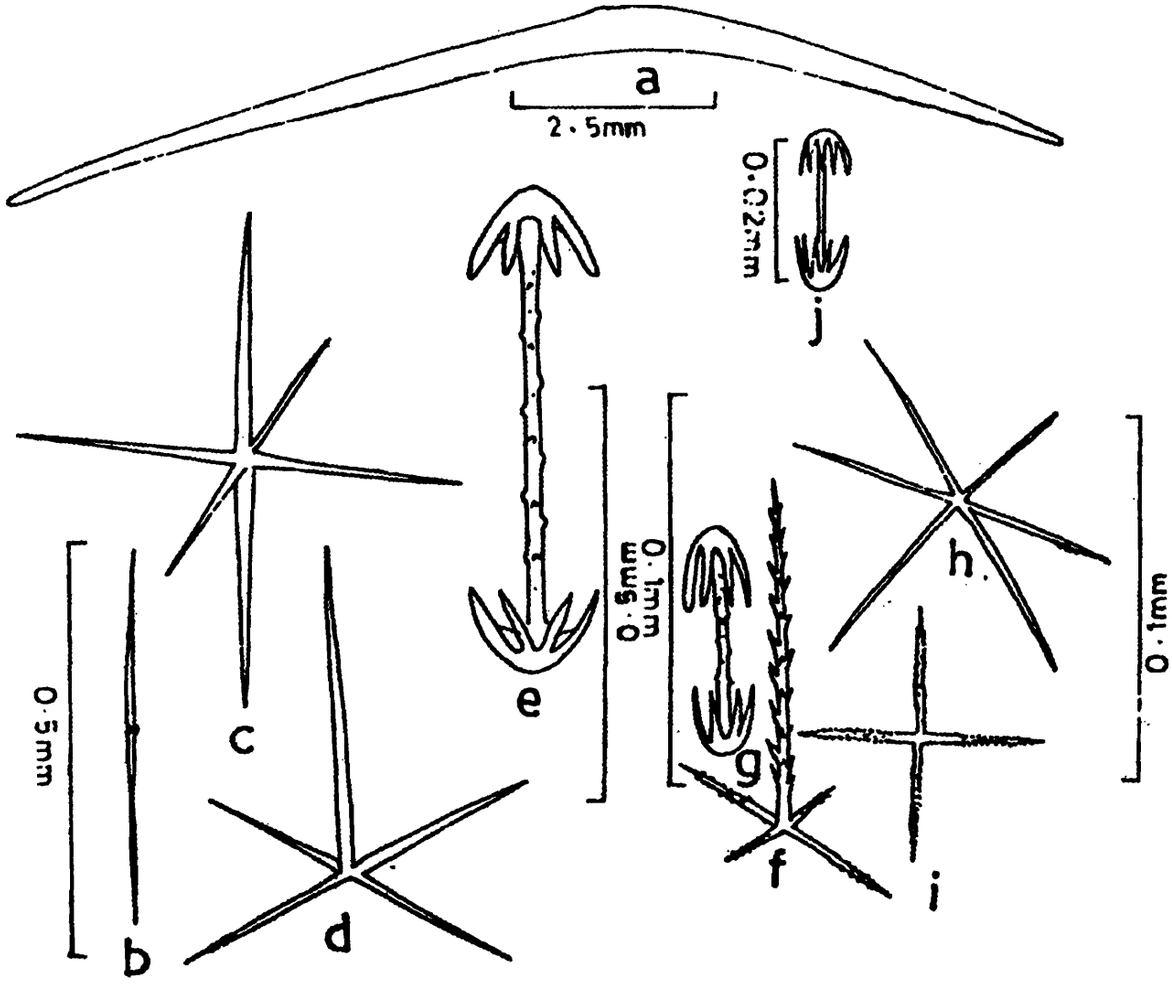


Fig. 65. *Hyalonema rapa*
a. curved oxydiactine b. oxypentactine
c. oxyhexactine d. oxypentactine e. macramphidisc
f. pinule g. mesamphidisc h. micro-oxyhexactine
i. acanthophore j. micramphidisc

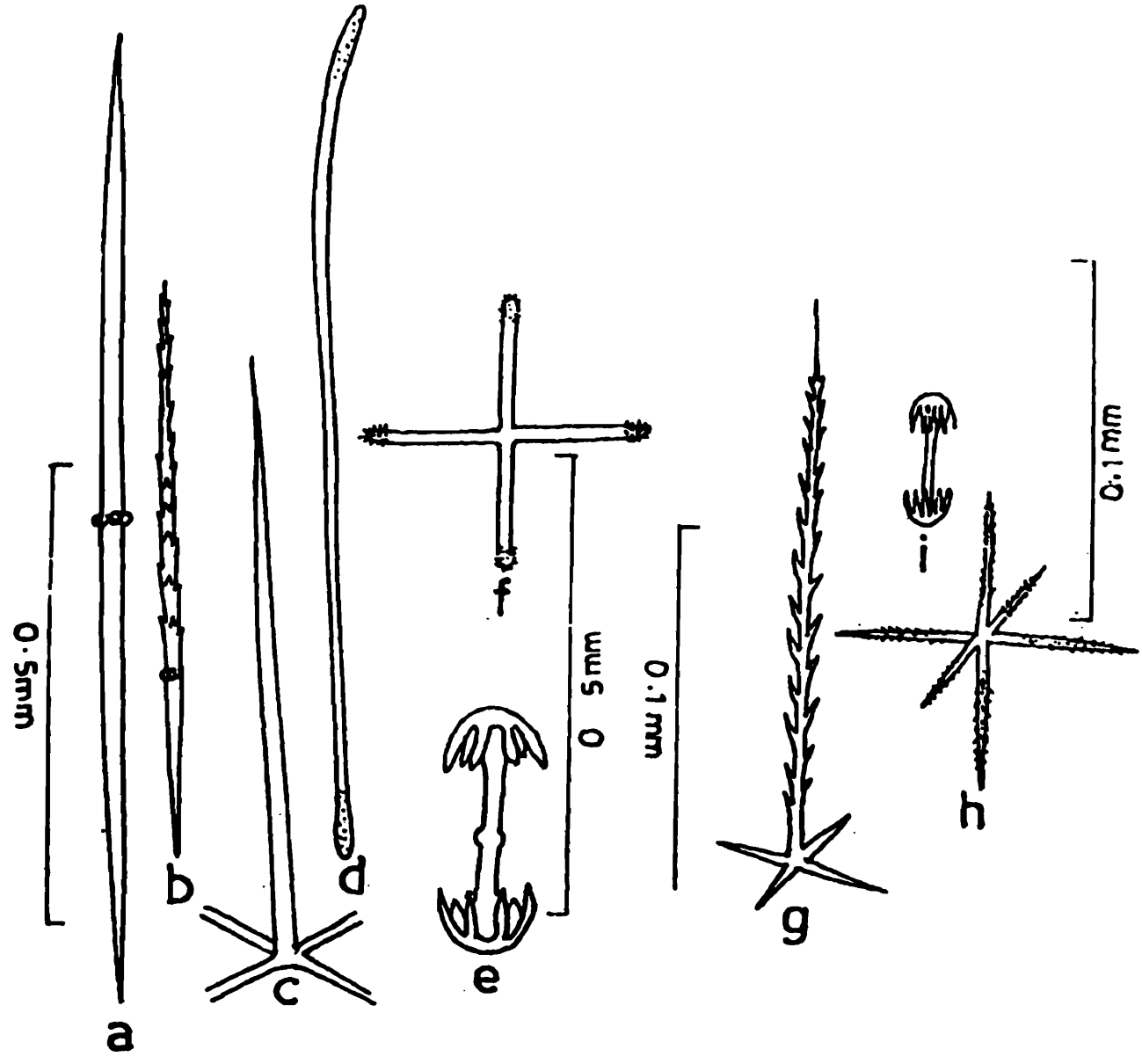


Fig. 66. *Lophophysema inflatum*
a. oxydiactine b. oxydiactine marginalia c. oxypentactine hypodermalia d. parenchymal diactine e. macramphidisc f. acanthophore g. pentactine pinule h. micro-oxyhexactine i. micramphidisc

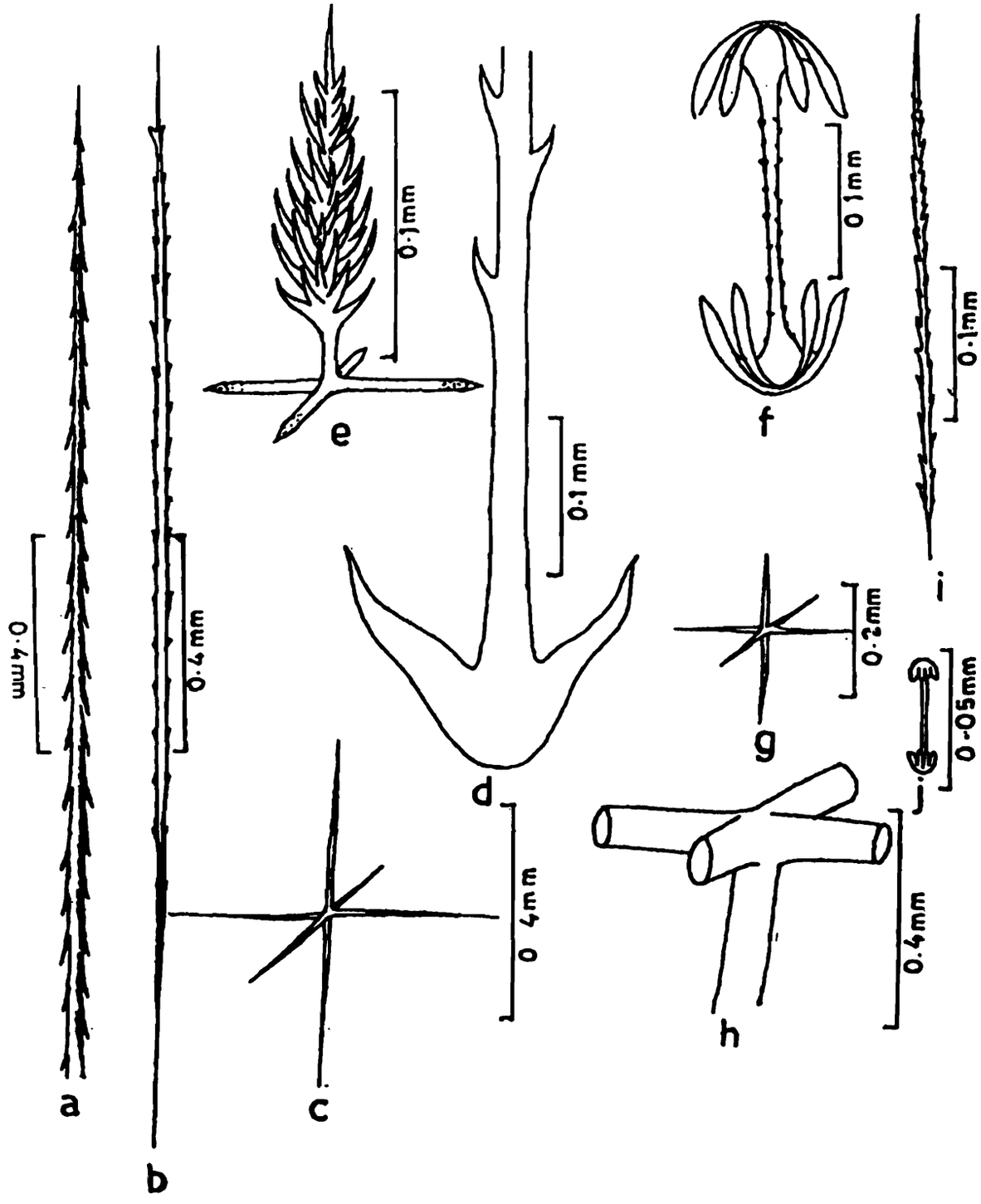


Fig. 67. *Pheronema raphanus*
a. upper end of large uncinate b. small uncinate c. micro-oxyhexactine
d. lower end of anchor e. pinule f. large amphidisc g. micro-oxyhexactine
h. central part or oxypentactine i. microuncinate j. microamphidisc

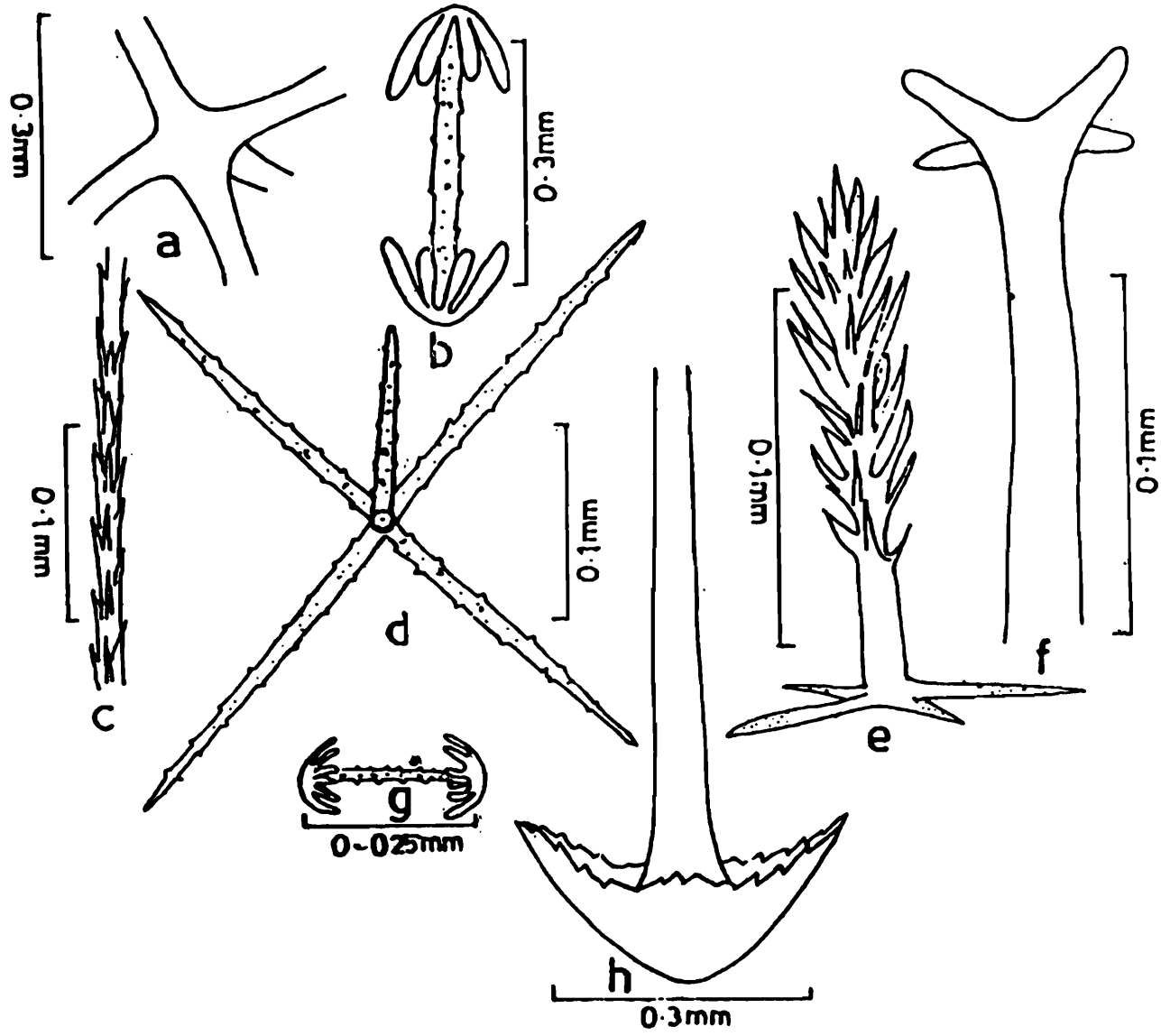


Fig. 68. *Semperella cucumis*
a. central part of large oxypentactine b. macramphidisc c. central part of an unicate
d. oxypentactine hypodermalia e. pinule f. subdermal pentactine
g. micramphidisc h. lower end of anchor

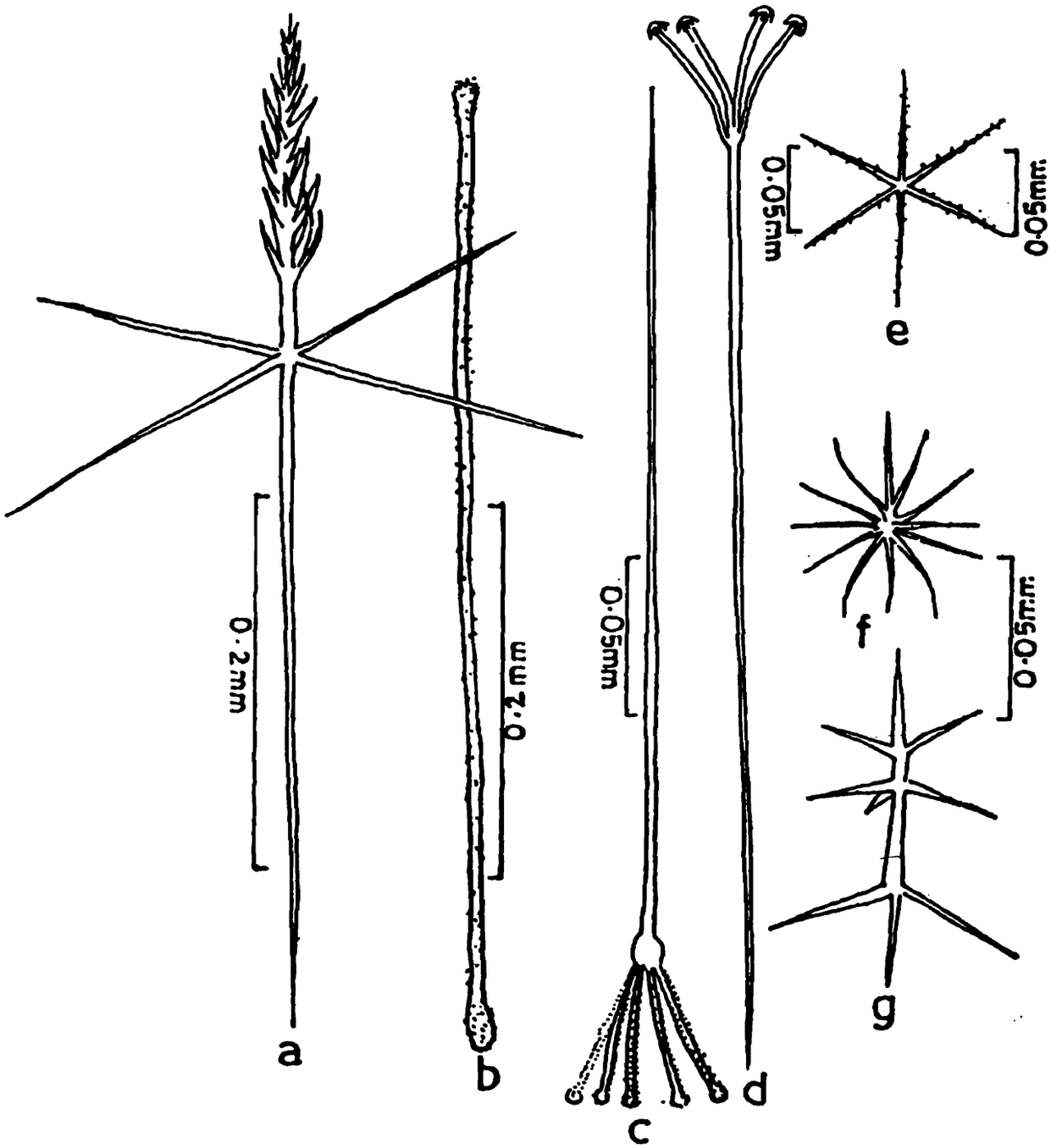


Fig. 69. *Aphrocallistes beatrix*
a. dermal oxyhexactine b. rhabdose diactine c,d. scopule
e. micro-oxyhexactine f. hexaster g. hemi-oxyhexaster

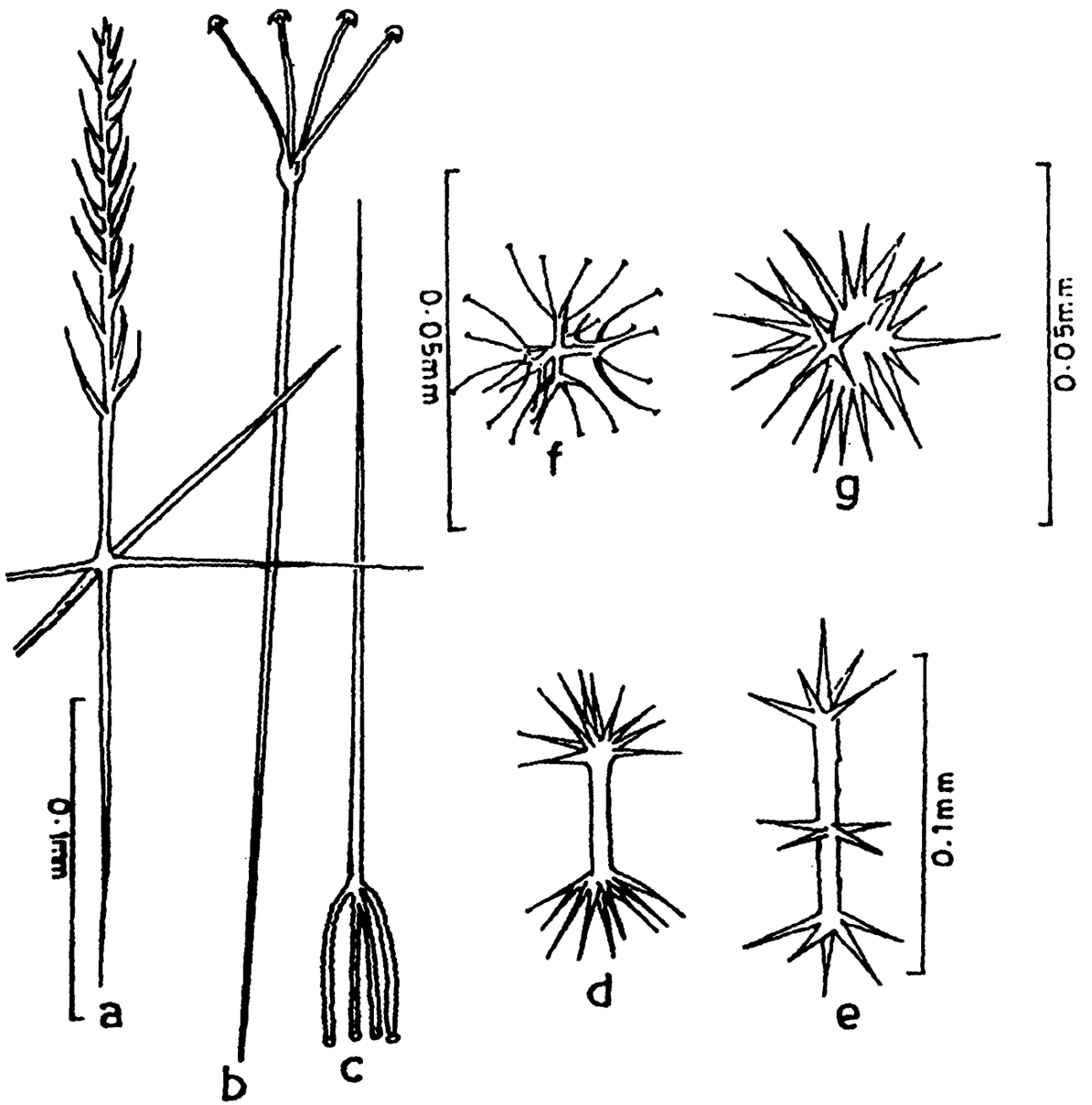


Fig. 70. *Aphrocallistes bocagei*
a. dermal oxyhexactine b. scopule with disc c. scopule with knob-like structure d,e. hemi-oxyhexaster f. onychaster g. micro-oxyhexatine

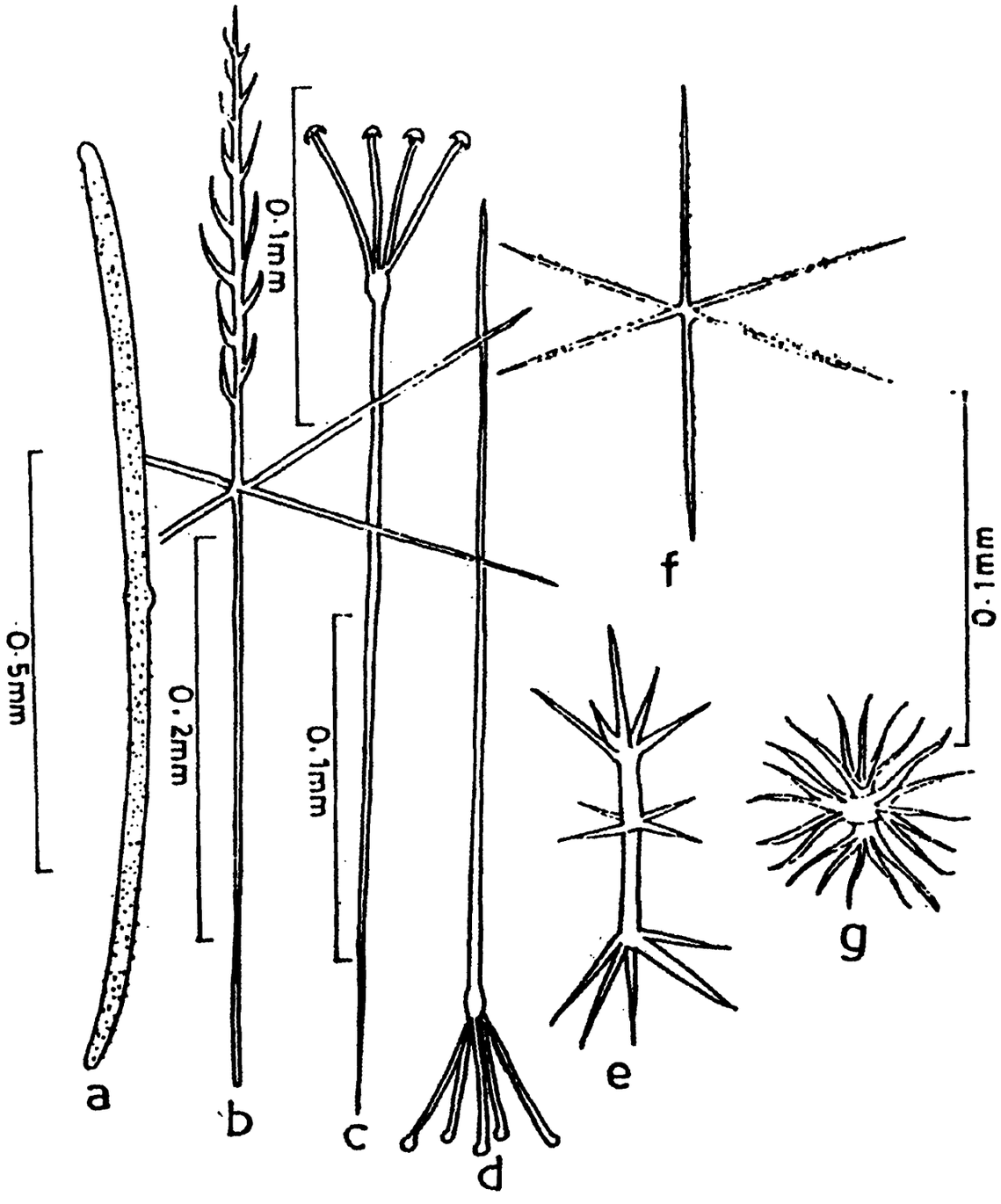


Fig. 71. *Aphrocallistes ramosus*
a. gastral diactine b. dermal oxyhexactine c. scopule with disc
d. scopule with knob-like structure e. hemioxyhexaster
f. parenchymal oxyhexactine g. hexaster

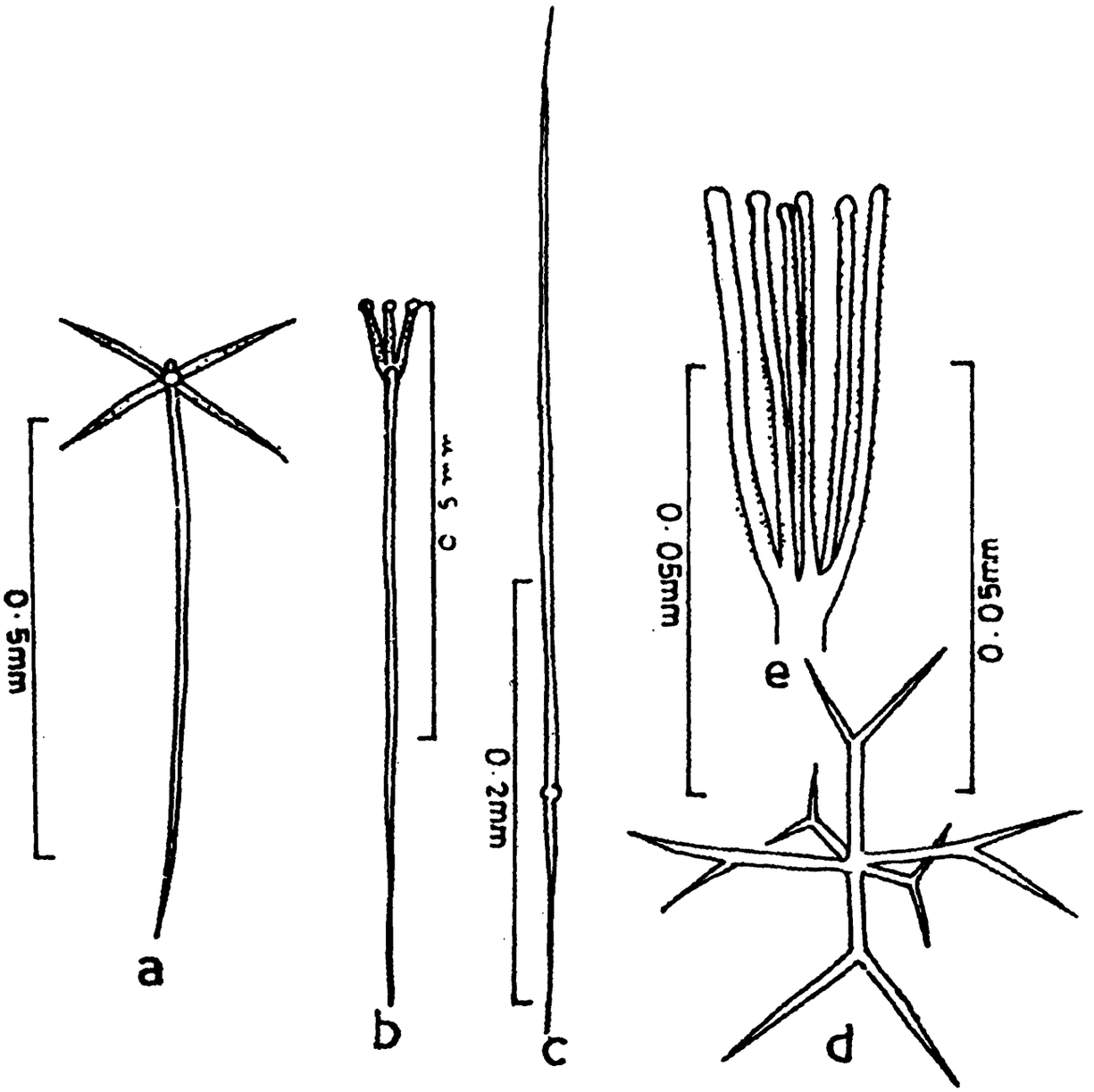


Fig. 72. *Hexactinella minor*
a. pentact b. scopule c. diact d. oxyhexaster e. scopule (enlarged)

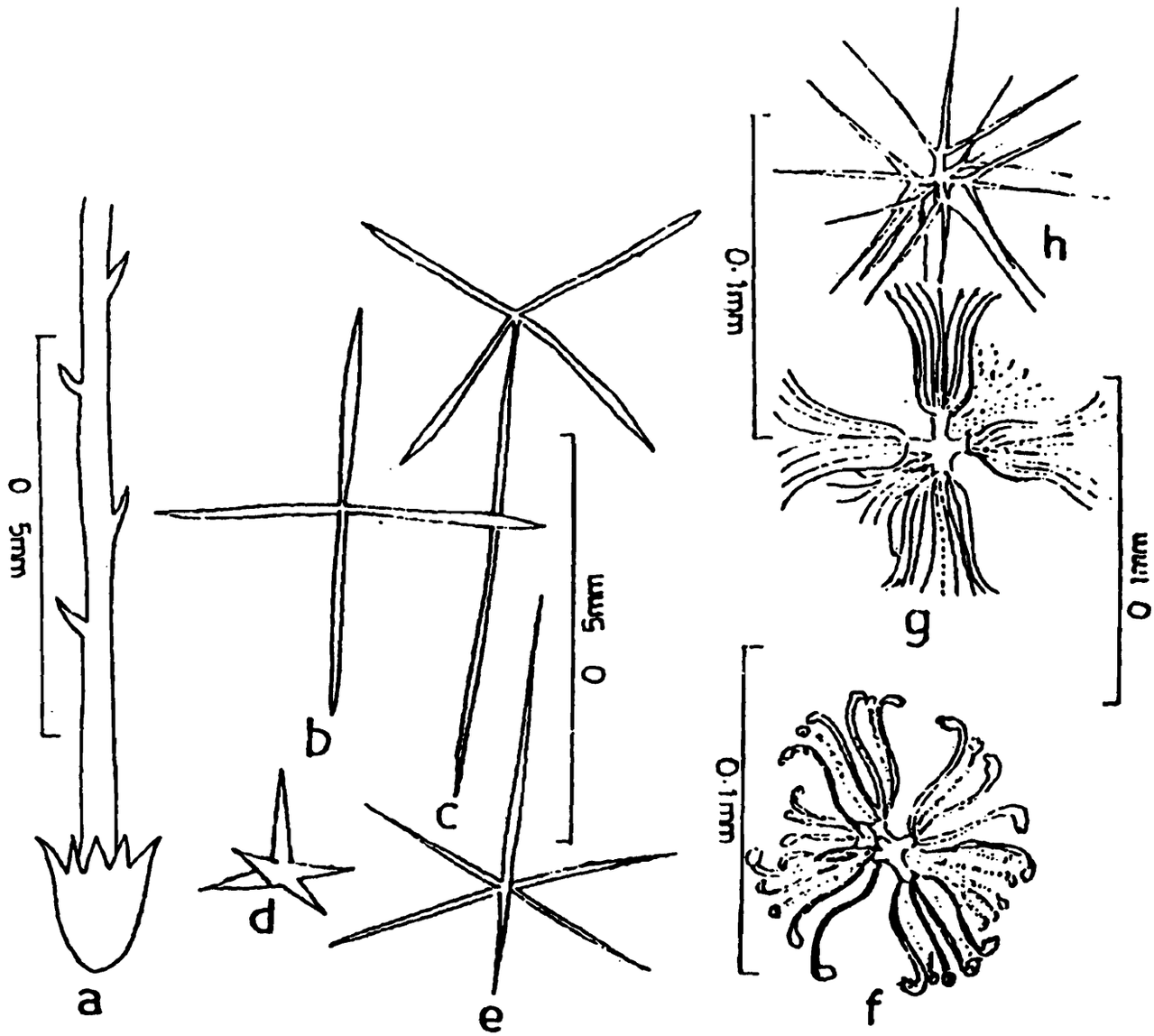


Fig. 73. *Euplecetella regalis*
a. basal club-shaped anchor spicule b. tetractine c. oxypentactine
d. robust oxypentactine e. hexactine hypodermalia f. floricom
g. sigmatocom h. oxyhexaster

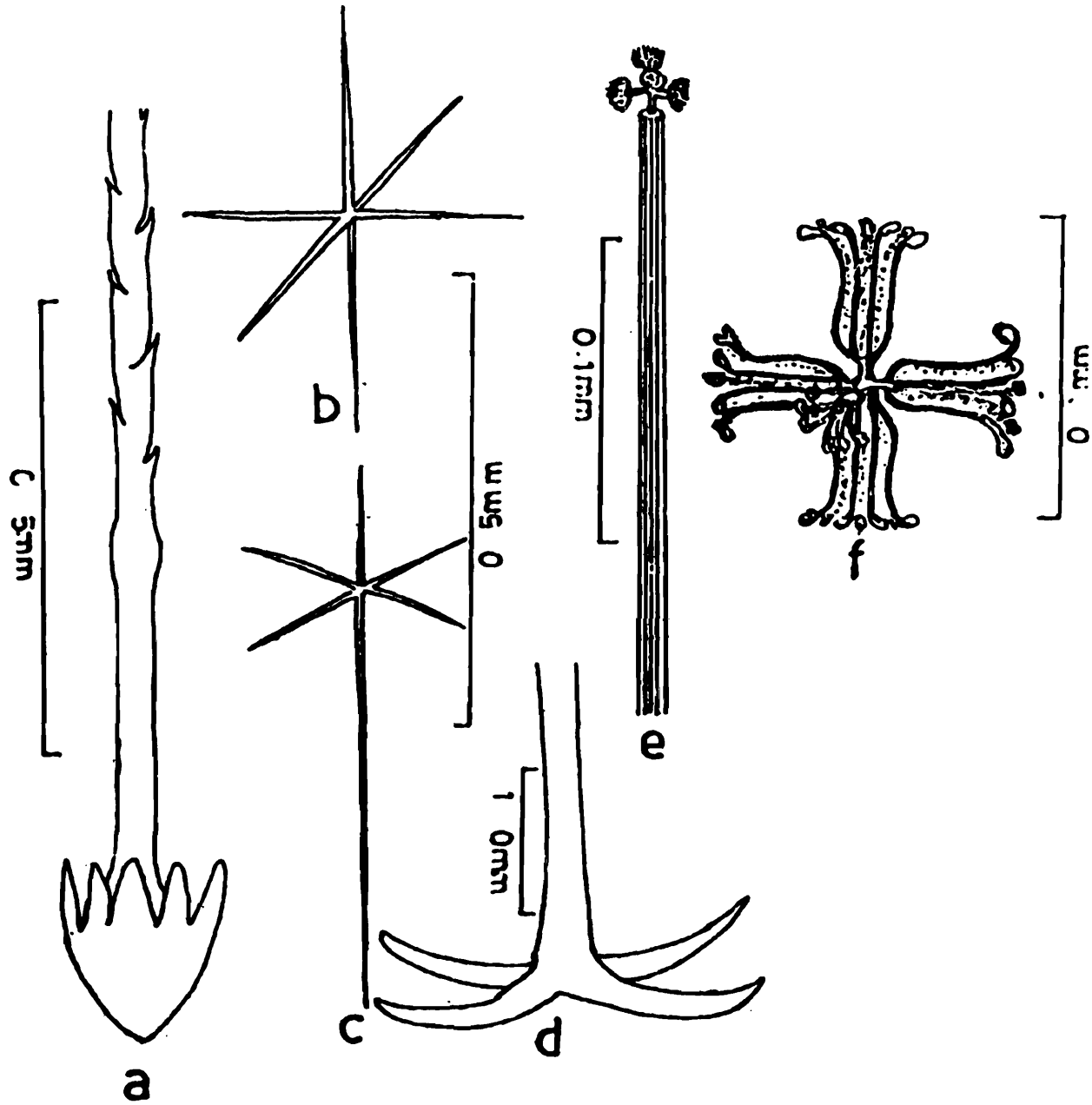


Fig. 74. *Euplactella simplex*
a. anchor-shaped basalia b. parenchymal oxyhexactine
c. hypodermal oxyhexactine d. tetradentate basa anchor spicule
e. graphicom f. floricom

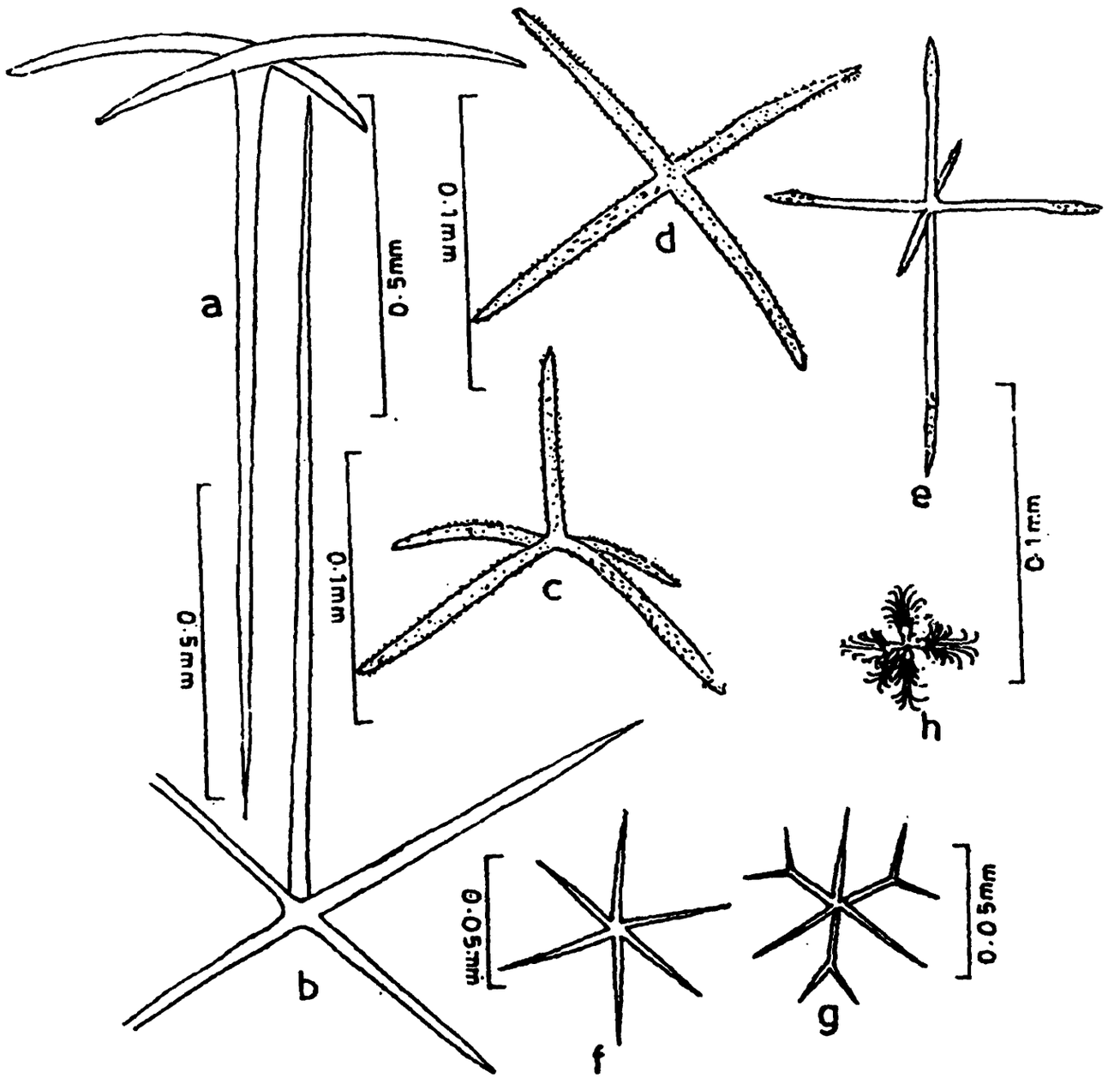


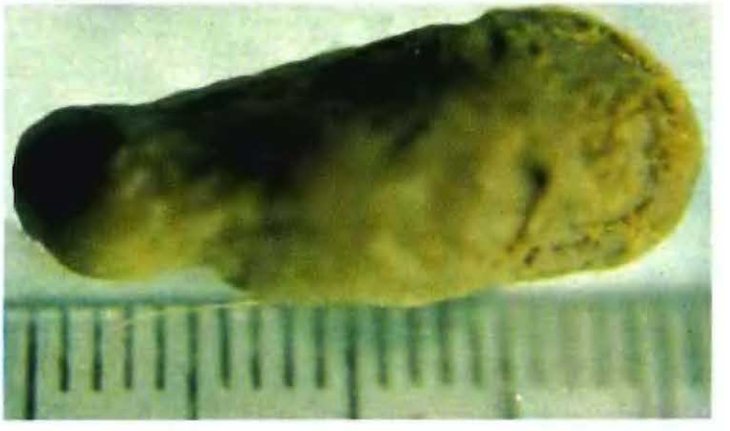
Fig. 75. *Lophocalyx spinosa*
a. curved oxypentactine b. straight oxypentactine
c. autodermal pentactine d. autodermal stauractine
e. autogastral hexactine f. microxyhexactine
g. oxyhexaster h. strobiloplumicome

PLATE - I

A. *Cinachyra arabica*

B. *Cinachyra australiensis*

C. *Paratetilla bucca*



D. *Tetilla dactyloidea*

E. *Ecionemia acervus*

F. *Rhabdastrella globostellata*

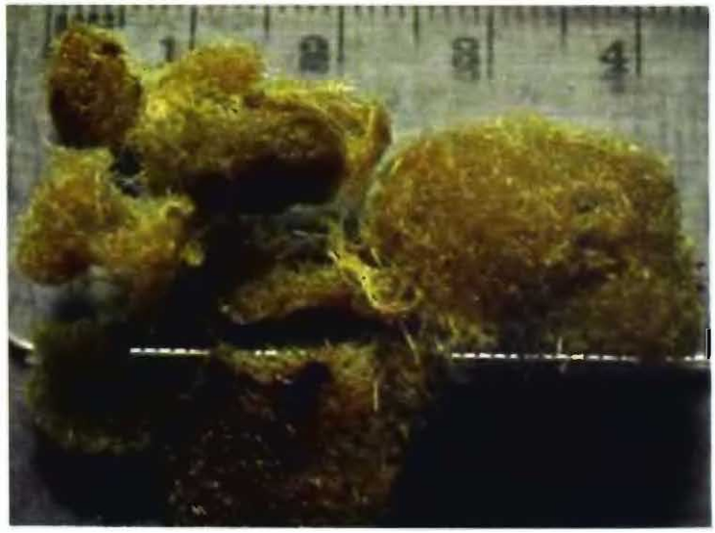
PLATE - II

A. ***Stelletta clavosa***

B. ***Stelletta purpurea***

C. ***Stelletta validissima***

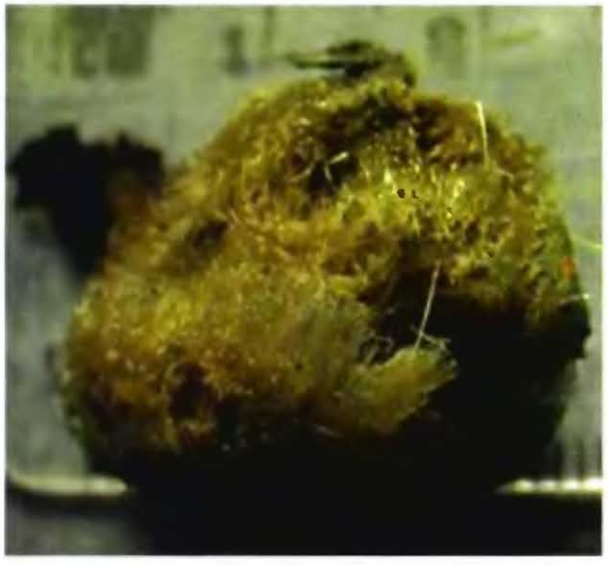
D. ***Erylus lendenfeldi***



E. ***Poecillastra eccentrica***

PLATE - III

A. *Poecillastra tenuilaminaris*



B. *Thenea andamanensis*

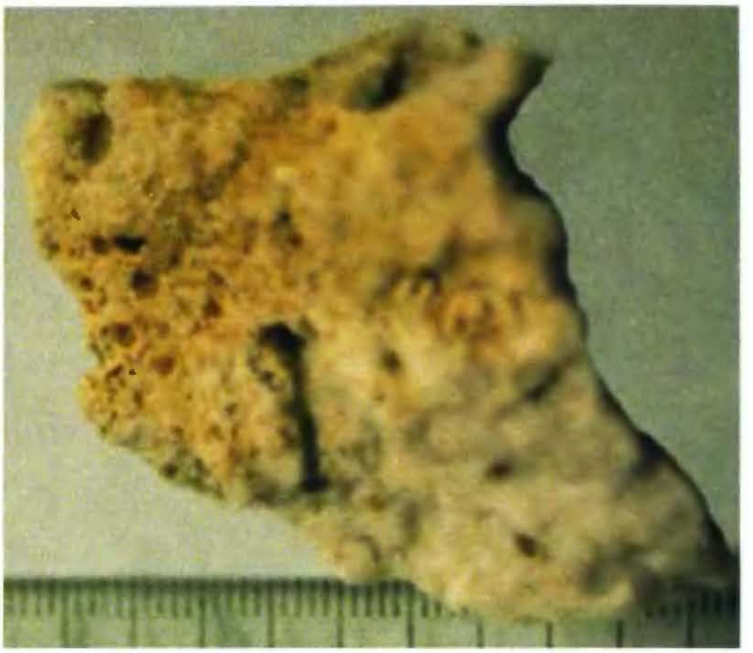
C. Coral infested with *Cliona ensifera*

D. Coral infested with *Cliona lobata*

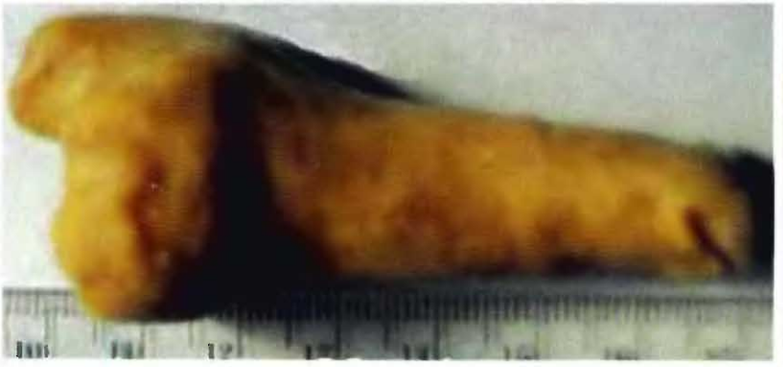
E. Coral infested with *Cliona quadtata*

PLATE - IV

A. Molluscan shells infested with *Cliona vastifica*



B. *Cliothosa hancocki* boring into coral



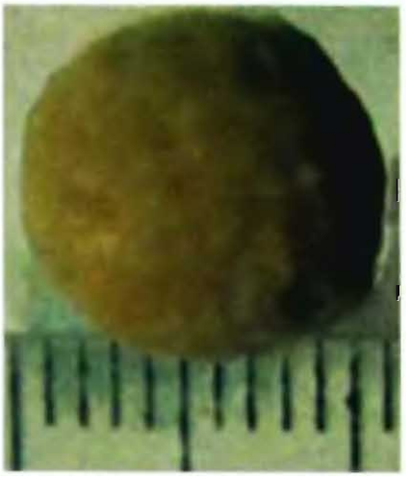
C. *Spirastrella inconstans*

D. *Spirastrella andamanensis* sp.nov.

E. *Tethya diploderma*

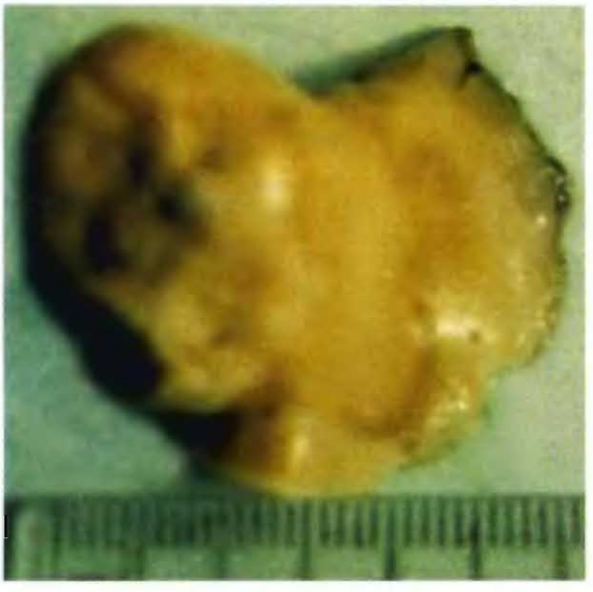
F. *Tethya robusta*

PLATE - V



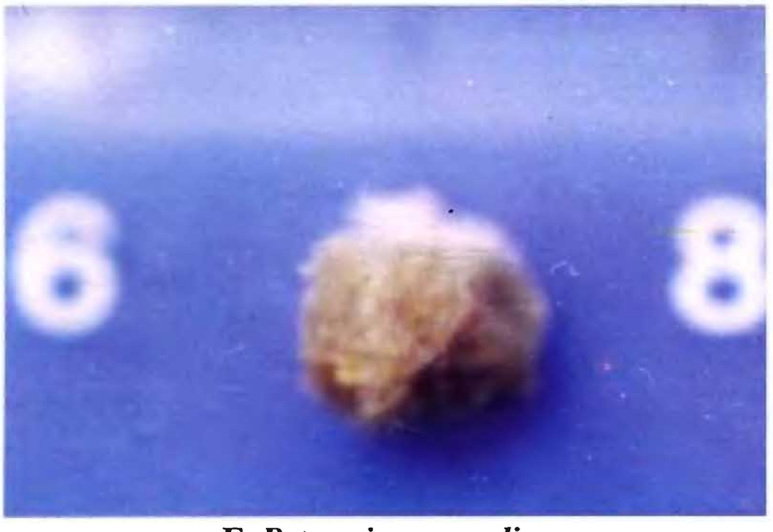
A. ***Tethya repens***

B. ***Discodermia gorgonoides***



C. ***Discodermia papillata***

D. ***Theonella swinhoei***



E. ***Petromica massalis***

F. ***Clathria (Microciona) atrasanguinea***

PLATE - VI

A. *Clathria (Thalisias) vulpine*

B. *Echinodictyum asperum*

C. *Raspailia typica*

D. Encrustation of *Psammochela elegans* on shells *typica*

E. *Damiriopsis brondstedi*

F. *Iotrochota baculifera*

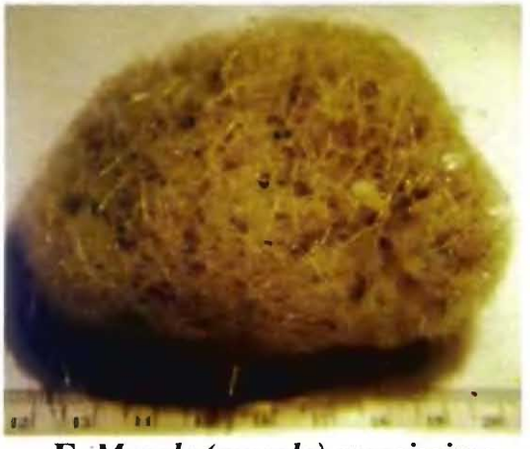
PLATE - VII

A. ***Monanchora enigmatica***

B. ***Tedania (Tedania) anhelans***

C. ***Biemna liposigma***

D. ***Auletta andamanensis*** **sp. nov.**



E. ***Mycale (mycale) crassissima***

F. ***Mycale (Mycale) Indica***

PLATE - VIII

A. ***Axinella tenuidigitata***

B. ***Axinella acanthelloides*** **sp. nov.**

C. ***Bubaris columnata***

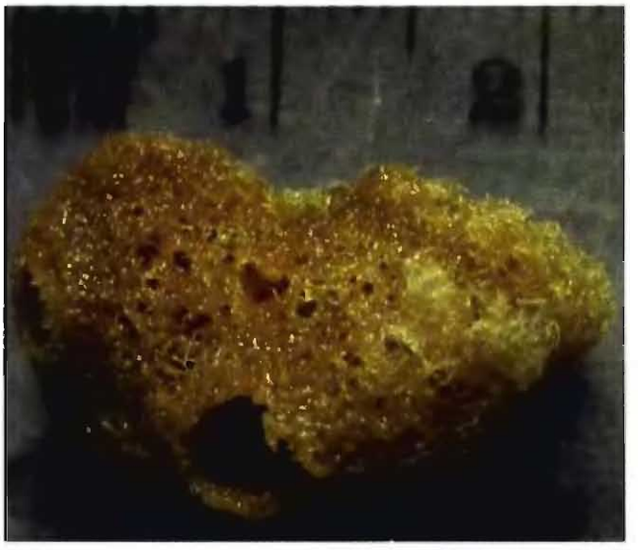
D. ***Amorphinopsis foetida***

E. ***Spongosorites halichondrioides***

F. ***Spongosorites andamanensis*** **sp. nov**

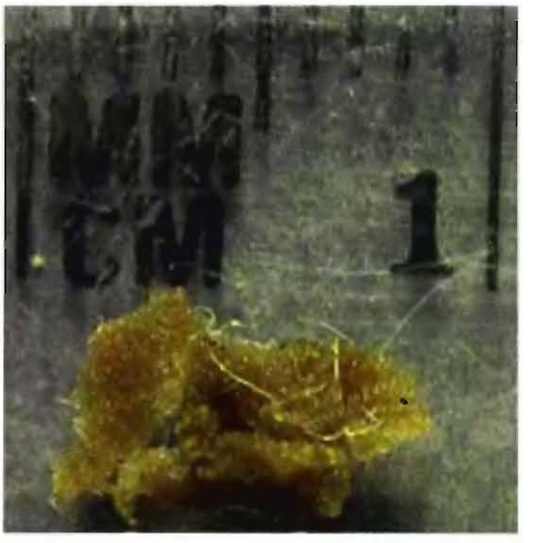
PLATE - IX

A. ***Haliclona (Gellius) flagellifer***



B. ***Haliclona (Gellius) megastoma***

C. ***Gelliodes fibulatus***



D. ***Calyx clavata***

E. ***Xestospongia testudinaria***

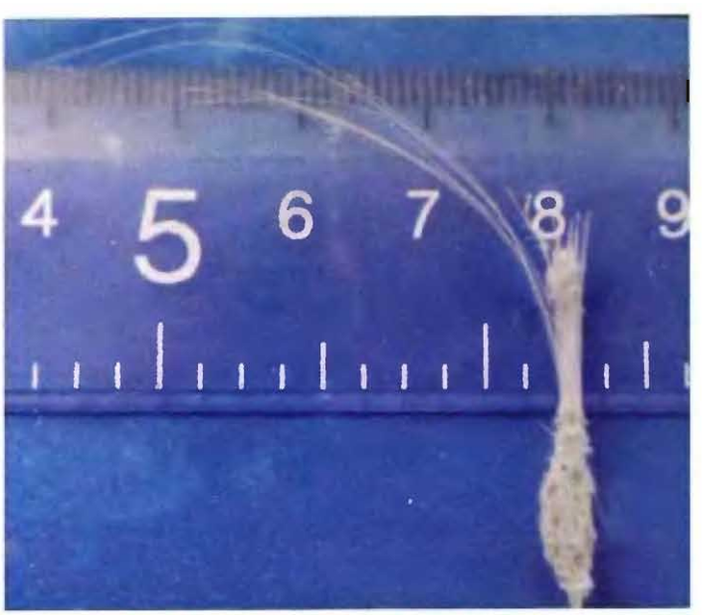
F. ***Phyllospongia foliascens***

PLATE - X

A. ***Clathrina coriacea***

B. ***Pericharax heteroraphis***

C. ***Hyalonema aculeatum***



D. ***Hyalonema affine***

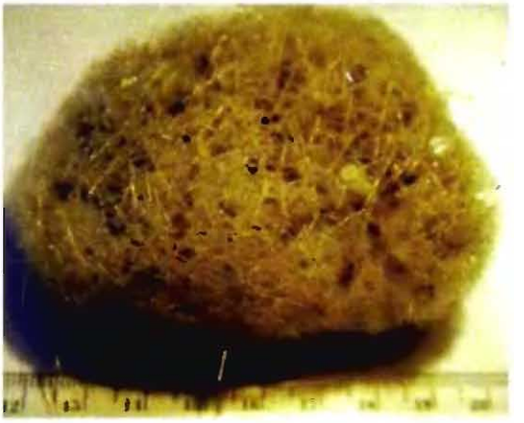
E. ***Hyalonema indicum***

PLATE - XI

A. *Hyalonema lamella*

B. *Hyalonema martabanense*

C. *Hyalonema masoni*

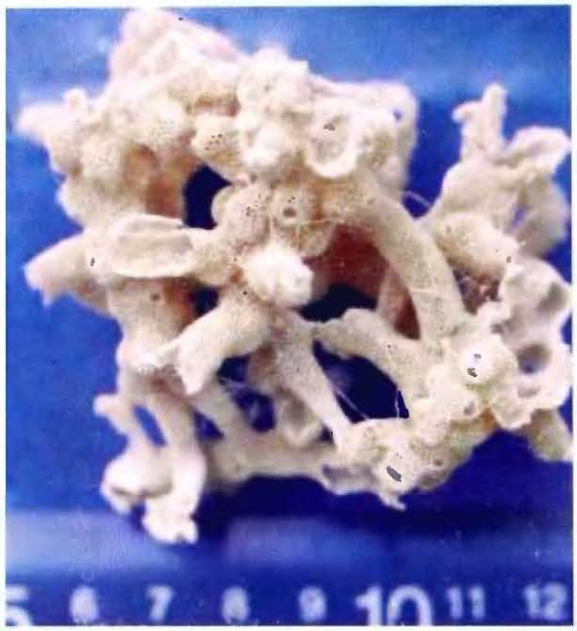


D. *Lophophysema inflatum*

E. *Pheronema raphanus*

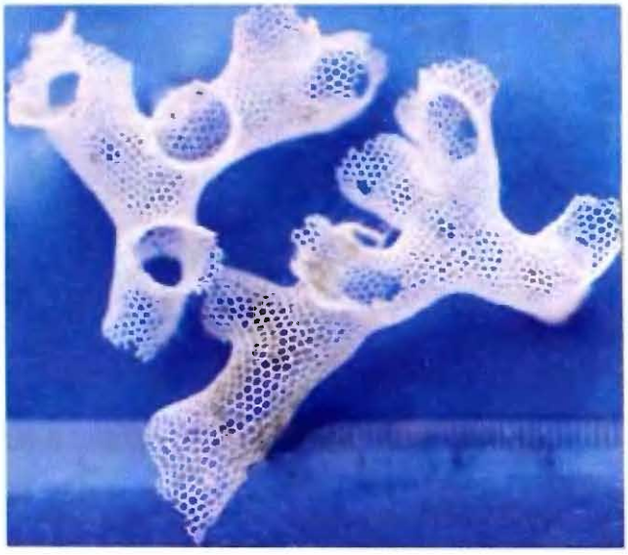
F. *Semperella cucumis*

PLATE - XII



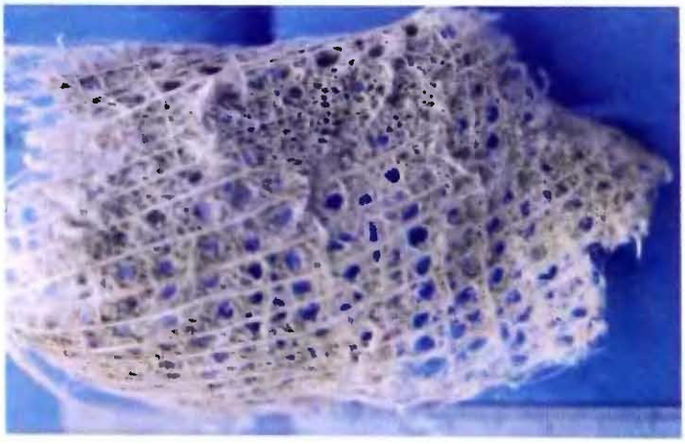
A. *Aphrocallistes beatrix*

B. *Aphrocallistes bocagi*



C. *Aphrocallistes ramosus*

D. *Hexactinella minor*



E. *Euplectella regalis*

F. *Lophocalyx spinosa*