

FRESH-WATER SPONGES IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM.—PART I. SPECIMENS FROM THE PHILIPPINES AND AUSTRALIA.

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The collection of Spongillinae in the United States National Museum consists very largely of specimens named by Mr. Edward Potts, whose Monograph of the Fresh-water Sponges<sup>a</sup> must ever remain a classical work on the group. Since Mr. Potts gave up active work on the sponges, however, a considerable number of specimens have been added, which the authorities of the Smithsonian Institution have been kind enough to send me for examination. As these specimens are accompanied by duplicates of all the named American species in the collection, and as the Indian Museum possesses an almost complete set of the species recorded from Europe, Asia, and Africa, I hope that it may ultimately be possible for me to determine all those that are determinable. In the meanwhile, stress of official work renders it difficult for me to attack the American species, and I propose, therefore, to deal separately with those from the Philippines and Australia.

Genus SPONGILLA.

Subgenus EUSPONGILLA Vejdovsky.

SPONGILLA SCEPTRIOIDES Haswell.

*Spongilla sceptrioides* HASWELL, Proc. Linn. Soc. N. S. Wales, 1882, p. 209.—v. LENDENFELD, Zool. Jahrbücher, II, 1887, p. 89.

Haswell's original description is very brief, and Lendenfeld adds little of importance to it. There is a specimen in the collection under review which is labeled, "Fresh water Sponge with winter eggs Queensland, Australia Apr. 4—". This, I believe, to represent Haswell's species, although I have had some doubts as to the identity. It will be well, therefore, to describe the specimen in some detail.

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<sup>a</sup>Academy of Natural Sciences, Philadelphia, 1887.

It apparently formed an irregular mass some 10.5 cm. long and 2 cm. thick, coating a piece of stick, but has unfortunately been much damaged in transit and now consists for the most part of loose powder and gemmules. The color (dry) is a pale gray. The surface so far as it remains, is smooth, with fairly large oscula (about 3 mm. in diameter), which are not raised on eminences. The external membrane has wholly perished. The substance of the sponge is compact, the primary radiating fibers, but not the secondary transverse ones, being visible in a vertical section to the naked eye as slender white threads. The gemmules, which are practically colorless, are numerous throughout the sponge.

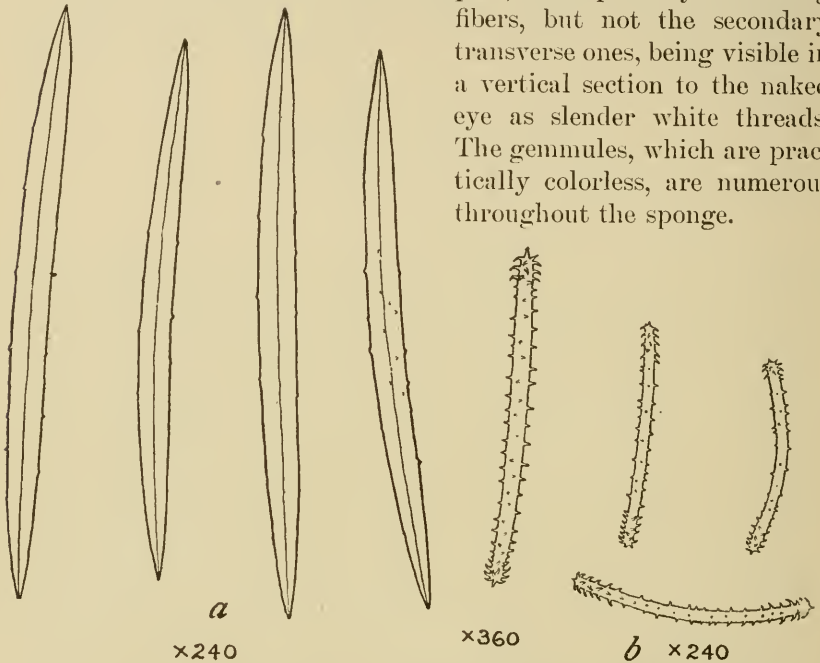


FIG. 1.—SPONGILLA SCEPTRIOIDES. *a*, SKELETON SPICULES; *b*, GEMMULE SPICULES.

The largest skeleton spicules measure 0.35 mm. by 0.021 mm. They are straight or feebly curved and are covered with extremely minute projections in the central part of their length, the ends, which are sharply and cleanly pointed, being smooth. The projections are so minute that it is often difficult to see them. They are conical in outline, somewhat broad at the base in comparison with their length, and are rarely sufficiently numerous to give the spicules a roughened look under a low power of the microscope.

I can find no flesh spicules.

The gemmule spicules measure from 0.126 mm. to 0.147 mm. in length. They are slender in proportion (transverse diameter about 0.0042 mm.) and straight or feebly curved. The spines which cover them with fair uniformity are about half as long as the spicule is thick; those in the middle are straight, those at either end curved and directed backward. As a rule the spicule terminates at either end in a single straight spine.

In general structure the gemmules closely resemble those of *Spongilla lacustris*. They are spherical and measure on an average 0.52 mm. in diameter. There is a thick granular coat, in which the spicules are arranged close together and tangentially, while an outer layer of horizontal spicules can be detected on the surface of some gemmules. The aperture of the gemmule, which is single, is provided with a stout foraminal tubule, which is generally more or less curved and projects through the granular coat.

*Remarks.*—It is clear that this sponge is a close ally of *S. lacustris*, from which it may be distinguished by the absence of free spicules and by the armature of the aperture of the gemmule. From my *Spongilla proliferens* it is distinguished by its more compact and massive structure as well as its lack of free spicules.

*Spongilla sceptrioides* has been recorded from New South Wales and Queensland.

SPONGILLA PHILIPPINENSIS, new species.

The sponge has evidently formed a sheet of considerable size adherent to some solid body but has been broken into small pieces in the

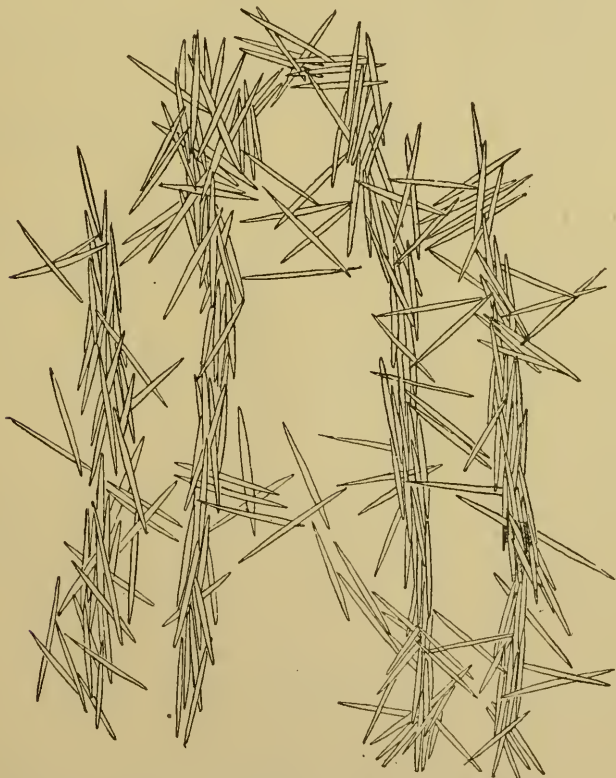


FIG. 2.—SPONGILLA PHILIPPINENSIS, FRAGMENT OF SKELETON,  $\times 70$ .

type-specimens, which are about 1 cm. thick. The surface is smooth, with numerous oscula level with it. There is no trace of branches.

Externally the sponge appears to have been bright green in color, but the basal parts are yellowish. The texture is light and friable, by no means elastic.

In vertical section both radiating and transverse fibers are visible to the naked eye and the sponge has a distinctly reticulate appearance, although the vertical interspaces are much more conspicuous than the horizontal ones. Wide circular canals penetrate the sponge in a course parallel to its base. Comparatively little spongin is present. Under the microscope it is evident that the radiating fibers are much

more coherent and regular than the transverse ones. On the external surface of the sponge a network of horizontal spicules can be distinguished.

There is a delicate basal structureless membrane. The ectodermal membrane has perished.

The skeleton spicules measure 0.174 mm. to 0.278 mm. in length and on an average 0.021 mm. in greatest transverse diameter. They are very sharply pointed at both ends, straight or nearly so, smooth or somewhat sparsely covered with extremely minute projections, the ends being always smooth.

There are no flesh spicules.

The gemmule spicules are very variable in length, measuring from 0.0798 mm. to 0.122 mm. in length and about 0.0031 mm. in transverse diameter. They are cylindrical, straight or nearly so, armed with somewhat irregular spines, which are often slightly retroverted at the two ends. Sometimes there is a single straight spine at either end, but often the spicule ends abruptly and is surrounded by a ring of spines in such a way as to suggest a rudimentary rotule.

There are few gemmules, those that exist occurring singly in the substance of the sponge and being free. They have a blackish color, are spherical, measuring on an average 0.609 mm. in diameter. Each is provided with a single aperture, to which a short, straight, rather stout foraminal tubule is attached. The inner chitinous coat is

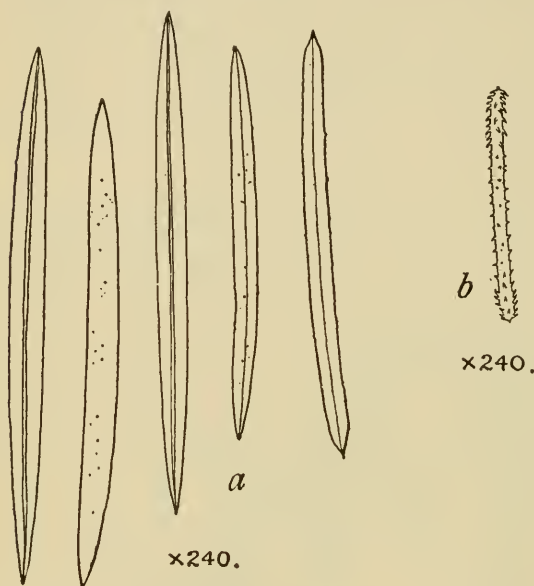


FIG. 3.—SPONGILLA PHILIPPINENSIS. *a*, SKELETON SPICULES; *b*, GEMMULE SPICULE.

rather thin, but the granular coat is well developed and contains many spicules, which are arranged horizontally or nearly so as a rule, but sometimes to a slight extent tangentially.

*Habitat*.—Camp Keithly, Lake Lanao, Mindanao, Philippines. Altitude 2,250 feet. Mary Strong Clemens, collector, January, 1907.

*Type-specimen*.—Cat. No. 7718, U.S.N.M.

*Remarks*.—With the exception of *Ephydatia fortis* from Luzon, this appears to be the first fresh-water sponge recorded from the Philippines. It appears to be quite distinct from the other form discovered with it and here described; but it is just possible that it may be a form of *S. sceptrioides*. Pending the acquisition of further information regarding the latter species, however, I prefer to consider it a new species.

All the specimens I have seen are dry.

Subgenus STRATOSPONGILLA Annandale.

SPONGILLA CLEMENTIS, new species.

In general appearance and color this sponge, judging from dry specimens, closely resembles *S. philippinensis*, but the surface is usually covered with a network of deep, broad furrows which separate small elevated areas of a more or less circular form. The oscula occur on these elevated areas and are large and numerous. Probably in the fresh sponge the furrows are roofed in by the ectodermal membrane.

In vertical section the transverse fibers of the skeleton are seen to be stouter and more regular than those of *S. philippinensis*, being hardly inferior to the radiating fibers in these respects, so that the skeleton forms a much more regular network than is the case in the other sponge.

There is a stout chitinous membrane, which sends bunches of hollow root-like processes downwards at intervals. These do not appear to be in any way connected with the primary skeleton fibers. There are numerous scattered skeleton spicules in the basal membrane.

The skeleton spicules are smooth, as a rule, but occasionally bear a few irregular spines; they are somewhat bluntly pointed at the ends, as a rule regularly but feebly curved. They measure on an average 0.252 mm. in length and 0.021 mm. in greatest transverse diameter.

There are no flesh spicules.

The gemmule spicules are slender, cylindrical, nearly straight. In the middle they bear minute irregular projections, which only take the form of actual spines towards the two ends. Each end terminates in a stout, straight spine, surrounded by a row of smaller spines at right angles to it. None of the spines are retroverted.

There are very few gemmules indeed. They occur singly in the basal membrane and are apparently closely adherent to the support

of the sponge. Each measures about 0.325 mm. in diameter (the shape being spherical) and is provided with a single straight for-  
aminal tubule on the summit. The granular coat is feebly developed, but there is a strong outer chitinous coat in continuity with the basal membrane. The gemmule spicules lie in this coat parallel or almost parallel to the surface of the gemmule but crossing one another at all angles.

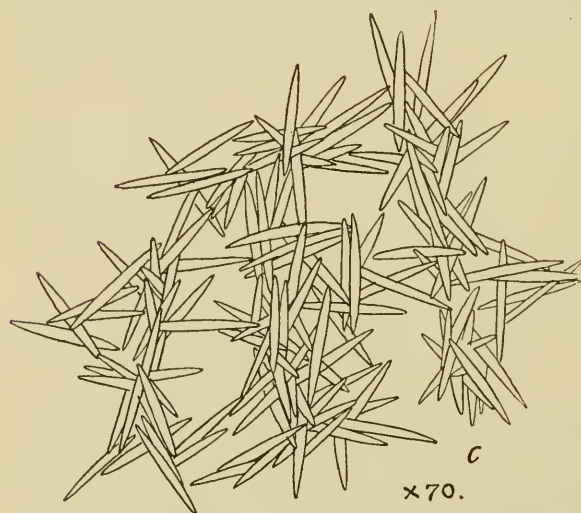


$\times 240$ .

*Habitat*.—Camp Keithly, Lake Lanao, Mindanao, Philippine Islands. Altitude 2,250 feet. Mary Strong Clemens, collector, January, 1907.

*Type-specimen*.—Cat. No. 7719, U.S.N.M.

*Remarks*.—This sponge, which I have much pleasure in naming after its discoverer, is evidently



$\times 70$ .

FIG. 4.—SPONGILLA CLEMENTIS. a, SKELETON SPICULES; b, GEMMULE SPICULE; c, FRAGMENT OF SKELETON.

very distinct from *S. philippinensis* (with which it was apparently found in close association), differing in its shorter and smoother skeleton spicules, more regular skeleton, thicker basal membrane, and adherent gemmules with their ill-developed granular coat. It approaches those forms I have recently grouped together in a new subgenus (*Stratospongilla*<sup>a</sup>), but differs from them in its slender gemmule spicules. On the whole, despite this difference, I think that it should be associated with them.

<sup>a</sup> In an account of the fresh-water sponges collected by Prof. Max Weber in S. Africa published in the *Zoolog. Jahrbücher*, 1909.