SOME TYPE AND OTHER SPECIMENS OF SPECIES INVOLVED IN THE PROBLEM OF *STYLOPOMA* LEVINSEN (POLYZOA)

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ABSTRACT

A lectotype is chosen for *Schizoporella errata* (Waters). *S. errata*, *S. longirostris* Hincks and the specimens referred to *Stylopoma spongites* by Levinsen are discussed The indications of identity given by Heller for his varieties of *Lepralia spinifera* Hassall are considered. The material to which Busk gave the manuscript name *Schizoporella spiculifera* belongs to *S. longirostris*, but Waters's publication of the name *S. spiculifera* appears to have made it an absolute synonym of *Stylopoma viride* (Thornely). Busk's specimen encrusts a sponge which was alive when collected. The specimens described by Levinsen as *Schizoporella* (*Stylopoma*) *spongites* have been examined. Large, acute avicularia, like those of *S. falcifera*, are present.

INTRODUCTION

Harmer's choice of type-specimen for *Eschara spongites* Pallas (which is strictly legal) has left problems about the status of the genus *Stylopoma* Levinsen (1909).[1]

The late Dr. H. Dighton Thomas and I prepared an application to the International Commission on Nomenclature which I have now submitted (Thomas & Hastings, 1967). It asks for suppression of all previous type-designations for *Eschara spongites* Pallas, and for the designation of Levinsen's two specimens from St. John, W. Indies (described below) as neotype and neoparatype. If these proposals be approved they will preserve the name *Stylopoma* in its currently accepted sense.

[1] See Cheetham & Sandberg (1964 : 1031) whose statement of the type-species of *Stylopoma* Levinsen is wrong. Canu & Bassler (1920 : 359) chose: "*Stylopoma* (*Eschara*) *spongites* Pallas, 1766".

Schizoporella errata (Waters)

SYNONYMY (Mediterranean area only):
Eschara spongites Pallas, 1766 (partim) : 45.
Lepralia spinifera Busk, 1854 (partim) : 69, pl. XCI, figs. 1, 2. (Gibraltar).
Lepralia spinifera c) *L. serialis* Heller, 1867 : 104.
Lepralia spinifera d) *L. spongites* Heller, 1867 : 104.
Lepralia errata Waters, 1878, p. 11 (expl. pl.), pl. I, fig. 9.
Lepralia errata, stadium *Hemeschara* Waters, 1879 : 39, pl. X, fig. 5.
Schizoporella unicornis, Johnston : Waters, 1909 (partim) : 143, pl. XII, figs. 12, 13.
Schizoporella unicornis, var. Waters, 1909 : 144, pl. XII, fig. 11. (Synonymy in footnote, p. 145. Referred to *Eschara spongites* Pallas.)
Schizoporella unicornis (Johnston, 1847) var. *errata* Waters, 1879: Calvet, 1927 : 16.
Schizoporella unicornis Johnston: Hastings, 1927 : 336.
Schizopodrella errata. Waters, 1878 : Canu & Bassler, 1930 : 39. (*Synonymy*.)
Schizopodrella violacea. Canu & Bassler, 1930 : 40, pl. IV, figs. 1–14.
Schizoporella spongites (Pallas): Harmer, 1930 : 79, 80, pl. I, fig. 2.
Schizopodrella errata (Waters, 1878): Barroso, 1935 : 373, text-figs. 1, 2.
Schizopodrella violacea (Canu y Bassler, 1930): Barroso, 1935 : 374, text-figs. 3, 3a.
Mucronella soulieri Calvet 1902: O'Donoghue & de Watteville, 1939 : 28. (Not *M. soulieri* Calvet. See Hastings, 1966 : 75.)
Schizopodrella errata (Waters): Gautier, 1953 : 52.
Schizopodrella errata (Waters) 1879: Gautier, 1958*a* : 57.
Schizoporella errata Waters 1878: Gautier, 1958*b* : 106.
Schizoporella errata (Waters) 1878: Gautier, 1962 : 149, text-fig. 14.
Schizoporella errata (Waters): Ryland, 1965 : 64, text-figs. 31a, 31b.

DISTRIBUTION (in the Mediterranean and some neighbouring areas): E. and W. Mediterranean, Adriatic (including the Venetian lagoon), Suez Canal, Red Sea, Zanzibar.

There can be no doubt that *S. errata* has a much wider distribution than that given above, and, in particular, that some of the records of *S. unicornis* from the Atlantic coast of America are based on it, e.g.: *Schizoporella unicornis* Hastings, 1930 : 720, Colon; Marcus, 1937 : 83, Brazil; Maturo, 1957 : 49, Beaufort, N. Carolina; Shier, 1964 : 629 (part ?)[1], W. Florida.

I have examined extensive colonies on oysters collected at Charleston, S. Carolina on 24th May, 1954, lent to me by the Zoologisk Museum, Copenhagen, (labelled as *Schizoporella spongites* Pallas).

Osburn (1952 : 318, as *S. unicornis*) noted that it had not previously been recorded from " the Pacific coast of the Americas ", but he had found it to be a " rather common species in the bays where oysters from the Atlantic coast have been planted ", and that it was probably a recent introduction.

S. errata is a typical ship-fouling species (see Ryland, 1965; 1967 : 354), and records of *S. unicornis* in works on fouling are mostly based on it. In works on Polyzoan systematics it is noticeable that its growth in ports, on piles and other harbour structures, and on boats, rafts etc. is very frequently mentioned.

Dr. Ryland has drawn my attention to the fact that a figure by Marcus (1940 : 237,

[1] Shier's description and measurements agree with *S. errata*, except that his account of large avicularia with " bulbous chambers which may be nearly as large as a zooecium " suggests an admixture of some other species.

text-fig. 121) represents *S. errata*, and has pointed out (MS) that it appears that the figure was not drawn from Danish material, and that only the form called by Marcus *S. unicornis* var. *ansata* (see Ryland, in press) is found in the Skagerrack (see Marcus, 1950 : 17).

LECTOTYPE, chosen here: H. 1186, Waters Collection, Manchester Museum. Naples 1875. One piece mounted on a slide after boiling in potash. Waters noted the absence of ovicells.

PARALECTOTYPES: Manchester Museum. Naples: two slides of chitinous parts.

OTHER WATERS MATERIAL: Two specimens mentioned by Waters in 1879 are in the British Museum. Not being mentioned in 1878, they are not syntypes. They are: 1899.5.1.1136. Specimen figured by Busk (Pl. 91, fig. 1) from the Bay of Gibraltar, the figure being cited by Waters.[1]

1955.7.20.1. Mediterranean. Specimen formerly exhibited without registered number, recognized later (and registered then) as the specimen described by Waters as " piece, about 2 inches high ".

MEASUREMENTS OF LECTOTYPE:

Basal layer.	Lz	0·43–0·60	average	0·50 mm.
	lz	0·30–0·49	,,	0·38 mm.
	Lo	0·13–0·18	,,	0·15 mm.
	lo	0·13–0·16	,,	0·14 mm.
Superficial layer.	Lz	0·55–0·80	average	0·65 mm.
	lz	0·45–0·53	,,	0·49 mm.
	Lo	0·14–0·18	,,	0·16 mm.
	lo	0·13–0·16	,,	0·14 mm.
Avicularia.	Lav.	0·12–0·16	average	0·14 mm.
	lav.	0·05–0·09	,,	0·07 mm.

These measurements, for which I am indebted to Miss Cook, are inevitably based on rather few (14) zooecia.

DESCRIPTION OF LECTOTYPE: The lectotype, kindly lent to me by the Manchester Museum, is an encrusting piece, measuring 9 × 10 mm. It consists of a regular layer of straight-sided zooecia over which two successive layers of superficial zooecia are spreading. The superficial zooecia are larger, irregular in shape and orientation, and more rounded in outline. The tremocyst in all layers has large pores, and the orifice has a broad, rounded sinus, and shows little variation in size. The avicularia are acute. They are of two kinds and sporadic in their distribution: (a) a small

[1] Waters cited both Busk's figures (Pl. XCI, figs. 1, 2). Both figures were drawn from material from the Bay of Gibraltar (information from Busk's drawings). A specimen from the Bay of Gibraltar, McA. [McAndrew], (1899.5.1.1136, Hincks Coll., mounted by Busk) is recognizable as the original of fig. 1. It is not to be expected that the single zooecium shown in fig. 2 should be individually recognizable.

There are two other slides of Busk's Gibraltar material, both in his own collection: 1899.7.1.2413 (chitinous parts) and 1899.7.1.2392, McAnd. [McAndrew].

avicularium beside the proximal part of the orifice and directed outwards; (b) a somewhat larger avicularium, not situated in relation to a particular zooecium (Vicarious? Interzooecial? Only one seen). Unfortunately the lectotype has no ovicells.

The first superficial layer has a recognizable, though uneven, growing edge, and most of its zooecia are orientated towards this edge. Such irregularities as are present are of some interest. For example, a few zooecia are budded laterally and lie parallel to the general line of the growing edge instead of being directed towards it. Lateral budding from these has restored the normal orientation.

The second superficial layer is an irregular patch of disorientated zooecia, including two zooecia in linear series, without lateral neighbours.

Thus the lectotype shows the transition from a regular primary encrusting layer to an irregular, multilaminar encrusting growth.

OTHER MATERIAL: The erect zoarium (1955.7.20.1), cited by Waters, is similar to that figured by Gualtieri (see reproduction in Harmer, 1930, pl. I, fig. 2, and referred to *S. spongites* Pallas, see Thomas & Hastings (1967)). It is dull pinkish purple, paler towards the tips, massive and many-layered. The tubular branches may be cylindrical or flattened, sometimes widening and almost trumpet-shaped, and they branch and anastomose. Ovicells are present.

The Gibraltar specimens (particularly 1899.7.1.2392) appear superficially different, being encrusting and white, with long, straight-sided zooecia, but an incipient, irregular, superficial layer is present, with traces of pigmentation. The specimens do not differ in the shape of the orifice or the position of the avicularia, and the shape of the longer zooecia is evidently related to their forming the primary encrusting layer of a much younger colony than 1955.7.20.1.

The consideration of these type, and other, specimens examined by Waters confirms the interpretation of *Lepralia errata* given, with full descriptions, by Canu & Bassler and Gautier. It also confirms the inclusion of the species in *Schizoporella* Hincks, type-species *S. unicornis* (Johnston).

The differences between young, ancestrulate colonies of *S. unicornis* and *S. errata* are well shown in Ryland's figures (1965: text-figs. 31b and 32a; figured specimens now in British Museum, 1964.4.12.1) which conclusively settle the much debated question of whether *S. errata* is specifically distinct from *S. unicornis*.

Waters (1909 : 144) described material in which the zooecia of successive layers were exactly superimposed on those in the layer below (see also Waters, 1913 : 501–502, 504; 1918 : 15, pl. II, fig. 17; Calvet, 1927 : 18 (quoted by Canu & Bassler, 1930 : 39); Marcus, 1937 : 84; Gautier, 1958*b* : 107). This is well seen in some part of most of the multilaminar colonies of this species. There are large colonies from the Red Sea and Malta in the Museum which show it, as do material from the Suez Canal (see Hastings, 1927 : 337) and the erect specimen cited by Waters in 1879 (1955.7.20.1).

THE IDENTITY OF HELLER'S VARIETIES OF *LEPRALIA SPINIFERA*

Unpublished information from the Busk Drawings (see Hastings, 1943 : 303) has elucidated the names used by Heller (1867 : 103) for certain Mediterranean species,

including *Schizoporella errata*. He recognized four forms (p. 104) and defined them as variations[1] of one species, *Lepralia spinifera* Johnston. Three of these he further defined by quoting figures by Busk and also (in two instances) by Johnston.

Heller's references are as follows:

a. *L. unicornis*, references to Johnston, [1847], pl. LVII, fig. 1, and Busk, [1854] pl. LXXX, figs. 5–7, pl. LXXXI, figs. 6–7.

Johnston's figure and the three figures on Busk's pl. LXXX were all drawn from the type-material of *L. unicornis* Johnston (Johnston Coll., 1847.9.16.174, 187, 194, Britain).

b. *L. aculeata*, references to Johnston, [1847], pl. LVII, fig. 6, and Busk, [1854], pl. LXXVI, figs. 2 and 3.

All three figures were drawn from Johnston's material of *L. spinifera* Hassall (Johnston Coll., 1847.9.16.49, Dublin Bay).

c. *L. serialis*, reference to Busk, [1854], pl. XCI, figs. 1, 2.

As noted above, under *Schizoporella errata*, these two figures were based on encrusting material of *S. errata* from the Bay of Gibraltar, and they were cited by Waters (1879 : 39) in discussing that species.

d. *L. spongites*, reference to Lamouroux, [1821], Expos. Méth., pl. XLI, fig. 3, and not to any figure by Johnston or Busk.

Heller's definition of this variety clearly indicates the massive, erect, often tubular, form, later described by Waters as *Lepralia errata*. Lamouroux's description (p. 2, *Cellepora spongites*) and figure are applicable to the same form. Heller's other varieties (a–c) are described as encrusting.

Schizoporella longirostris Hincks

Schizoporella unicornis, form *longirostris* Hincks, 1886 : 266, pl. X, fig. 2.
Schizoporella longirostris Hincks Levinsen, 1909 : 323, pl. XVIII, fig. 3a–g (as *Schizoporella* (*Stylopoma*) *longirostris* Hincks in explanation of plate).
Schizopodrella longirostris Hincks 1886 Canu & Bassler, 1925 : 29.
Schizopodrella longirostris, Hincks, 1886: Canu & Bassler, 1930 ; 43, pl. IV, figs. 15–20, pl. V, figs. 1–19.
Schizoporella longirostris Hks: Marcus, 1950 : 18, text-fig. 4.
Schizopodrella longirostris (Hincks): Gautier, 1953 : 51, text-fig. 6.
Schizoporella longirostris Hincks 1886: Gautier 1962 : 151 (synonymy).
?*Lepralia ansata*, Johnst., var. *porosa*, Rss: Waters, 1879 : 32. (Not *L. ansata* var. *porosa* Reuss, 1874 : 158, pl. VI, fig. 13.)

DISTRIBUTION: Mediterranean (for details see Gautier); Atlantic coast of Morocco (Canu & Bassler); Scilly Isles (Brit. Mus.).

SPECIMENS IN HINCKS COLLECTION: Adriatic (1899.5.1.1107, as *S. unicornis* form *longicornis* [sic]; 1109, as *S. unicornis* form; 1112, as *S. unicornis* var.).

All these three slides agree with Hincks's description, and may be syntypes (Hincks often omitted to put the published name on his slides); but he stated in his

[1] He called them " variationen " but did not treat them formally as varieties. Jelly (1889), however, lists them as such.

paper that he received his material from Pieper. The three slides were mounted by Jelly (evidence of style), and Pieper's name does not appear on them. I formerly regarded them as syntypes, and Cheetham and Sandberg (1964 : 1030), who examined the specimens, consequently referred to one of them as " holotype ". Specimens of Hincks's " normal " *S. unicornis* from the Adriatic are discussed below.

OTHER MATERIAL: Capri, 100 f. [fathoms[1]] (Bracebridge Wilson Coll., from Waters, 1897.5.1.775, as *Schizoporella unicornis*); Roche de la Madrague, Mediterranean, May, 1952 (Gautier Coll., 1960.11.2.18); Mediterranean (Gautier Coll., St. 187, 1965.9.4.11; St. 229, 1965.9.2.8; Busk Coll., as *Schizoporella spiculifera*, 4 slides as follows: 1899.7.1.2366, dry mount by Busk and preparation of chitinous parts from it by Waters; 1899.7.1.2367, from Alder; 1899.7.1.2368, preparation of chitinous parts by Busk, with a note that they were taken from " The thick massive specimen "); Naples, Gorgonian zone (Waters Coll., as *Lepralia ansata*, 1879.4.25.9); Mazarron, S. Spain (1891.5.29.4); No locality, on *Pinna rotundata* (Copenhagen Museum, as *Schizoporella spongites* Pallas. The Polyzoa are detached and no shell present). Porth Hellick, Scilly Is., 40 ft., 21st July, 1966 (University of London Subaqua Club, St. 230, 1967.8.2.17); off Great Britain Rock, Scilly Isles, 170 ft., 22nd July, 1966 (U.L. Subaqua Club, St. 288, 1967.8.2.16).

REMARKS: Gautier's description and material of *S. longirostris* agree with those of Hincks. There is some variation in the length of the sinus, reflected in the length of the tongue (vanna) of the operculum. Marcus's material had the sinus short (1950: text-fig. 4A). Further, the published figures are not consistent in the shape of the vanna (cf. Levinsen, 1909: pl. XVIII, fig. 3e; Canu & Bassler, 1930: pl. IV, fig. 18; Marcus, 1950: 17, text-fig. 4B). Levinsen's appears to be the truest representation. The shape shown in the other two figures is sometimes seen. It appears to be produced when the thinner part at the articulation has either been lost in teasing out the operculum, or become invisible in clearing and mounting.

The specimens from the Scilly Isles constitute the only record of this species from Britain. They show all the essential characters of the species, but are smaller in all dimensions than Mediterranean specimens, and more heavily calcified.

Waters (1879 : 32) recorded *Lepralia ansata* Johnston var. *porosa* Reuss from Naples. The specimen in the British Museum set of slides of Waters's Naples material (1879.4.25.9) is labelled *L. ansata* by Waters, without the varietal name. It proves to be a specimen of *Schizoporella longirostris*. As Waters did not include typical *L. ansata* in his paper, I have taken it that this slide represents his variety, and have tentatively included the name in the synonymy of *S. longirostris*. *S. ansata* sensu Hincks, as opposed to the Mediterranean species often called *S. ansata*, see Gautier (1962: 147 note; Ryland, in press), is a deep-water British form rather similar to *S. unicornis*. It is chiefly characterized by being only very obscurely porous (Hincks, 1880 : 239; Ryland, in press). Thus, the markedly porous wall of *S. longirostris* fully explains Waters's varietal name, *porosa*, for his supposed specimen of *S. ansata*.

[1] Waters did not describe his collection from Capri as such, but he cited specimens from there in his papers, usually without stating the depth. Where I have found it given, it is in fathoms or in metres, and is considerably in excess of 100 feet. It is thus probable that here f. stands for fathoms.

The name *Schizoporella spiculifera* on the labels of some of Busk's Mediterranean slides was unpublished until Waters (1909 : 147) stated that one of these specimens belonged to *Schizoporella viridis* Thornely (1905 : 116; a species of *Stylopoma* redescribed by Harmer, 1957 : 1036). It could, perhaps, be argued that Waters's published statement made the name *spiculifera* an absolute synonym of *Stylopoma viride*, a species not known from the Mediterranean. Busk's specimens are distinct from *S. viride* (see Hastings, 1932 : 426), and clearly belong to *Schizoporella longirostris*. They encrust the surface of a sponge, and are multilaminar. The oscules of the sponge are clear of all débris, and are neatly bordered by the zooecia of the Polyzoan. Looking into the oscules the channel is also seen to be clear, and its brown spicular lining reaches to the surface of the Polyzoan colony, and ends neatly at the rim of the opening, thus having grown as successive layers of zooecia were added. In one, smaller, opening the spicular tissue projects slightly above the surface of the Polyzoan colony forming a rim, and tufts of spicules project obliquely over the opening as a bordering fringe. It is evident, from examination of the oscules and channels, that the sponge was alive when collected. The reason for Busk's choice of name is now obvious.

Hincks's supposed " normal " *S. unicornis* from the Adriatic is represented by two slides, 1899.5.1.1113 and 1114, labelled respectively *S. unicornis* and *S. unicornis* (normal); both mounted by Jelly. They certainly do not represent true *S. unicornis* (Johnston). 1899.5.1.1113 bears one piece of *S. errata*. The rest of the material (both slides) has the sinus broad and rounded, similar to that of *S. unicornis*, but the frontal avicularia are like those of *S. longirostris* in their shape and their variable position. The base of the avicularium is beside the sinus, and the mandible is directed laterally or obliquely proximally. In addition 1899.5.1.1114 has interzooecial avicularia with acute mandibles and extensive, convex tremocyst, similar to those of *S. longirostris*, but smaller. This specimen also has what looks superficially like a broad, rounded, spatulate avicularium. No opesia is, however, discernible proximally to the articulation of the supposed mandible. The tremocyst in these specimens is coarser and rougher than is usual in either *S. unicornis* or *S. longirostris*.

THE SPECIMENS DESCRIBED BY LEVINSEN AS *SCHIZOPORELLA (STYLOPOMA) SPONGITES*

The material under the name *Schizoporella spongites* in the Zoologisk Museum, Copenhagen, includes three specimens representing material mentioned in Levinsen's monograph (1909 : 324), and others that may have been examined by him. Those mentioned are:

1. St. Jean Bay, 10 Fv. [St. John, W. Indies, 10 fath.][1] Th. Mortensen. 19.12.05. Dry specimen.

2. St. Jean. [on] Arca. Spirit specimens.

3. Aor, [Malacca] Corneliussen legit. 1874. As suggested by Levinsen, this material represents a distinct species. It agrees with *Stylopoma duboisii* (Aud.), redescribed by Harmer, 1957 : 1033. Spirit specimen.

[1] Levinsen gave the depth as 15–20 fath.

The specimen from Java, figured (operculum only) by Levinsen (1909: pl. XVIII, fig. 4d) is not in the Museum. The shape of the sinus is consistent with its having been a specimen of *Stylopoma parviporosum* Canu & Bassler (redescribed by Harmer, 1957 : 1035).

The material from St. John, W. Indies: The dry specimen is an extensive colony on the surface of a shell. It is practically complete, with the growing edge largely intact, extensive areas of regular series of zooecia of the primary layer exposed, and a distinct development of the secondary, disorientated layer present. It has many ovicells and, in general, agrees with Levinsen's account, but has a second type of large avicularium, and rather few of the small ones. I have not seen small avicularia in any other position than beside the orifice and I have not seen any " tubercle-shaped projection proximally to the aperture".

In the primary layer, the spatulate avicularia arise as one of the paired zooecia at the start of a new series, but there are also instances when both members of the pair are autozooecia. The mandibles are a little longer in proportion to their width than that on the right in Canu & Bassler's figure (1928, pl. X, fig. 8). They are mostly directed distally, but I noted one directed proximally and one oblique mandible.

The second type of large avicularium resembles those figured in *Schizoporella falcifera* Canu & Bassler (1928: pl. X, fig. 2). It has a much raised chamber extending across two or more zooecia, and a long, slender, pointed mandible, which is strongly curved as it arches down towards the surface of the zoarium, with its point of attachment higher than its distal end. It is considerably more arched than those figured by Canu & Bassler.

The presence together of these two types of avicularia confirms Osburn's (1940 : 424) treatment of Canu & Bassler's two forms as conspecific. The agreement of the measurements given by Canu & Bassler should also be noticed.

The spirit material from St. John agrees in general with the dry. It has spatulate avicularia in both the regular and irregular layers, those in the regular layers being at the bifurcation of the series. Large, pointed avicularia have not been seen. Ovicells are present. The material is labelled " Arca ", presumably indicating the substratum, but it is now unattached. The largest specimen has basal irregularities which suggest loose attachment to an irregular surface. There are round openings through the zoarium which appear to have been caused by an underlying organism (possibly burrowing in the shell?).

The synonymy and distribution of " *Stylopoma spongites* " Levinsen are given by Cheetham & Sandberg (1964 : 1031).

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ADDENDUM

Part of the specimen of *S. errata*, 1955.7.20.1, is in the Department of Invertebrate Zoology, U.S. National Museum, catalogue number 9528.