

5. SPONGES

By MAURICE BURTON

With Plate 9 and Text-figs. 1-9

SYNOPSIS

The 42 specimens, representing 35 species, of which 8 are new, were collected from widely separated points on the Atlantic seaboard, providing useful fauna records. Two specimens are of special interest, since they make possible re-descriptions of species long known but too inadequately described to make recognition possible. The species are *Stryphnus pachastrelloides* (Schmidt) and *Callyspongia tenerrima* (Duchassaing and Michelotti).

I. LIST OF SPECIES MENTIONED IN THIS REPORT

Order HEXACTINELLIDA.

Sub-order AMPHIDISCOPHORA.

Family HYALONEMATIDAE.

Pheronema carpenteri (Thomson).

Sub-order HEXASTEROPHORA.

Family FARREIDAE.

Farrea occa Bowerbank.

Family MELETTIONIDAE.

Aphrocallistes beatrix Gray.

Family ROSSELLIDAE.

Rossella mortenseni Burton.

Order CALCAREA.

Family HOMOCOELIDAE.

Leucosolenia botryoides (Ellis and Solander).

Leucosolenia canariensis (Michlucho-Maclay).

Order TETRAxonIDA.

Sub-order STREPTASTROSCLEROPHORA.

Family THENEIDAE.

Thenea fenestrata (Schmidt).

Thenea wyvilli Sollas.

II. SYSTEMATIC NOTES

Order HEXACTINELLIDA.

Sub-order AMPHIDISCOPHORA.

Family HYALONEMATIDAE.

Genus *Pheronema* Leidy.*Pheronema carpenteri* (Thomson).

Holtenia carpenteri Thomson, 1869, p. 120, woodcut; Thomson, 1869, p. 210; Thomson, 1869, p. 702, pls. lxvii-lxxi; *Pheronema carpenteri*, Kent, 1870, p. 243, pl. lxiii, fig. 1; Gray, 1870, p. 210; *Holtenia carpenteri*, Bocage, 1871, p. 69; *Pheronema carpenteri*, Marshall, 1876, p. 130; Schulze, 1886, p. 64; Schulze 1887, p. 241, pl. liii; Schulze, 1893, p. 562; Schulze, 1904, p. 50, pl. xv, figs. 1-5; Burton, 1928, p. 14.

OCCURRENCE. St. 49, between Fuerteventura Island (Canaries) and Africa (28° 25' N., 13° 34' W.), 1st February, 1938. One specimen.

DISTRIBUTION. Iceland; Faroes; Lewis; Portugal; Brazil; Zanzibar; 823-2928 m., on mud.

REMARKS. In spite of the wide geographical range, and the number of references to this species in the literature, it has not been recorded on more than five occasions. Yet from the numbers of individuals referred to in those references the species would appear to be abundant at suitable depths. This is borne out by the account Bocage (l.c.) gives. He refers to it as well-known to the "pêcheurs des squales" in the deep waters off Setubal.

In dealing with this species in 1928, I gave a reference to "Carpenter and Thomson 1869," both in the synonymy list and in the list of literature. This was taken from Lendenfeld's bibliography in his work of 1886 (p. 598). There are two papers listed by Lendenfeld under this supposed joint authorship, both for the year 1869, and both were written, in fact, by Thomson alone.

Another correction is necessary, this time from Marshal (1876). This author lists the genus "*Holtenia* Schmidt" on p. 126, for *H. pourtalesii* and, on p. 130, gives "*Holtenia* Schmidt p.p." under *Pheronema*. The only valid authorship of *Holtenia* is, of course, of Thomson, 1869.

Sub-order HEXASTEROPHORA

Family FARREIDAE

Genus *Farrea* Bowerbank*Farrea occa* Bowerbank

(for discussion see Ijima, 1927)

OCCURRENCE. St. 49, between Fuerteventura Island (Canaries) and Africa (28° 25' N., 13° 34' W.), 1st February, 1938, 1300 m. One specimen.

DISTRIBUTION. World-wide, from 204-1901 m.

Sub-order ASTROSCLEROPHORA.

Family STELLETTIDAE.

Stelletta anancora (Sollas).

Stryphnus pachastrelloides (Schmidt).

Family CLAVULIDAE.

Radiella sol Schmidt.

Family TETILLIDAE.

Tetilla cranium (Müller).

Sub-order SIGMATOSCLEROPHORA.

Family HAPLOSCLERIDAE.

Haliclona rubens (Pallas).

„ *erina* de Laubenfels.

„ *spiculosa* (Dendy).

„ *calcinea* sp. n.

„ *tenerrima* sp. n.

Callyspongia tenerrima Duchassaing and Michelotti.

Family DESMACIDONIDAE.

Desmacella annexa (Schmidt).

„ *inornata* (Bowerbank).

Myxilla distorta sp. n.

Phorbas amaranthus (Duchassaing and Michelotti).

Inflatella viridis (Topsent).

Plocamionida topsenti sp. n.

Tedania anhelans (Lieberkühn).

Family AXINELLIDAE.

Axinella ramosa sp. n.

Hymeniacion assimilis (Levinsen).

„ *glabrata* sp. n.

Halichondria panicea (Pallas).

„ *osculum* Lundbeck.

„ *bowerbanki* Burton.

„ *cornuloides* sp. n.

Family RASPELIIDAE.

Higginsia strigilata (Lamarck).

Dragnetyle topsenti sp. n.

Order KERATOSA.

Family SPONGIIDAE.

Hircinia variabilis Schmidt.

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Family MELETTIONIDAE.

Aphrocallistes beatrix Gray.

Family ROSSELLIDAE.

Rossella mortenseni Burton.

Order CALCAREA.

Family HOMOCOELIDAE.

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Leucosolenia canariensis (Michlucho-Maclay).

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Sub-order STREPTASTROSCLEROPHORA.

Family THENEIDAE.

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Thenea wyvilli Sollas.

Sub-order ASTROSCLEROPHORA.

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Haliclona rubens (Pallas)." *erina* de Laubenfels." *spiculosa* (Dendy)." *calcinea* sp. n." *tenerrima* sp. n.*Callyspongia tenerrima* Duchassaing and Michelotti.

Family DESMACIDONIDAE.

Desmacella annexa (Schmidt)." *inornata* (Bowerbank).*Myxilla distorta* sp. n.*Phorbis amaranthus* (Duchassaing and Michelotti).*Inflatella viridis* (Topsent).*Plocamionida topsenti* sp. n.*Tedania anhelans* (Lieberkühn).

Family AXINELLIDAE.

Axinella ramosa sp. n.*Hymeniacion assimilis* (Levinsen)." *glabrata* sp. n.*Halichondria panicea* (Pallas)." *osculum* Lundbeck." *bowerbanki* Burton." *cornuloides* sp. n.

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DISTRIBUTION. Iceland; Faroes; Lewis; Portugal; Brazil; Zanzibar; 823-2928 m., on mud.

REMARKS. In spite of the wide geographical range, and the number of references to this species in the literature, it has not been recorded on more than five occasions. Yet from the numbers of individuals referred to in those references the species would appear to be abundant at suitable depths. This is borne out by the account Bocage (l.c.) gives. He refers to it as well-known to the "pêcheurs des squales" in the deep waters off Setubal.

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Sub-order HEXASTEROPHORA

Family FARREIDAE

Genus *Farrea* Bowerbank*Farrea occa* Bowerbank

(for discussion see Ijima, 1927)

OCCURRENCE. St. 49, between Fuerteventura Island (Canaries) and Africa (28° 25' N., 13° 34' W.), 1st February, 1938, 1300 m. One specimen.

DISTRIBUTION. World-wide, from 204-1901 m.

REMARKS. I find it difficult to believe that the many subspecies, into which Ijima divided this species, represent anything more than simple fluctuating variations, or, at most, ecological varieties.

Family MELETTIONIDAE

Genus *Aphrocallistes* Gray

Aphrocallistes beatrix Gray

Aphrocallistes beatrix Gray, 1858, p. 114, pl. xi; Ijima, 1927, p. 286, pl. xxiv, figs. 20-30, pl. xxv, figs. 1-25, text-fig. 35.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49' W.), 27th November, 1937, 720-800 m. One specimen.

DISTRIBUTION. South-west of Ireland; Azores; Madeira; Canaries; Cape Verde Islands; Ascension Island; Bermuda; Florida; West Indies; Indian Ocean (south of Bombay, Bay of Bengal, Andaman Islands); Malay Area; Philippines; Japan; 105-1633 m., on gravel, sand, mud and ooze.

Family ROSSELLIDAE

Genus *Rossella* Carter

Rossella mortenseni Burton

Rossella mortenseni Burton, 1928, p. 9, figs. 3-9.

OCCURRENCE. St. 49, between Fuerteventura Island (Canaries) and Africa (28° 25' N., 13° 34' W.), 1st February, 1938, 1300 m. One specimen.

DISTRIBUTION. Iceland; Faroes; 479-957 m.

Order CALCAREA

Family HOMOCOELIDAE

Genus *Leucosolenia* Bowerbank

Leucosolenia botryoides (Ellis & Solander)

Spongia botryoides Ellis and Solander, 1786, p. 190, pl. lviii, figs. 1-4; *Leucosolenia botryoides*, Arndt, 1939, p. 4, fig. 1.

OCCURRENCE. St. 10, NW. Arm, Horn Bay, Newfoundland (52° 13' N., 55° 47' W.), 23rd September, 1937, 15 m. One specimen.

DISTRIBUTION. Arctic; Atlantic coasts of Europe; Mediterranean; West Africa; South Africa; Red Sea; Australia (west and east coasts); Atlantic coast of North America; California; Chile; Sandwich Isles; mainly littoral, but occurring down to 860 m., growing on rocks, stones and seaweeds.

Leucosolenia canariensis (Michlucho-Maclay)

Nardoia canariensis Michlucho-Maclay, 1868, p. 230; *N. sulphurea* Michlucho-Maclay, 1868, p. 230; *N. rubra* Michlucho-Maclay, 1868, p. 230; *Tarroma canariense*, Haeckel, 1870, p. 244; *T. rubrum*, Haeckel, 1870, p. 245; *T. sulphureum*, Haeckel, 1870, p. 245; *Ascallis canariensis*, Haeckel, 1872, p. 52, pl. ix, figs. 1-3, pl. x, fig. 1; *Auloplegma canariensis*, Haeckel, 1872, p. 52; *Ascuris arredifae* Haeckel, 1872, p. 52; *A. papillata* Haeckel, 1872, p. 52; *Ascetta compacta* Schuffner, 1877, p. 404, pl. xxv, fig. 9; *A. coriacea* var., Fristedt, 1885, p. 8; *Ascuris canariensis*, Lackschewitsch, 1886, p. 338; *Leucosolenia nausicae* Lackschewitsch, 1886, p. 300, pl. vii, fig. 1; *L. nanseni* Breitfuss, 1896, p. 427; Breitfuss, 1898, p. 106, pl. xii, figs. 1-9; Breitfuss, 1898, p. 13; *L. coriacea*, Arnesen, 1901, p. 10; Arnesen, 1901, p. 67; *L. canariensis* (pars), Thacker, 1908, p. 762, pl. xl fig. 3, text-figs. 157-160; *Clathrina canariensis* var. *compacta* Row, 1909, p. 184; *Leucosolenia nanseni* Breitfuss, 1911, p. 311; *L. canariensis*, Dendy and Row, 1913, p. 724; *L. nanseni*, Derjugin, 1915, p. 289; *L. canariensis*, Hentschel, 1916, p. 4; Hozawa, 1918, p. 528, pl. lxxxiv, fig. 2; Breitfuss, 1932, p. 240; Hozawa, 1933, p. 2, pl. i, fig. 1; Topsent, 1934, p. 7.

OCCURRENCE. St. 10, NW. Arm, Horn Bay, Newfoundland (52° 13' N., 55° 47' W.), 23rd September, 1937, 15 m. Two specimens.

DISTRIBUTION. Spitzbergen; Kola Fiord; Norway; Sweden; Mediterranean; Canaries; Cape Verde Islands; Mauritius; Suez; Japan; on rock, sand, stones, mud, shells; littoral to 165 m.

REMARKS. The similarity between the external form of this species and that of the better-known *L. coriacea* tempts the suggestion that it is a recurrent mutant of the latter. Both occupy a similar range, have the same colour varieties and a closely similar external form. If, as we have reason to believe, the presence or absence of oxea in calcareous sponges has no specific value, then the affinity between *L. canariensis* and *L. coriacea* is even closer, and the recognition of the former as a mutant of the latter depends mainly on the presence of quadriradiates.

Order TETRAONIDA

Sub-order STREPTASTROSCLEROPHORA

Family THENEIDAE

Genus *Thenea* Gray

Thenea fesestrata (Schmidt)

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

OCCURRENCE. St. 26, north of Turneffe Island, West Indies (17° 53' N., 84° 44' W.), 7th November, 1937, 900 m. One specimen.

DISTRIBUTION. Galapagos; Chile; West Indies; Sierra Leone; 1745-4114 m., on mud and ooze.

Thenea wyvillii Sollas

Thenea wyvillii Sollas, 1886, p. 184; Sollas, 1888, p. 74, pl. vi, figs. 1-9; *T. calyx* Thiele, 1898, p. 24, pl. v, figs. 9-10; *Ancorina (Thenea) wyvillii*, Lendenfeld, 1903, p. 56; *A. (T.) grayi calyx*, Lendenfeld, 1903, p. 57.

OCCURRENCE. St. 49, between Fuerteventura Island and Africa (28° 25' N., 13° 34' W.), 1st February, 1938, 1300 m. One specimen.

DISTRIBUTION. Off Zebu, Philippines, 174 m., on blue mud.

REMARKS. The species evidently ranges throughout tropical waters. In addition to the present specimen from the tropical Atlantic and the holotype from the Philippines, there is a third specimen in the John Murray Collection, in the British Museum, from the Gulf of Aden.

Sub-order ASTROSCLEROPHORA

Family STELLETTIDAE

Genus *Stelletta* Schmidt*Stelletta anancora* (Sollas)

Pilochrota anancora Sollas, 1886, p. 189; *P. gigas* Sollas, 1886, p. 190; *P. tenuispicula* Sollas, 1886, p. 190; *P. crassispicula* Sollas, 1886, p. 190; *P. gigas* Sollas, 1888, p. 124, pl. xx, figs. 1-13; *P. tenuispicula* Sollas, 1888, p. 127, pl. xv, figs. 28-32; *P. crassispicula* Sollas, 1888, p. 128, pl. xiv, figs. 9-15; *P. anancora* Sollas, 1888, p. 132, pl. xiv, figs. 16-22; *Stelletta crassispicula*, Lendenfeld, 1903, p. 42; *S. tenuispicula*, Lendenfeld, 1903, p. 42; *S. anancora*, Lendenfeld, 1903, p. 43; *S. gigas*, Lendenfeld, 1903, p. 43; *S. crassiclada* Lendenfeld, 1906, p. 281, pl. xxxi, figs. 3-12; *S. crassispicula*, Topsent, 1922, p. 1; Topsent, 1928, p. 123, pl. i, fig. 25, pl. v, fig. 13.

OCCURRENCE. St. 44, St. Paul's Rock, 28th December, 1937, 50-60 m. One specimen.

DISTRIBUTION. Bermuda; Cape Verde Islands; St. Paul's Rock; Bahia; on rock and calcareous algae; 12-91 m.

REMARKS. Topsent (1922) has given an account of the variations in this species, and on the basis of this has suggested the identity of *S. crassiclada* and *S. crassispicula*. It is difficult to understand why he failed at the same time to recognize Sollas' *Pilochrota anancora*, *P. gigas* and *P. tenuispicula* as synonyms also; the species name is, by priority, *Stelletta anancora*.

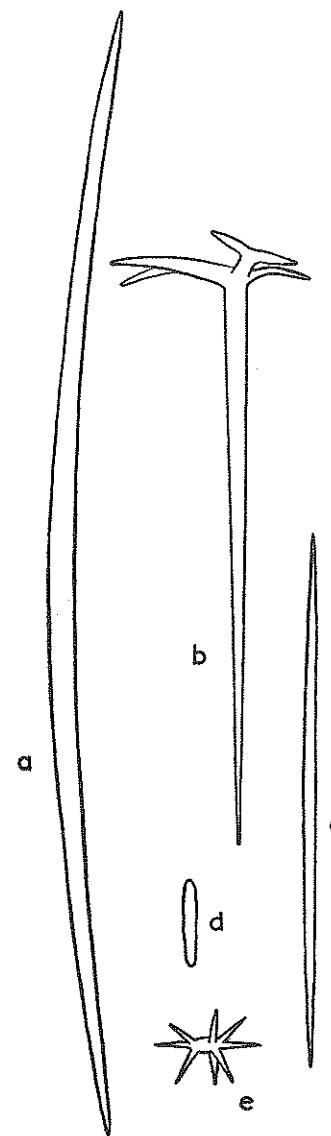
Genus *Stryphnus* Sollas*Stryphnus pachastrelloides* (Schmidt)

(Text-fig. 1)

Ancorina pachastrelloides Schmidt, 1870, p. 68; Sollas, 1888, p. 205; Lendenfeld, 1903, p. 66.

OCCURRENCE. St. 49, between Fuerteventura Island and Africa (28° 25' N., 13° 34' W.), 1300 m., 1st February, 1938. One specimen.

REMARKS. Schmidt's original description of this species, alone, was inadequate for purposes of identification. With the few details he gives, together with a poor spicule preparation made by him and now in the British Museum (Reg. No. 70.5.3.48), it is possible to recognize the species when these two things can be compared with fresh material. The present specimen, although collected in the eastern Atlantic, whereas the holotype was taken off Florida, is massive, with a



TEXT-FIG. 1. *Stryphnus pachastrelloides* (Schmidt). a, oxete, $\times 50$; b, dichotriaene, $\times 50$; c, microxeote, $\times 500$; d, microstrongyle, $\times 500$; e, amphiaser, $\times 500$.

cylindrical outgrowth. There is one oscule at the summit of the main mass and one at the end of the outgrowth, each leading into a deep cloaca. The colour, in spirit, is a pale yellowish-brown. Schmidt described the sponge as "unregelmässige Knollen mit unregelmässig cylindrischen Fortsätzen." The only other guide to the external appearance is given: "Die Rindenschicht wird lediglich durch . . . ein bräunliches Pigment vertreten." The skeleton of the "Rosaura" specimen consists of large radially-arranged oxea, short-shafted dichotriaenes, with microxea, roughened microstrongyla and amphiasters. There appear to be present, also, oxyasters, but these, I believe, are no more than the amphiasters seen in end-view. The spicule-preparation (70.5.3.48) contains these same categories, and they are of similar dimensions in each case. There are, however, a number of smooth strongyla, about the same length as the microxea but much thicker. At first sight, the strongyla seem proper to the sponge but the discovery of a number of other more obviously extraneous spicules in this preparation suggests that the strongyla may also be foreign to it. Schmidt's preparations, of which the British Museum has many, are notorious for either the poverty of their proper spicules or the richness of those spicules accidentally included. The identity of Schmidt's holotype, based on B.M. 70.5.3.48, and the present specimen is made the more certain by the presence, in both, of a faint annulus at the centre of so many of the microxea.

The species may be re-described:

Irregularly massive with cylindrical outgrowths; surface uneven, hispid; oscules large, apical; texture firm, incompressible; colour, in spirit, light brown; skeleton of radially-arranged oxea and short-shafted dichotriaenes, with microxea, microstrongyla and amphiasters for microscleres:

Spicules: Oxea, slightly curved, 3.2 by 0.06 mm., dichotriaenes, cladome 0.6 mm. across, rhabdome 1.5 by 0.048 mm., microxea, 0.14 by 0.004 mm., microstrongyla 0.024 by 0.004 mm., amphiasters 0.028 mm. across.

Family CLAVULIDAE

Genus *Radiella* Schmidt

Radiella sol Schmidt

Trichostemma hemisphaericum Sars, 1869, p. 259 [nom. nud.]; *Radiella sol* Schmidt, 1870, p. 48, pl. iv, fig. 6; *Trichostemma hemisphaericum* Sars, 1872, p. 62, pl. vi, figs. 1-15; *Radiella sol*, Burton, 1930, p. 510; Burton, 1934, p. 15.

OCCURRENCE. St. 26, north of Turneffe Island, West Indies (17° 53' N., 87° 44' W.), 900 m. One specimen.

DISTRIBUTION. Greenland; between Norway and Bear Island; Barents Sea; Kara Sea; Franz Josef Land; Norway (Lofoten); West Indies; 97-1167 m., on clay and mud.

Family TETILLIDAE

Genus *Tetilla* Schmidt

Tetilla cranium (Müller)

Alcyonium cranium Müller, 1776, p. 255; *Tethya cranium*, Lamarck, 1815, p. 71; *Craniella cranium*, Sollas, 1888, p. 51; *Tethya cranium*, Topsent, 1913, p. 12, pl. iii, fig. 3, pl. v, fig. 12.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49'), 27th November, 1937, 720-800 m. One specimen.

DISTRIBUTION. Arctic; Atlantic coast of Europe; Azores; West Indies; Ceylon; Japan; Pacific coast of North America; 9-1829 m., on rock, gravel, sand, mud and ooze.

Family HAPLOSCLERIDAE

Genus *Haliclona* Grant

Haliclona rubens (Pallas)

Spongia rubens Pallas, 1766, p. 389; Duchassaing and Michelotti, 1864, p. 41, pl. x, fig. 1; *Pachychalina rubens*, Schmidt, 1870, p. 37; *Chalina rubens*, Carter, 1882, p. 276; *Chalinopsis rubens*, Lendenfeld, 1887, p. 744; *Ceraochalina rubiginosa* Lendenfeld 1887, p. 779; *Pachychalina rubens*, Wilson, 1902, p. 392; *Cladochalina rubens*, Burton, 1927, p. 511; *Haliclona rubens*, de Laubenfels, 1932, p. 59; 1936, p. 42, pl. vii, fig. 2, pl. viii, fig. 1; de Laubenfels, 1949, p. 9.

OCCURRENCE. St. 31, Gorda Cay, Mosquito Bank, West Indies (15° 54' N., 82° 13' W.), 16th November, 1937, 34 m. One specimen.

DISTRIBUTION. Dry Tortugas; Bahamas; Long Key Island; Guadeloupe; Vieques; St. Domingo; St. Thomas; Cuba; Porto Rico; 1-17 m.

Haliclona erina de Laubenfels

Haliclona erina de Laubenfels, 1936, p. 457.

OCCURRENCE. St. 10, NW. Arm, Horn Bay, Newfoundland (52° 13' N., 55° 47' W.), 23rd September, 1937, 15 m. Two specimens.

DISTRIBUTION. Panama (Caribbean).

REMARKS. These specimens, although agreeing with the holotype in structure and appearance, were obtained well away from the type locality. It is therefore worth recalling de Laubenfels' comment, in describing the species: "It must be admitted that this may be a remarkable modification of some previously described *Haliclona*, due perhaps to unusual environment conditions, but it is impossible to say which *Haliclona* has been so modified." This expresses the situation for so many specimens of *Haliclona* from all parts of the world.

Haliclona spiculosa (Dendy)

Siphonochalina spiculosa Dendy, 1887, p. 505; Dendy, 1890, p. 354, pl. lviii, fig. 2, pl. lxii, fig. 3; Wilson, 1902, p. 394.

OCCURRENCE. St. 24, Turneffe Island, West Indies (17° 15' N., 87° 49' W.), 1st November, 1937, 2 m. One specimen.

DISTRIBUTION. Turk's Island, Bahamas; St. Thomas; 2-42 m.

REMARKS. The species is doubtfully referred to the genus *Haliclona*, principally on the absence of a special tangential skeleton at the surface.

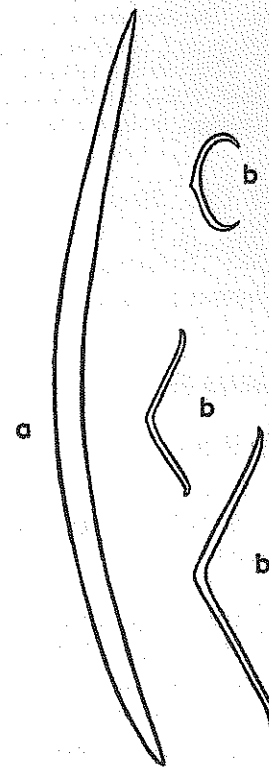
Haliclona calcinea sp. n.

(Pl. 9, fig. 1; Text-fig. 2)

HOLOTYPE. B.M. 1938.6.30.31.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49' W.), 27th October, 1937, 720-800 m. One specimen.

DESCRIPTION. Sponge massive, rounded; surface even, minutely hispid; oscules small, scattered; texture firm, friable; colour, in spirit, dark brown; skeleton subhalichondroid, mainly unispicular; megascleres oxea, 0.5 by 0.016 mm.,



TEXT-FIG. 2. *Haliclona calcinea* sp. n. a, oxeote, $\times 200$; b, toxa and sigma, $\times 500$.

megascleres centrangulated sigmata, 0.024 mm. chord, and toxa, 0.04 to 0.08 mm. chord.

REMARKS. Although the colour is given as dark brown, this applies strictly to the ectosome, whether of the outer surface or of the linings of the large canals. The choanosome is a dull brownish-yellow. The surface, moreover, is largely coated with a pale greyish yellow, in places up to 3 mm. thick. This apparent incrustation has the same spicules as the main body and must be presumed to represent new growth.

The species differs, in its external form, as well as in the detailed measurements of the microscleres, from other species of *Haliclona* having such long oxea combined with the presence of microscleres.

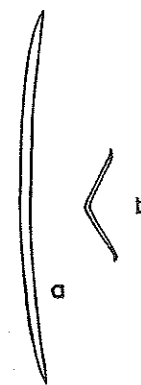
Haliclona tenerrima sp. n.

(Pl. 9, fig. 2; Text-fig. 3)

HOLOTYPE. B.M. 1938.6.30.42.

OCCURRENCE. St. 24, Turneffe Island, British Honduras (17° 16' N., 87° 50' W.), 1st November, 1937, 3½ m. One specimen.

DESCRIPTION. Sponge a fragment only; surface uneven, minutely hispid; oscules not present; texture soft, compressible, elastic; colour, in spirit, pale



TEXT-FIG. 3. *Haliclona tenerrima* sp. n. a, oxeote, $\times 200$; b, toxa, $\times 500$.

yellow; skeleton irregularly sub-isodictyal (almost halichondroid) with triangular mesh, and with occasional fibres of 2 to 3 spicules width running to surface; megascleres oxea, 0.28 by 0.007 mm.; microscleres toxa, 0.03 to 0.1 mm. chord.

Calyspongia tenerrima Duchassaing & Michelotti

Calyspongia tenerrima Duchassaing & Michelotti, 1864, p. 57, pl. x, figs. 3-4.

OCCURRENCE. St. 31, Gorda Cay, Mosquito Bank, West Indies (15° 54' N., 82° 13' W.), 16th November, 1937, 34 m. One specimen.

DISTRIBUTION. West Indies (St. Thomas, Viecques).

DIAGNOSIS. Sponge branching, stipitate, slender, dichotomous; surface even; oscules small, in linear series along branches; texture soft, compressible; colour, in life and in spirit, yellow tinted with rose; main skeleton an irregular network of mainly quadrangular mesh, with recognizable primary, secondary and tertiary fibres; special ectosomal skeleton, of similar structure but with meshes mainly triangular; fibres 0.03 to 0.08 mm. diameter, cored by 1-4 spicules; megascleres strongyla, 0.1 by 0.002 to 0.003 mm.; microscleres absent.

REMARKS. The holotype has been lost, as was ascertained some years ago by de Laubenfels during his visit to Turin. The original description, inadequate though it is, leaves, no doubt of the identity of the present specimen. The holotype was described as "phytoide, dichotome, grêle . . . les rameaux . . . cylindriques . . . jaune un peu rosé" in life with small oscules in series along the branches. Every one of these features is found in the present specimen. Above all, the peculiar appearance of the surface, shown in fig. 4 (Duchassaing & Michelotti, l.c.) puts the identification beyond reasonable doubt.

Family DESMACIDONIDAE

Section MYCALEAE

Genus *Desmacella* Schmidt

Desmacella annexa (Schmidt)

Desmacella annexa Schmidt, 1870, p. 53; *Tylodesma annexa*, Burton, 1930, p. 525.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49' W.), 27th November, 1937, 720-800. Two specimens.

DISTRIBUTION. Iceland; Norway; south-west Ireland; Atlantic coast of France; Mediterranean; West Indies; Florida; Indian Ocean; 85-1331 m., on rock, mud and ooze.

Desmacella inornata (Bowerbank)

Halichondria inornata Bowerbank, 1866, p. 271; *Tylodesma inornata*, Burton, 1930, p. 527.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 44' W.), 27th November, 1937, 420-800 m. One specimen.

DISTRIBUTION. British Isles; France; Spain; Mediterranean; Azores; 200-1025 m., on mud, sand, gravel, broken shells, rocks.

Section MYXILLEAE

Genus *Myxilla* Schmidt

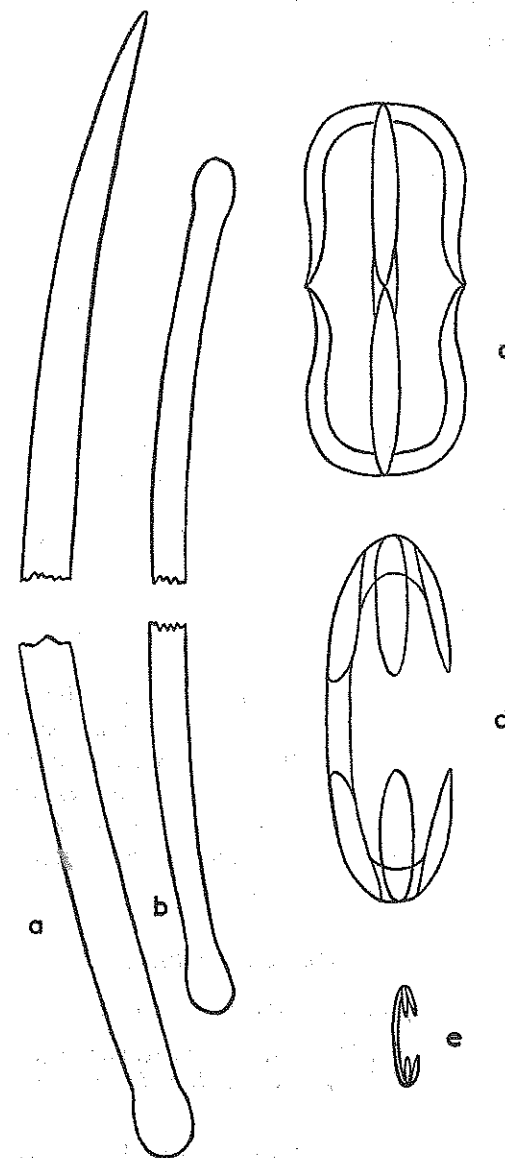
Myxilla distorta sp. n.

(Pl. 9, fig. 3, Text-fig. 4)

HOLOTYPE. 1938.6.30.30.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49' W.), 27th November, 1937, 720-800 m. One specimen.

DESCRIPTION. Sponge erect, lobate; surface uneven; harsh to touch; oscules at apices of lobes; texture firm, incompressible, friable; colour, in spirit, pale yellow; main skeleton an irregular reticulation of bluntly-pointed curved styli, 1.0 by 0.024 mm.; ectosomal skeleton a tangential reticulation of irregular mesh formed of tornota with both ends tylote and measuring 0.72 by 0.016 mm.; micro-



TEXT-FIG. 4. *Myxilla distorta* sp. n. a, style, $\times 300$; b, tornote, $\times 300$; c, isochela with teeth meeting in middle line (front view), $\times 600$; d, normal large isochela, $\times 600$; e, small isochela, $\times 600$.

scleres isochelae spatuliferae, larger frequently distorted by unusual length of teeth, ranging from 0.024 to 0.08 mm. chord.

REMARKS. The species is peculiar in the presence of the distorted chelae, but is also separable from other known species in the remaining details of its spiculation.

Genus *Phorbas* Duchassaing & Michelotti

Phorbas amaranthus Duchassaing & Michelotti

Phorbas amaranthus Duchassaing & Michelotti, 1864, p. 92, pl. xxi, fig. 1; *Cribrella hospitalis* Schmidt, 1870, p. 56, pl. iv, fig. 12; ? *Anchinoë fictitius*, Topsent, 1928, p. 284; *Phorbas amaranthus*, de Laubenfels, 1936, p. 63.

OCCURRENCE. St. 31, off Gorda Bay, Mosquito Bank, West Indies (15° 54' N., 82° 13' W.), 16th November, 1937, 34 m. One specimen.

DISTRIBUTION. Florida; West Indies; ? Azores; ?? Morocco and Spain; 27 m.

REMARKS. Since this species has never been adequately described, a description based on the holotype is given:

Sponge encrusting or massive and irregularly digitate; surface villous, particularly in larger individuals; oscules not apparent; pores in sieves; texture firm; colour, alive, maroon, in spirit, almost white; skeleton of ascending fibres of serially-arranged tornota, echinated by acanthostyli of two sizes, and with a tangential ectosomal layer of tornota similar to those of main skeleton; tornota, with oxate to hastate ends, 0.2 to 0.36 by 0.004 to 0.005 mm.; large acanthostyli, 0.2 by 0.006 mm., small acanthostyli, 0.1 by 0.006 mm., microscleres isochelae arcuatae, 0.026 mm. chord.

In a very brief redescription of the species, de Laubenfels (1936) describes the microscleres as chelae and rare sigmata. I have found no sigmata in my preparations from the type.

Topsent (1928) records specimens of *Achinoë fictitius*, from the Azores, Morocco and Spain, having a spiculation similar to that of *Phorbas amaranthus*. In addition, he includes *Cribrella hospitalis* Schmidt as a synonym of his supposed *Anchinoë fictitius*, but Schmidt's species is identical with *Phorbas amaranthus*. Whether, indeed, this West Indian species extends to the Azores is problematic, but it is highly doubtful that it should also occur off Morocco and Santander. Re-examination of Topsent's material is needed to settle this.

Genus *Inflatella* Schmidt

Inflatella viridis (Topsent)

Joyeuxia viridis Topsent, 1890, p. 29; Topsent, 1892, p. 94, pl. ii, fig. 8, pl. x, fig. 19; *Inflatella viridis*, Lundbeck, 1910, p. 20, pl. ii, figs. 11-12, pl. iv, fig. 7; Hentschel, 1929, p. 968; *nec* Topsent, 1904, p. 205.

OCCURRENCE. St. 34, St. George, Grenada, West Indies (12° 05' N., 61° 49' W.), 27th November, 1937, 720-800 m. One specimen.

DISTRIBUTION. Denmark Strait; Azores; 136-1768 m.

Genus *Plocamionida* Topsent

Plocamionida topsenti sp. n.

(Text-fig. 5)

HOLOTYPE. 1938.6.3.29.

OCCURRENCE. St. 34, off St. George, Grenada, West Indies (12° 25' N., 61° 49' W.), 27th November, 1937, 720-800 m. One specimen.

DESCRIPTION. Sponge thinly encrusting; surface hispid; oscules not apparent; colour, in spirit, pale greyish-yellow; skeleton of styli, 1.2 by 0.04 mm., and acanthostyli, 0.24 by 0.008 mm., with occasional intermediates; ectosomal tornota, with ends strongylote or faintly subtylote, 0.36 by 0.006 mm., acanthostrongyla, 0.18 by 0.014 mm.; microscleres isochelae arcuatae, 0.06 to 0.068 mm. chord.

REMARKS. The species differs from all others in the genus in the much larger sochela, as well as in other details of the spiculation.

Section TEDANIEAE

Genus *Tedania* Schmidt

Tedania anhelans (Lieberkühn)

Halichondria anhelans Lieberkühn, 1859, p. 521, pl. xi, fig. 6; *Tedania nigrescens*, Burton, 1932, p. 346, fig. 44; *Xytopsibis asperus* de Laubenfels, 1936, p. 61.

OCCURRENCE. St. 24, Turneffe Island (17° 15' N., 87° 49' W.), 1st November, 1937, 2 m. One specimen.

DISTRIBUTION. Mediterranean; Cape Verde Islands; Bermuda; West Indies; West Africa; Red Sea; Indian Ocean; Indonesia; Cochinchina; Australia; littoral to 120 m., on rock, stones, shells, mud or sand.

REMARKS. The species has been fully discussed (Burton, 1932) under *Tedania nigrescens* (Schmidt). This name is, however, pre-empted by *Halichondria anhelans* Lieberkühn which, as shown by the original description and by Schmidt's (1862, p. 74) finding of tornota in preparations of the type, is identical with the widespread species known so long under Schmidt's name.

Family AXINELLIDAE

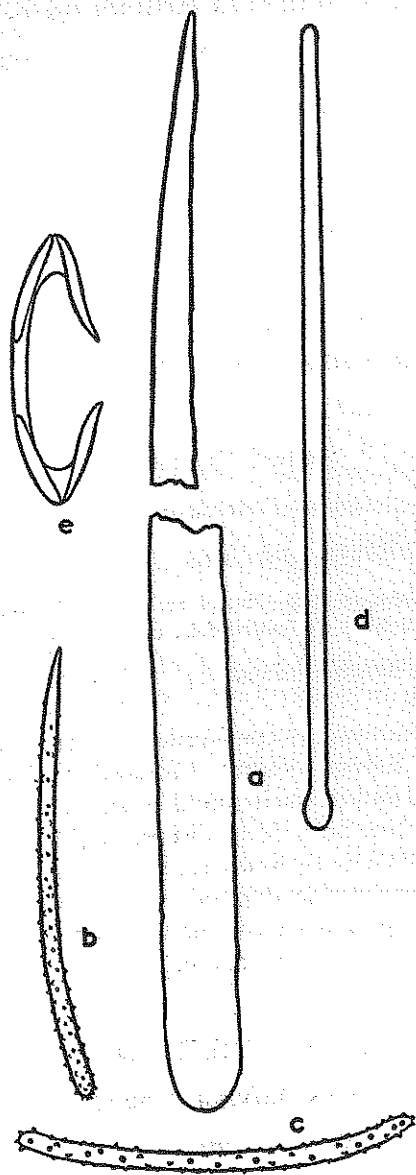
Genus *Axinella* Schmidt

Axinella ramosa sp. n.

(Pl. 9, fig. 4; Text-fig. 6)

HOLOTYPE. 1938.6.30.37.

OCCURRENCE. St. 31, off Gorda Bay, Mosquito Bank, West Indies (15° 54' N., 82° 13' W.), 16th November 1937. Three specimens.



TEXT-FIG. 5. *Plocamionida topsenti* sp. n. a, style, $\times 300$; b, acanthostyle, $\times 300$; c, acanthostrongyle, $\times 300$; d, tornote, $\times 300$; e, isochela, $\times 600$.

DESCRIPTION. Sponge branching; surface slightly uneven, minutely hispid; oscules not apparent; texture firm; colour, in spirit, pale yellow; skeleton subisodictyal, ascending fibres somewhat plumose, connectives mainly unispicular; megascleres styli, 0.4 by 0.016 mm.; microscleres absent.



TEXT-FIG. 6. *Axinella ramosa*, sp. n. a, style, $\times 100$.

REMARKS. There are three specimens, the largest, the holotype, is 65 mm. high with its branches 4 mm. in diameter at most. The other two are considerably smaller.

Genus *Hymeniacidon* Bowerbank

Hymeniacidon assimilis (Levinsen)

Halichondria assimilis Levinsen, 1886, p. 352, pl. xxx, fig. 5; *Hymeniacidon assimilis*, Burton, 1935, p. 74.

OCCURRENCE. St. 5, Julianshaab, Greenland ($60^{\circ} 43' N.$, $46^{\circ} 02' W.$), 4th September, 1937, 80 m. One specimen.

DISTRIBUTION. Kara Sea; Sea of Japan; Sea of Okhotsk; littoral to 124 m., on seaweeds.

Hymeniacidon glabrata sp. n.

(Pl. 9, fig. 5; Text-fig. 7)

HOLOTYPE. 1938.6.30.35.

OCCURRENCE. St. 22, Belize Harbour, West Indies ($17^{\circ} 28' N.$, $88^{\circ} 11' W.$), 29th October, 1937, 6 m. One specimen.

DESCRIPTION. Sponge encrusting, agglutinating; surface even, minutely hispid; oscules at ends of cloacae running parallel to and just under surface; texture soft, compressible; colour, in spirit, pale greyish-yellow; main skeleton halichondroid, with tendency to multispicular ascending fibres; ectosomal skeleton a loose network of more or less quadrangular mesh; megascleres styli, thickest at centre (? incompletely differentiated into two sizes), ranging from 0.24 to 0.8 by 0.004 to 0.024 mm.

REMARKS. The holotype is a thin and flattened, somewhat irregular plate, with a number of small bivalve shells incorporated in its lower surface. Being no more

than a fragment, the interpretation of its mode of growth is difficult. In general appearance it recalls *H. tubulosa* (Ridley & Dendy) from the mouth of the River Plate, which has, presumably, a more erect growth; and also larger spicules.



TEXT-FIG. 7. *Axinella glabrata* sp. n. Large and small styli, $\times 100$.

Genus *Halichondria* Fleming

Halichondria panicea (Pallas)

Spongia panicea Pallas, 1766, p. 388; *Halichondria panicea*, Arndt, 1928, p. 52.

OCCURRENCE. St. 1, Angmagssalik Harbour, Greenland ($65^{\circ} 35' N.$, $37^{\circ} 20' W.$), 27th August, 1937, 25-50 m. One specimen.

DISTRIBUTION. Arctic; Atlantic coasts of Europe (including Baltic Sea); Mediterranean; Black Sea; Atlantic coast of Africa to Saldanha Bay; St. Paul; Patagonia; Chile; Atlantic coasts of North America, south to Newfoundland; Pacific coast of Asia, south to Japan; Indian Ocean (Ceylon); Kerguelen; New Zealand; littoral to 183 m.

Halichondria tenera (Marenzeller)

Isodictya tenera Marenzeller, 1877, p. 364, pl. i, fig. 2; Burton, 1930, p. 516; *Halichondria tenera*, Burton, 1935, p. 76.

OCCURRENCE. St. 1, Angmagssalik Harbour, Greenland ($65^{\circ} 35' N.$, $37^{\circ} 20' W.$), 27th August, 1937, 25-50 m. One specimen.

DISTRIBUTION. Franz Josef Land; Sea of Japan; Sea of Okhotsk; 2-178 m., mud.

REMARKS. This sponge, which is massive, or may be massively branched, with uneven surface, small scattered oscules and a soft friable texture, has for main skeleton a loose isodictyal reticulation. The tangential ectosomal skeleton is ill-developed; the sole spicules are oxea 0.3 to 0.4 by 0.003 to 0.01 mm. The species is not, therefore, a typical *Halichondria*. It may even have affinities with the species of *Adocia*, except that the oxea are more like those typical for *Halichondria*.

Halichondria osculum Lundbeck

Halichondria osculum Lundbeck, 1902, p. 23, pl. iii, figs. 3-7, pl. ix, figs. 7-9; Hentschel, 1929, p. 991.

OCCURRENCE. St. 10, NW. Arm, Horn Bay, Newfoundland ($52^{\circ} 13' N.$, $55^{\circ} 47' W.$), 23rd September, 1937, 15 m. One specimen.

DISTRIBUTION. Greenland, 18-718 m.

REMARKS. The specimen forms a small irregular mass, 10 mm. across, growing on a Nullipore. There is an encrusting body with processes arising from it and it is these which determine its identification with Lundbeck's species. Although much smaller than Lundbeck's original specimens, each process bears a strong resemblance to them. On the other hand, the spicules are somewhat smaller, none exceeding 0.6 mm., or slightly more, by 0.012 mm., against a maximum of 0.7 by 0.17 mm., in the types.

On first examination I had taken this to be the type of a new species, but on further consideration accept it as an atypical specimen of *Halichondria osculum*.

Halichondria bowerbanki Burton

Spongia coalita Lamouroux, 1816, p. 80; *Halichondria coalita*, Topsent, 1911, pp. i-xv; *H. bowerbanki* Burton, 1930, p. 489.

OCCURRENCE. St. 10, NW. Arm, Horn Bay, Newfoundland ($17^{\circ} 53' N.$, $87^{\circ} 44' W.$), 23rd November, 1937, 15 m. One specimen.

REMARKS. *Halichondria bowerbanki* and *H. panicea* resemble each other closely in spiculation and in external appearance. In addition, both are extremely variable in form. The consequence is that, although Topsent (1911) has shown marked differences in their larvae, it is rarely possible to be certain of the identification of a given specimen. The present sample is of a loose-textured, massive sponge, about 100 mm. across and some 50 mm. high. Its surface is covered with low digitate processes, 3 to 4 mm. high. The identification given here is based on the translucent appearance and the fact that specimens having the cavernous quality of the inner tissues as well as the digitate processes of the surface have been collected by me off the coast of Devon. Even so, it is given with hesitation.

Halichondria cornuloides sp. n.

(Pl. 9, fig. 6; Text-fig. 8)

HOLOTYPE. B.M. 1938.6.30.41.

OCCURRENCE. St. 1, Angmagssalik Harbour, Greenland (65° 35', 37° 20' W.), 27th August, 1937, 25-50 m. One specimen.

DESCRIPTION. Sponge irregularly massive, lobular; surface smooth, even, translucent; oscules (and pores?) in circular cribriform areas at summits of

TEXT-FIG. 8. *Halichondria cornuloides* sp. n. Oxea, $\times 200$.

low secondary lobes or apical on main lobes; texture firm, compressible owing to cavernous structure of inner tissues; colour, in spirit, yellowish; megascleres oxea, 0.2 to 0.5 by 0.008 to 0.012 mm.; microscleres absent.

REMARKS. The species resembles in external appearance the various forms included by Dendy in his family Coelosphaeridae, and especially those of the genus *Cornulum*. So strong is this resemblance that I found it difficult to be convinced that it is a true *Halichondria*. Nevertheless, the oxea have the typical form and variable length, and the structure of both main and tangential ectosomal skeletons leave little doubt that it is a *Halichondria*.

Family RASPAILIIDAE

Genus *Higginsia* Higgin*Higginsia strigilata* (Lamarck)

Spongia strigilata Lamarck, 1813, p. 450; Lamarck, 1816, p. 377; *Higginsia coralloides* Higgin, 1877, p. 291, pl. xiv, figs. 1-5.

OCCURRENCE. St. 31, off Gorda Bay, Mosquito Bank, West Indies (15° 54' N., 82° 13' W.), 16th November, 1937, 34 m. One specimen.

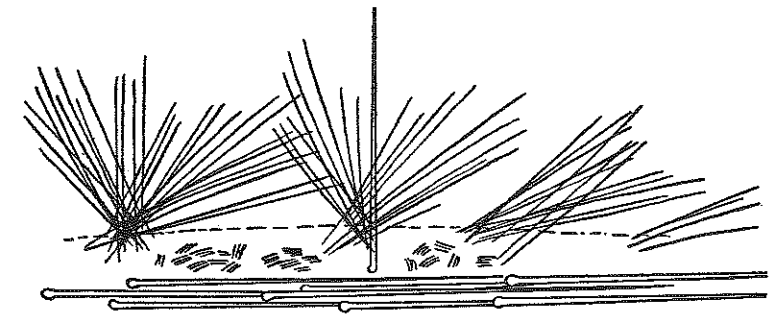
DISTRIBUTION. Ireland; west coast of Africa; West Indies; Natal; Amboina; Australia; littoral (?) to 20 m., on rock or coral rock.

REMARKS. Topsent (1933, p. 112) has shown that Higgin's *Higginsia coralloides* is the same as Lamarck's *Spongia strigilata*.

Genus *Dragmatyle* Topsent*Dragmatyle topsenti* sp. n.

(Pl. 9, fig. 7; Text-fig. 9)

OCCURRENCE. St. 26, north of Turneffe Islands, West Indies (17° 53' N., 84° 44' W.), 7th November, 1937, 900 m. Several fragments (belonging to one specimen?)



TEXT-FIG. 9. *Dragmatyle topsenti* sp. n. Section at right angles to surface, showing axial core of tylostyli; surface brushes of styloids, with occasional tylostyli set at right angles to surface; and trichodragmata.

DESCRIPTION. Sponge comprising slender branches; surface uneven, hirsute; oscules not apparent; texture soft, compressible; colour, in spirit, light brown; skeleton an axial core of tylostyli, with occasional tylostyli set at right angles and projecting beyond surface, with ectosomal brushes of oxeote styloids and trichodragmata for microscleres; tylostyli 1.6 by 0.014 mm., styloids 1.2 by 0.008 mm. trichodragmata, 0.06 mm. long.

Order KERATOSA

Genus *Hircinia* Nardo*Hircinia variabilis* Schmidt

Hircinia variabilis Schmidt, 1862, p. 34, pl. iii, fig. 17; Lendenfeld, 1889, p. 557, pl. xxxvi, figs. 11-14.

OCCURRENCE. St. 31, off Gorda Cay, Mosquito Bank, West Indies (15° 54' N., 37° 20' W.), 16th November, 1937, 34 m. One specimen.

DISTRIBUTION. Mediterranean; West Indies and Florida; Indian Ocean; Australia; "Pacific Oceanic Islands"; 6-75 m.

REMARKS. If it be possible to recognize varieties in this extremely variable species, then the present specimen should be assigned to var. *dendroides*.

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PLATE 9

- FIG. 1. *Haliclona calcinea* sp. n. $\times 1/1$.
 FIG. 2. *Haliclona tenerrima* sp. n. $\times 3/2$.
 FIG. 3. *Myxilla distorta* sp. n. $\times 1/1$.
 FIG. 4. *Axinella ramosa* sp. n. $\times 1/1$.
 FIG. 5. *Hymeniacion glabrata* sp. n. $\times 1/1$.
 FIG. 6. *Halichondria cornuloides* sp. n. $\times 1/1$.
 FIG. 7. *Dragmatyle topsenti* sp. n. $\times 3/2$.

