

## Additions to the Sponge Fauna at Plymouth.

By

M. Burton, M.Sc.,

Assistant Keeper, Department of Zoology, British Museum (Natural History), London.

With 9 Figures in the Text.

DURING a short visit to Plymouth, in 1928, Dr. M. W. de Laubenfels made a collection of sponges which, with the exception of six, he identified and deposited in the Biological Laboratory at Plymouth. Before leaving England he left these six with me, with the request that they should be identified. This I have now done, and the results have proved extremely interesting, adding six species, *Halichondria bowerbanki*, *Mycale similaris*, *Iophon hyndmani*, *Endectyon delaubenfelsi*, *Hymedesmia stephensi*, and *Pachaxinella subdola*, to the recorded faunal list for Plymouth, of which three are new species.

### HALICHONDRIA BOWERBANKI sp. n.

*Spongia coalita* Lamouroux 1816, p. 80; Lamarck 1816, p. 382; Grant 1825, pp. 95, 96, 101, 102, 105, 340; Id. 1826 *a*, pp. 114, 116–118, 120, 338; Id. 1826  $\xi$ , p. 347; Id. 1826  $\eta$ , pp. 123, 135.

*Halichondria coalita* Fleming 1828, p. 522; Bellamy 1839, p. 268; Johnston 1842, p. 135, pl. xii, fig. 1; Bowerbank 1866, p. 238; Parfitt 1868, p. 11.

*Amorphina coalita* Schmidt 1870, p. 77.

*Halichondria coalita* Bowerbank 1874, p. 102, pl. xli, figs. 18–20; Id. 1882, p. 96.

*Halichondria panicea* (pars) Levinsen 1887*a*, p. 512.

*Amorphina coalita* Topsent 1888, p. 146.

*Halichondria coalita* Topsent 1911*a*, pp. i–xv; Id. 1913, p. 31.

*Diagnosis*.—Sponge typically repent, and sub-ramose or profusely branched; branches frequently anastomosing; surface smooth, slightly uneven; texture compact, friable; oscules small, few, or not apparent; colour, in life, yellowish, dried, white; oxea ranging from  $\cdot 2$  by  $\cdot 003$  to  $\cdot 33$  by  $\cdot 012$  mm.

(There is little to choose between this species and *Halichondria panicea*. The main differences are that in *H. bowerbanki* the external form is usually ramose, the oscules are inconspicuous, the dermal reticulation more

strongly marked, and the oxea slightly stouter. Topsent (1911a) has also shown a difference in the larvæ of the two species.)

*Remarks.*—The species *coalita*, usually ascribed to Bowerbank or Johnston, is first mentioned by Müller (1776), but between the date of its inception and the year in which Johnston gave it an adequate description and illustration, its history is a series of errors and confusions. Müller appears to have taken as his type the specimen figured by Ellis (1755, p. 80, pl. xxxii, fig. F; not p. 95, as quoted by Müller), which is almost certainly a slightly atypical, though fairly common, form of *Chalina oculata*, and to which Ellis gave the name of *Spongia ramosa Britannica*. Thirteen years later Müller (1789) once again refers to *Spongia coalita*, this time giving his own figure, that of a white encrusting sponge growing on a branching Cœlenterate. It is impossible to tell what this sponge was, but it was most probably a specimen of *Halichondria panicea*. Gmelin (1791, p. 3825) described *Spongia coalita* as “Sp. ramosissima mollis tenera flava, ramis compressiusculis. Habitat in mari norwegico.” This helps very little, but since Gmelin probably took his ideas from Müller, we may justifiably regard it as a synonym of *Chalina oculata*. In the same way, Bosc (1802, p. 146), in describing the species as “Très-rameuse, molle, tendre, jaune; les rameaux aplatis,” was probably following Müller’s first description, and we may regard his sponge as *Chalina oculata*. Turton (1806, p. 662) appears to have merely translated Bosc’s description when he says, “Very much branched, soft, tender, yellow, the branches a little compressed.”

Lamouroux (1816), on the other hand, appears to have had before him a sponge similar to that which Johnston and Bowerbank both figure as *Halichondria coalita*. He says, “base étalée en membrane qui enveloppe plusieurs corps et qui se divise en rameaux prolifères, mous, doux au toucher; surface irrégulièrement réticulée.” At the same time, even this is open to doubt. He quotes *Spongia Lycopodium* Esper as a synonym, which is quite wrong. Lamarck (1816), who appears to be slavishly following Lamouroux, even to the extent of quoting *S. Lycopodium* as a synonym, describes *S. coalita* as “Sp. basi dilatata, corpora aliena obvolvens, ramosissima; ramis tereticompressis, ramulosis; superficie fibris apressis.”

Montagu (1818, p. 80) gives as his diagnosis of *S. coalita*, “much branched in an irregular and distorted manner, rather compressed and of brittle corky substance,” a description aptly fitting *Chalina oculata* when dried. Gray (1821, p. 355) in describing his “Coalescent Tuphe,” uses almost the same words as Montagu, but treats the sponge as an alga.

Grant, from whose papers Johnston quoted extensively in his description of *Halichondria coalita*, and Fleming (1828, p. 522), were evidently dealing with the sponge Bowerbank (1874) so clearly figured. Fleming gives as

his diagnosis, "growth very irregular, branches more or less compressed, frequently uniting; substance resembling *H. papillaris* (which we now know to be a synonym of *H. panicea*); tubular processes sometimes occur on the sides of the branches, with small round orifices. It grows on dead shells or invests corallines, beyond low-water mark." Bellamy, in recording the sponge from South Devon, merely remarks that it is "not uncommon on exposed beaches." His sponge is, therefore, clearly not *Chalina oculata*, but is probably *Halichondria coalita* or *H. panicea*.

Blainville (1834, p. 532) merely quotes Müller.

After this date, following the accounts given by Johnston and Bowerbank, the conception of *H. coalita* becomes quite clear and consistent.

Prior to Johnston, therefore, we can divide the references to the species into three groups; those probably synonymous with *Chalina oculata*, with *Halichondria panicea*, and with another species which I shall call *H. bowerbanki* sp. n., as follows:—

*Chalina oculata*.

- Spongia coalita* Müller 1776, p. 256.  
*Spongia coalita* Gmelin 1791, p. 3825.  
*Spongia coalita* Bosc 1802, p. 146.  
*Spongia coalita* Turton 1806, p. 662.  
*Spongia coalita* Montagu 1818, p. 80.  
*Tupha coalita* Gray 1821, p. 355.  
*Spongia coalita* Blainville 1834, p. 532.

*Halichondria panicea*.

- Spongia coalita* Müller 1789, p. 71, pl. 120.  
*Halichondria coalita* Bellamy 1839, p. 268.

*Halichondria bowerbanki* sp. n. with synonymy as given at the beginning. Since Bowerbank's specimen is the only one which has survived, and of which we can have first-hand knowledge, I take this for the holotype of the new species.

*Distribution*.—Arctic Seas; Norway; British Isles; France.

MYCALE SIMILARIS (Bowerbank).

(See Topsent 1924, p. 109.)

*Remarks*.—I have re-examined the holotype of *Raphiodesma fallaciosum* Bowerbank and find, as Topsent (l.c., p. 84) tentatively suggests, that it is a synonym of *Mycale similaris*.

*Distribution*.—Jersey; Westport, Ireland; France, North and East coasts.

## IOPHON HYNDMANI (Bowerbank).

*Remarks.*—As I hope shortly to publish a comprehensive study of the Iophonæ generally, it is inadvisable to say more concerning this species now.

*Distribution.*—British Isles generally and, probably, along the whole of the Atlantic coast of Europe.

## GENUS ENDECTYON Topsent.

*Genotype.*—*Phakellia tenax* Schmidt.

*Diagnosis.*—Ectyoninæ of erect, branching habit; branches supported by an axial skeleton composed of a uni- or multispicular reticulation of smooth styli, which may be partially or wholly replaced by acanthostyli; surface of sponge rendered hispid by projecting brushes of long smooth styli, with which a third category of spicule, slender styli, may be associated.

## ENDECTYON DELAUBENFELSI sp. n.

(Text figs. 1, 2, 3.)

*Holotype.*—B.M. 29.8.21.3.

*Diagnosis.*—Sponge erect, stipitate, branched, composed of a number of irregular branches lying in one plane; surface coarsely hispid; oscules and pores not apparent; colour, in life, golden-yellow; skeleton composed of an axial reticulation of small styli and acanthostyli, which gives off short bundles of spicules on its outer fringes to run vertically to dermis; surface echinated by bundles of long styli; spicules:—(i) long smooth styli, usually straight, almost entirely confined to surface brushes,  $\cdot 85$  by  $\cdot 007$  to  $\cdot 012$  mm.; (ii) short styli, smooth, usually curved, often vermiform, roughly divisible into two categories,  $\cdot 18$  by  $\cdot 005$  mm. and  $\cdot 225$  by  $\cdot 005$  mm.; (iii) acanthostyli, sparingly beset with spines which occasionally form a crown at either base or apex of spicule,  $\cdot 18$  by  $\cdot 006$ ; microscleses absent.

*Remarks.*—The species is interesting from many points of view. In the first place, new species of sponges are rarely found in British waters to-day, and it is extremely likely that this one has been overlooked hitherto owing to its extremely close resemblance to *Raspailia ventilabrum* (Bowerbank). Indeed, from external appearance only it is quite impossible to tell the two species apart. This emphasizes, once again, the great need for examining all sponges microscopically in order to be absolutely certain as to their identity.

The present species is the third one recorded for the genus *Endectyon*, the other two, *E. tenax* and *E. demonstrans*, having been found off Florida and the Azores respectively (see Topsent 1920  $\beta$ , pp. 23–26).

The chief interest attaching to it, however, is that the spiculation shows

the manner in which the acanthostyli of the Ectyoninæ may have arisen. The axial skeleton of the branches consists of a multispicular reticulation of triangular meshes, built up of small styli, for the

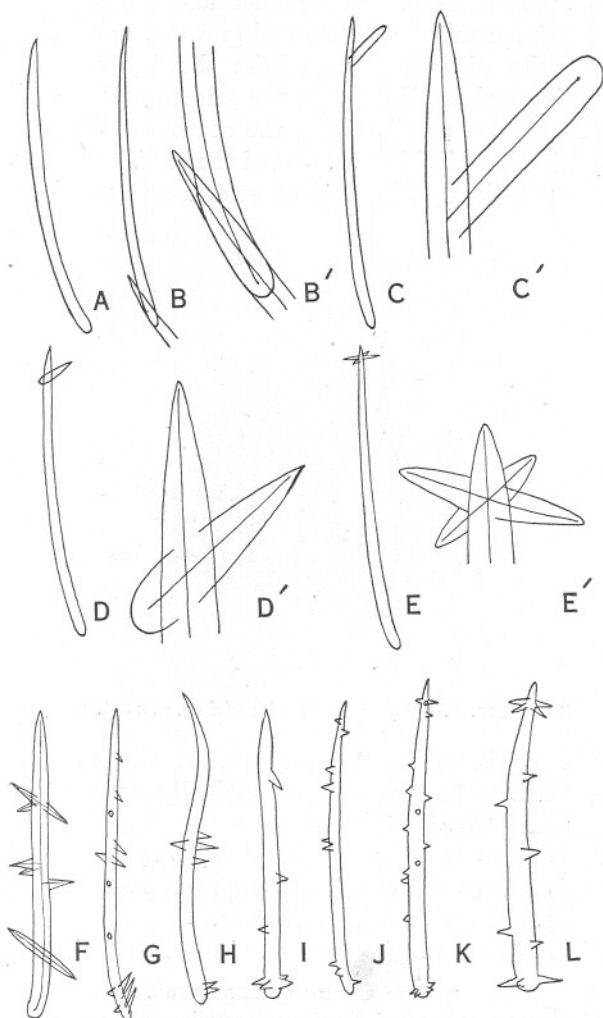


FIG. 1.—*Endectyon delaubenfelsi* sp. n. A. Normal stylus of main skeleton; B-E. abnormal styli (B'-E'. abnormalities enlarged); F-H. abnormal styli showing transitions to normal acanthostyli; I-L. normal acanthostyli. All figures (except B'-E')  $\times 220$ .

most part curved, and acanthostyli. The latter, however, are of comparatively rare occurrence. The typical form (figs. I I, L.) is that of a smooth style bearing a few stout spines. In a few cases, the

spines have become so grouped that the spicule is ornamented by crowns of spines, four to six in number, at either end of the spicule. In this condition the spicules closely resemble those of the genotype, *E. tenax* (see Topsent, l.c., p. 24, fig. 4b). On the other hand, the smooth styli of the axial skeleton frequently bear abnormal growths, and it is possible to pick out a series of such abnormalities showing a transition which effectually bridges the gulf between the smooth styli and the acanthostyli. In this species, at all events, the acanthostyli have arisen from an abnormal (pathological?) condition of the styli. The next question, for which as yet there is insufficient evidence to provide an answer,

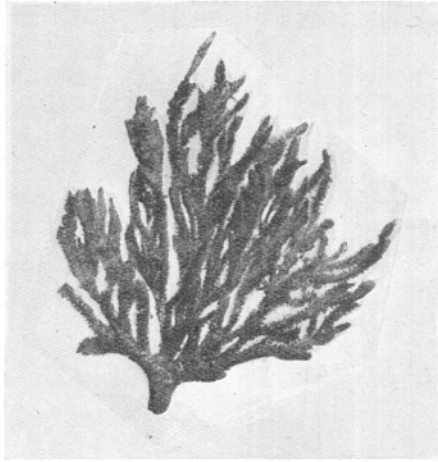


FIG. 2.—*Endectyon delaubenfelsi* sp. n.  $\times 3/4$ .

concerns the origin of the acanthostyli of the remainder of the Ectyoninæ, whether they too arose originally as abnormalities and what factors led to their stabilisation.

*Endectyon* is apparently closely related to *Hemectyon* Topsent (genotype *Raspailia hamata* Schmidt), *Tethyospira* Topsent (genotype *Tethea spinosa* Bowerbank), and, possibly, *Acarnus*.

*Distribution*.—Plymouth.

KEY TO SPECIES OF ENDECTYON.

- |   |  |                      |
|---|--|----------------------|
| 1 | { Axial skeleton composed exclusively of acanthostyli . . . . .                    | <i>demonstrans</i>   |
|   | { Axial skeleton composed of a mixture of smooth styli and acanthostyli . . . . .  | 2                    |
| 2 | { Acanthostyli invariably with a crown of recurved spines at each end . . . . .    | <i>tenax</i>         |
|   | { Acanthostyli only occasionally bearing a crown of spines at either end . . . . . | <i>delaubenfelsi</i> |

HYMEDESMIA STEPHENSI sp. n.

(Fig. 4.)

*Holotype*.—B.M. 29.8.21.5.

*Diagnosis*.—Sponge thinly encrusting; surface uneven, minutely

hispid, in places slightly conulose; oscules few, scattered, conspicuous; pores not apparent; colour, in life, brown; texture, in life, "slimy"; megascleres of main skeleton divided into two categories, long acanthostyli, usually slightly curved, sparingly spined and often quite smooth,  $\cdot 225$  by  $\cdot 007$  mm., and small entirely spined acanthostyli,  $\cdot 048$  by  $\cdot 002$  mm.; tornota very variable in shape, straight, smooth, with hastate mucronate, strongylote, or slightly tylote heads,  $\cdot 165$  by  $\cdot 003$  mm.

*Remarks.*—The species finds its closest ally in *H. mucronella* Lundbeck, from which it differs in many important respects, notably in the size and

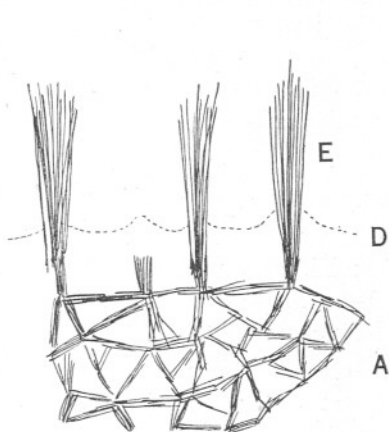


FIG. 3.—*Endectyon delaubenfelsi* sp. n. Section at right angles to surface, showing, A, reticulation of styli and acanthostyli of internal skeleton; D, dermis; and E, echinating tufts of long styli at the surface. (Diagrammatic.)



FIG. 4.—*Hymedesmia stephensi* sp. n. A, styli of main skeleton,  $\times 260$ ; B, acanthostyle,  $\times 260$ ; C, heads of tornota, to show variability in form,  $\times 2600$ .

shape of the acanthostyli and the variability of the ends of the tornota. The small size of the smaller acanthostyli is, indeed, its characteristic feature.

Dr. de Laubenfels describes this sponge in life as "brown, slimy."

*Distribution.*—Plymouth.

List of species of *Hymedesmia* recorded for the British Isles.

The following list of 21 species of *Hymedesmia* represents the complete list recorded for the British Isles. So far, the only species recorded for the Plymouth area is *H. stephensi* sp. n., but since there is no obvious reason why they may not all be found there, in time, I have



thought it worth while to give this list. Several of the British species described by Bowerbank have hitherto been only inadequately described. The re-descriptions given here are based on a re-examination of the types.

GENUS **HYMEDESMIA** Bowerbank.

*Genotype*.—*H. zetlandica* Bowerbank.

*Diagnosis*.—Ectyoninæ of encrusting habit; main skeleton composed of acanthostyli, of one or more kinds, variable in size, placed vertically with their bases echinating the substratum; dermal skeleton composed of tornota variously disposed, either in bundles running vertically from the apices of the acanthostyli to the surface, in scattered bundles, or in a horizontal layer supporting the dermis; microscleres chelæ, occasionally absent, and/or sigmata.

1. *H. ZETLANDICA* Bowerbank.

*H. zetlandica* Bowerbank 1864, p. 190; Id. 1866, p. 152; Gray 1867, p. 537; Id. 1874, p. 73, pl. xxix, figs. 1-7; *Myxilla zetlandica* Vosmaer 1880, p. 126; *Hymedesmia zetlandica* Bowerbank 1882, p. 70; Topsent 1888, p. 142; *Leptosia zetlandica* Id. 1894, p. 31; *Hymedesmia zetlandica* Stephens 1921, p. 32, pl. iv, fig. 3.

*Distribution*.—Shetland Is.; S.W. coast of Ireland.

2. *H. RADIATA* Bowerbank.

*H. radiata* Bowerbank 1866, p. 149; *Epicles radiatus* Gray 1867, p. 521; *Hymedesmia radiata* Bowerbank 1874, p. 71, pl. xxviii, figs. 1-4, pl. xxix, fig. 8; Id. 1882, p. 56; *Myxilla radiata* Topsent 1892, p. 109; *Hymeraphia radiata* Hanitsch 1894, p. 196; Dendy 1921, 84.

*Diagnosis*.—Megascleres of main skeleton divided into two categories, long, smooth styli, usually straight or nearly so, sometimes slightly subtylostylote, up to 1.8 by .012 mm., and entirely spined acanthostyli, with somewhat pronounced head, from .075 by .004 to .24 by .009 mm.; tornota, sometimes inclined to be slightly vermiform, arranged for most part in stellate groups in dermis, with strongylote ends, .27 by .003 mm.

*Remarks*.—The specimen described by Dendy under this name evidently represents a totally different species which I propose to call *Hymedesmia dendyi* sp. n. The suggestion made by Dendy, that Topsent's *Myxilla radiata* differs specifically from *Hymedesmia radiata*, is almost certainly wrong.

*Distribution*.—Shetland Is., and the Minch, Scotland; Azores.



## 3. H. PAUPERTAS (Bowerbank).

*Hymeniacion paupertas* Bowerbank 1866, p. 223; Id. 1874, p. 93, pl. xxxvii, figs. 4-8; *Myxilla paupertas* Vosmaer 1880, p. 127; *Hymeniacion paupertas* Bowerbank 1882, p. 92; *Myxilla paupertas* Ridley and Dendy 1887, p. 143; *Hymenaphia paupertas* Hanitsch 1894, p. 177; Topsent 1894  $\beta$ , p. 18; *Hymedesmia paupertas* Stephens 1912, p. 28; Id. 1921, p. 31, pl. iv, fig. 1.

*Remarks.*—Contrary to the assertion of Ridley and Dendy (l.c.), Bowerbank's preparations show that the species is, quite unmistakably, a *Hymedesmia*. *Myxilla paupertas* Topsent (1904, p. 168) is obviously different to Bowerbank's species and, since it is almost certainly a true *Myxilla*, I propose for it the name *M. topsenti* sp. n.

*Distribution.*—Greenland; Shetland Is.; W. and S.W. coasts of Ireland.

## 4. H. BRONSTEDI sp. n.

*Hymeniacion dujardini* Bowerbank 1866, p. 224; Id. 1874, p. 95, pl. xxxviii, figs. 1-4; Id. 1882, p. 92; *Stylopus dujardini* Levinsen 1887a, p. 512; *Dendoryx dujardini* Topsent 1888, p. 146; Id. 1890, p. 201; Id. 1891, p. 528; Id. 1892, p. 99; *Myxilla radiata* Id. l.c., p. 109; *Leptosia dujardini* Id. 1894a, p. 37; Id. 1896  $\beta$ , p. 275; Id. 1902  $\beta$ , p. 353; Id. 1904a, p. 185, pl. i, fig. 5; *Hymedesmia dujardini* Lundbeck 1909, p. 444; Id. 1910, p. 101, pl. x, fig. 5; *Hymedesmia dujardini* Arndt 1912, p. 119; Stephens 1917, p. 11; Id. 1921, p. 40.

*Remarks.*—In describing his *Hymeniacion dujardini*, Bowerbank was under the impression that it was specifically identical with Johnson's *Halisarca dujardini*. Since this is clearly a case of wrong identification, the name *dujardini* as applied to *Hymeniacion* and, since Bowerbank's time, to *Hymedesmia*, cannot stand. I propose, therefore, the name *bronstedii*.

*Distribution.*—N.E., S.E., and W. coasts of Ireland; Greenland; Norway.

## 5. H. OCCULTA Bowerbank.

*H. occulta* Bowerbank [in] Norman 1869a, p. 331; Id. 1874, p. 250, pl. lxxix, figs. 9-11; *Myxilla occulta* Vosmaer 1880, p. 129; *Hymedesmia occulta* Bowerbank 1882, p. 56; *Desmacidon occultum* Hanitsch 1894, p. 180; *Hymenaphia occulta* Topsent 1894  $\beta$ , p. 12; *Leptosia occulta* Id. 1904a, p. 186, pl. xv, fig. 1; *Hymedesmia occulta* Lundbeck 1910, p. 67, pl. iii, fig. 6, pl. vii, fig. 8; Stephens 1921, p. 37.

*Distribution.*—Greenland; Shetland Is.; W. and S.W. coast of Ireland; Azores.

6. *H. CRUX* (Schmidt).

*Desmacidon crux* Schmidt 1875, p. 118, pl. i, figs. 10-11; *Hymedesmia crux* Thiele 1903a, p. 392, pl. xxi, fig. 26; Lundbeck 1910, p. 83, pl. iii, fig. 11, pl. viii, fig. 10; Stephens 1921, p. 38.

*Distribution*.—Greenland; Norway; Faröes; S.W. coast of Ireland.

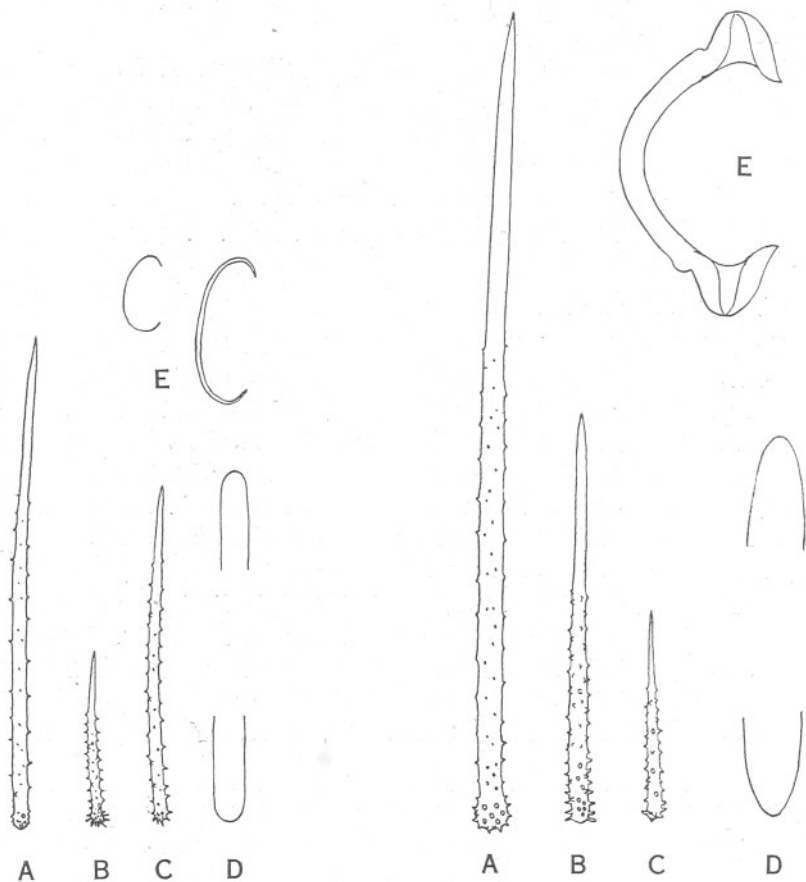


FIG. 5.—*Hymedesmia pilata* Bowerbank. A-C, acanthostyli, showing three typical sizes,  $\times 260$ ; D, ends of a typical tornote,  $\times 2600$ ; E, sigmata,  $\times 650$ .

FIG. 6.—*Hymedesmia peachii* Bowerbank. A-C, acanthostyli of main skeleton,  $\times 260$ ; D, ends of tornota,  $\times 2600$ ; E, isochela arcuata,  $\times 1300$ .

7. *H. PANSA* Bowerbank.

*H. pansa* Bowerbank 1882, p. 56, pl. i, figs. 1-4; *H. pulchella* Id. l.c., p. 61, pl. ii, figs. 5-8; *H. pansa* Stephens 1912, p. 29; Id. 1917, p. 11; Id. 1921, p. 36, pl. iv, fig. 4.

*Remarks.*—*H. pulchella* differs from *H. pansa* in the smaller size of its spicules only. The following are the maximum dimensions of the spicules of *H. pulchella*: large acanthostyli,  $\cdot 22$  by  $\cdot 006$  mm.; small acanthostyli,  $\cdot 09$  by  $\cdot 007$  mm.; tornota,  $\cdot 18$  by  $\cdot 003$  mm.; isochelæ,  $\cdot 019$  mm.

*Distribution.*—W. coast of Ireland; Roscoff, France (*vide* Stephens 1912, p. 300).

8. *H. PILATA* Bowerbank. (Fig. 5.)

*H. pilata* Bowerbank 1882, p. 59, pl. ii, figs. 1-4.

*Diagnosis.*—Acanthostyli not divisible into two categories, spined for the greater part of length but smooth in distal portion, spining particularly pronounced at base, varying from  $\cdot 078$  by  $\cdot 009$  to  $\cdot 24$  by  $\cdot 008$  mm., including spines; tornota extremely slender, straight, with strongylote ends,  $\cdot 12$  by  $\cdot 0015$  mm.; microscleres sigmata of two sorts,  $\cdot 015$  and  $\cdot 03$  mm. long respectively.

*Distribution.*—Birterbuy Bay, W. coast of Ireland.

9. *H. PEACHII* Bowerbank. (Fig. 6.)

*H. peachii* Bowerbank 1882, p. 64, pl. xiii, figs. 5-12.

*Diagnosis.*—Acanthostyli not divisible into two categories, spined for greater part of length but smooth in distal portion, spining particularly strong near base, varying from  $\cdot 105$  by  $\cdot 012$  to  $\cdot 39$  by  $\cdot 022$  mm., including spines; tornota slender, straight, with bluntly oxoete ends,  $\cdot 195$  by  $\cdot 003$  mm.; isochelæ arcuatæ,  $\cdot 03$  mm. long.

*Remarks.*—The chelæ vary considerably in shape. The one figured probably represents the typical form, but large numbers may be found in which the shaft is more strongly curved.

*Distribution.*—Wick, North Britain.

10. *H. ARMIGER* (Bowerbank).

*Hymeniacidon armiger* Bowerbank 1882, p. 73, pl. iv, figs. 10-17.

*Remarks.*—The species undoubtedly belongs to *Hymedesmia* and Bowerbank's figures show this clearly. The reason for its having been so long ignored is probably to be found in the fact that his figures are misleading in regard to the size of the spicules. The megascleres are faithfully portrayed, the acanthostyli measuring from  $\cdot 075$  to  $\cdot 22$  mm. in length, and the tornota  $\cdot 175$  by  $\cdot 003$  mm. The microscleres are chelæ arcuatæ, chiefly remarkable for their small size,  $\cdot 012$  mm. long, and form the characteristic feature of the species.

*Distribution.*—Roundstone Bay, Ireland.

11. *H. KOEHLERI* (Topsent).

*Leptosia kœhleri* Topsent 1896 $\beta$ , p. 284, pl. viii, figs. 7-9; Id. 1904a, p. 188; Lundbeck 1910, p. 42, pl. v, fig. 5; Stephens 1921, p. 34.

*Distribution*.—Greenland; Iceland; Farøes; W. and S.W. coasts of Ireland; Bay of Biscay; Azores.

12. *H. MUCRONATA* (Topsent).

*Hymeraphia mucronata* Topsent 1904a, p. 165, pl. xiv, fig. 4; *Hymedesmia mucronata* Lundbeck 1910, p. 98, pl. x, fig. 3; Stephens 1921, p. 39.

*Distribution*.—Greenland; S.W. coast of Ireland; Azores.

13. *H. MUTABILIS* (Topsent).

*Hymeraphia mutabilis* Topsent 1904a, p. 166, pl. xiv, fig. 3; *Hymedesmia mutabilis* Stephens 1921, p. 38.

*Distribution*.—S.W. coast of Ireland; Azores.

14. *H. BACULIFERA* (Topsent).

*H. baculifera* Topsent 1902 $\beta$ , p. 354; Id. 1904a, p. 191, pl. xv, fig. 2; Lundbeck 1910, p. 71, pl. viii, fig. 1; Stephens 1915a, p. 440; Id. 1921, p. 37.

*Distribution*.—Greenland; Iceland; Farøes; S.W. Ireland; Mediterranean coast of Algeria; Azores; Saldanha Bay, S. Africa.

15. *H. CURVICHELA* Lundbeck.

*H. curvichela* Lundbeck 1910, p. 48, pl. vi, fig. 2; Stephens 1921, p. 34.

*Distribution*.—Greenland; S.W. coast of Ireland.

16. *H. TRUNCATA* Lundbeck.

*H. truncata* Lundbeck 1910, p. 77, pl. iii, fig. 9, pl. viii, fig. 6; Stephens 1921, p. 33.

*Distribution*.—Greenland; Iceland; Farøes; S.W. coast of Ireland.

17. *H. DIGITATA* Lundbeck.

*H. digitata* Lundbeck 1910, p. 90, pl. iii, fig. 15, pl. ix, fig. 4; Stephens 1921, p. 39.

*Distribution*.—Greenland; S.W. coast of Ireland.

18. *H. TENUISIGMA* Lundbeck.

*H. tenuisigma* Lundbeck 1910, p. 100, pl. x, fig. 4; Stephens 1921, p. 39.

*Distribution*.—Greenland; W. coast of Ireland.

19. *H. HELGÆ* Stephens.

*H. helgæ* Stephens 1915, p. 236 ; Id. 1921, p. 40, pl. iv, fig. 6.

*Distribution.*—S.W. coast of Ireland.

20. *H. SPINOSA* Stephens.

*H. spinosa* Stephens 1916, p. 237 ; Id. 1921, p. 41, pl. iv, fig. 5.

*Distribution.*—S.W. coast of Ireland.

21. *H. HIBERNICA* Stephens.

*H. hibernica* Stephens 1916, p. 237 ; Id. 1921, p. 42, pl. iv, fig. 2.

*Distribution.*—S.W. coast of Ireland.

22. *H. STEPHENSI* sp. n.

*Distribution.*—Plymouth.

KEY TO BRITISH SPECIES OF HYMEDESMA.

1	{	With spicules of main skeleton divided into two categories, long, usually basally-spined, and short, entirely-spined, acanthostyli . . . . .	2
		With spicules of main skeleton of one sort only, but of varying size and, usually, entirely-spined . . . . .	12
2	{	With larger spicules of main skeleton spined for some part of length . . . . .	3
		With larger spicules of main skeleton entirely smooth styli . . . . .	<i>radiata</i>
3	{	With microscleres . . . . .	5
		Without microscleres . . . . .	4
4	{	With smaller acanthostyli never less than one-third the length of larger acanthostyli . . . . .	<i>hibernica</i>
		With smaller acanthostyli less than one-fifth of larger acanthostyli . . . . .	<i>stephensi</i>
5	{	Microscleres sigmata only . . . . .	6
		Microscleres chelæ to which sigmata may be added . . . . .	7
6	{	With microscleres less than .04 mm. long . . . . .	<i>pilata</i>
		With microscleres more than .04 mm. long . . . . .	<i>tenuisigma</i>
7	{	Microscleres ancoræ spatuliferæ and sigmata . . . . .	<i>mutabilis</i>
		Microscleres chelæ arcuatæ . . . . .	8
8	{	With sigmata . . . . .	<i>digitata</i>
		Without sigmata . . . . .	9
9	{	With larger megascleres of main skeleton spined throughout length, strongly in lower, feebly along distal portion . . . . .	<i>helgæ</i>
		With larger megascleres of main skeleton spined in basal portion only . . . . .	10
10	{	With chelæ less than .025 mm. long . . . . .	<i>pansa</i>
		With chelæ more than .025 mm. long . . . . .	11
11	{	With oxeote tornota . . . . .	<i>occulta</i>
		With stronglytote, to slightly tylote, tornota . . . . .	<i>paupertas</i>
12	{	With microscleres . . . . .	13
		Without microscleres . . . . .	<i>brondstedti</i>
13	{	Microscleres chelæ and sigmata . . . . .	14
		Microscleres chelæ only . . . . .	15
14	{	With chelæ of one sort only . . . . .	<i>zelandica</i>
		With chelæ of two sorts . . . . .	<i>mucronata</i>
15	{	With shaft of chelæ smooth . . . . .	16
		With shaft of chelæ spined . . . . .	<i>crux</i>

16	{	With strongylote tornota . . . . .	17
		With oxeote tornota . . . . .	19
		With tylote tornota . . . . .	<i>truncata</i>
17	{	With polytylote tornota . . . . .	18
		With simple tornota, not polytylote . . . . .	<i>baculifera</i>
18	{	With shaft of chelæ strongly curved and teeth small . . . . .	<i>curvichela</i>
		With chelæ of normal shape . . . . .	<i>köhleri</i>
19	{	With chelæ more than .02 mm. long . . . . .	20
		With chelæ less than .02 mm. long . . . . .	<i>armiger</i>
20	{	With all acanthostyli strongly and entirely spined . . . . .	<i>spinosa</i>
		With larger acanthostyli smooth in distal half . . . . .	<i>peachii</i>

BRITISH SPECIES OF HYMEDESMIA NOW REMOVED TO OTHER  
GENERA.

*H. stellata* Bowerbank 1866, p. 150 = *Timea stellata*.

*H. simplicima* Id. 1874, p. 253, pl. lxxx, fig. 1 = *Pseudosuberites simplicima*.

The skeleton of *Hymedesmia simplicima* is composed of tylostyles (fig. 7) only disposed with no apparent order. They measure, on an



FIG. 7.—*Hymedesmia simplicima* Bowerbank. Head of a tylostyle,  $\times 250$ .

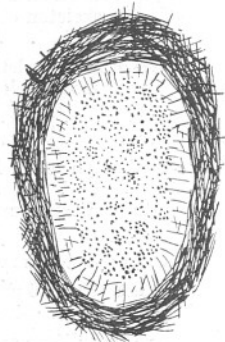


FIG. 8.—*Pachaxinella subdola* Bowerbank. Transverse section of a branch, showing internal axial skeleton of longitudinally-disposed spicules and outer, dermal layer. (Diagrammatic.)

average, .6 by .009 mm. The sponge itself is so small that it is difficult to be certain of its systematic position, but it is extremely possible that it is nothing more than the immediate post-fixation stage of a species of *Pseudosuberites*.

*H. inflata* Id. 1874, p. 245, pl. lxxix, figs. 5–8 = *Orella inflata*.

The spiculation of this species consists of acanthoxea, .096–.12 by .006 mm., and long, slender tornota, on an average, .5 by .003 mm. The acanthoxea are for the most part slightly curved or sharply angulated and, usually, centrotylote. The tornota have oxeote ends and

are quite straight and smooth. The species closely resembles *C. carnosa* (Topsent), but differs from it in the dimensions of the spicules, the centrotylote character of the acanthoxea, and the absence of polytylote markings on the tornota.

*H. acuto-stellata* Hanitsch 1894, p. 203.

The original description of this species is quite inadequate, but, so far as one may judge, it is probably an encrusting form, perhaps even the immediate post-fixation stage, of *Dictyocylindrus stuposus*. It is certainly not a *Hymedesmia*.

GENUS **PACHAXINELLA** gen. n.

*Genotype*.—*Halichondria subdola* Bowerbank.

*Diagnosis*.—Axinellidæ of erect, branching habit; skeleton composed

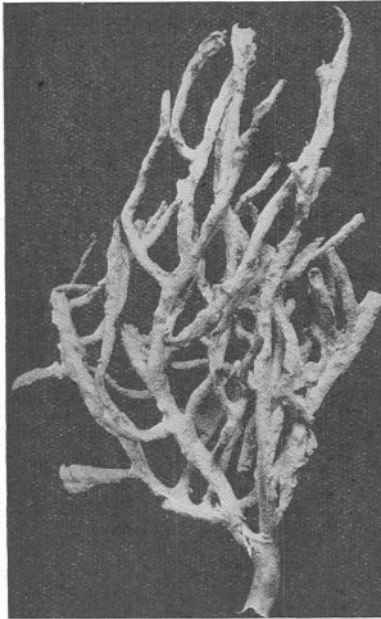


FIG. 9.—*Pachaxinella subdola* Bowerbank.  $\times 3/4$ .

of an axial core of loose bundles of spicules surrounded by a dense layer in which spicules are irregularly disposed, sometimes at right angles, sometimes tangential to the surface; spicules smooth styli of varying size.

*Remarks*.—The genus is closely allied to *Homaxinella*, but differs from it in the arrangement of the skeleton. The usual order of the Axinellidæ, with a dense axial skeleton and a diffuse extra-axial skeleton, is reversed.



## PACHAXINELLA SUBDOLA (Bowerbank).

(Figs. 8, 9.)

*Holotype*.—B.M.—29.11.27.1.*Halichondria subdola* Bowerbank 1866, p. 247; Id. 1874, p. 106, pl. xliii, figs. 14–16.*Diagnosis*.—Sponge erect, copiously branched, stipitate; surface even, minutely hispid; oscules and pores not apparent; texture firm, brittle when dry; colour, in dried state, creamy-white, alive golden-yellow; axial skeleton composed of loose bundles of spicules running longitudinally through branches, united by moderate quantity of spongin; extra-axial skeleton a dense layer of spicules, very irregularly arranged, sometimes horizontal to surface, sometimes at right angles to it, with all positions between these two; spicules smooth styli, usually straight, varying in size, .22 by .003 to .51 by .006 mm.*Remarks*.—The present specimen, a complete sponge, is practically identical in all essential features with Bowerbank's fragmentary holotype.

The junction between the axial and extra-axial skeletons is marked by a thin, almost imperceptible, zone of loose tissue supported by spicules which emerge from the axial skeleton, almost at right angles to it, and project into the extra-axial zone.

*Previously known distribution*.—Guernsey.

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