

FRESH-WATER SPONGES IN THE COLLECTION OF THE
UNITED STATES NATIONAL MUSEUM. — PART II.
SPECIMENS FROM NORTH AND SOUTH AMERICA.

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With the possible exception of specimens from Peru which are unfortunately indeterminable, the American specimens in the collection do not include examples of any undescribed species. Several of them, however, are noteworthy in affording proof of the identity of certain Indian forms with species long known from North America, on account of their locality, or for other reasons, and others have enabled me to carry out a little piece of work much more interesting than the description of new species.

Before proceeding to comment on the American specimens I would like to supplement a statement made in my description of *Spongilla clementis*^a which, on reading the paper in print, I do not think quite clear. The membrane referred to as sending "branches or hollow root-like processes downward at intervals" is at the base of the sponge, and the root-like processes must have been in intimate contact with the object to which it was attached.

Genus SPONGILLA Wierzejski.

Subgenus EUSPONGILLA Vejdovsky.

SPONGILLA LACUSTRIS of authors.

There are in the collection specimens from Alaska of what appears to be the typical form of this species, but devoid of gemmules. They are labeled "McDonald Lake, Alaska. About 3 feet deep. Very abundant. Color bright green. J. S. Burcham. Sept. 11, 1905. Bureau of Fisheries. Acc. No. 46416."

The Indian form of *S. lacustris*, of which I have now examined specimens from Bombay, Eastern and Lower Bengal, Orissa, and Madras, is distinguished from that of the Holarctic Region by the

^a Proc. U. S. Nat. Mus., vol. 36, p. 631.

extreme tenuity of its skeleton fibers and by the fact that the branches are never cylindrical but always compressed. When well developed they anastomose. For this form, which I think should be regarded as a subspecies, the name *reticulata*^a is available. Young specimens are, however, difficult to distinguish from some European and North American forms of *S. lacustris*. *S. proliferens*, another common Indian species closely allied to *S. lacustris*, is easily distinguished by the tubular character of the aperture of the gemmules.

In the collection sent me for examination from the U. S. National Museum there is a bottle of specimens labeled "Lake Titicaca, Peru. R. E. Coker (506). VII.31.08. From Peruvian Government. Acc. No. 49549." Unfortunately, the sponges in the bottle are devoid of gemmules, and as there is nothing distinctive about their slender, smooth, amphioxious skeleton spicules, it is impossible to identify the species. There are no free microscleres. Probably this sponge belongs to the subgenus *Euspongilla*.

Subgenus SPONGILLA Wierzejski.

SPONGILLA FRAGILIS Leidy.

Spongilla fragilis LEIDY, Proc. Acad. Nat. Sci., Philadelphia, 1851, p. 278.—POTTS, Proc. Acad. Nat. Sci., Philadelphia ("Monograph"), 1887, p. 197, pl. 5, fig. 2; pl. 8, figs. 1-4.

Spongilla decipiens WEBER, Zool. Ergebn. Nederland. Ost. Ind., vol. 1, p. 40, pl. 4.

There are specimens in the collection from the mouth of Echo River, Mammoth Cave, Kentucky (W. P. Hay), as well as from other North American localities. I have recently recorded this species from Japan;^b it also occurs in Calcutta, whence the large series of specimens now in the Indian Museum seems to afford a complete transition between *S. fragilis* and Weber's *S. decipiens*, which must therefore be regarded as a synonym. My *S. crassissima*, of which *S. crassior* is no more than a variety, is distinguished from *S. fragilis* mainly by its extremely hard and compact skeleton. It is sometimes found in the same pond as Leidy's species.

Genus EPHYDATIA Lamouroux.

EPHYDATIA CRATERIFORMIS (Potts).

Meyenia crateriformis POTTS, Monogr., p. 228, pl. 9, fig. 6; pl. 10, fig. 5.

Ephydatia indica ANNANDALE, Journ. Asiat. Soc. Bengal, 1907, p. 20; Rec. Ind. Mus., vol. 1, p. 272.

This species, which is well represented in the U. S. National Museum collection, is interesting for two reasons: (a) its peculiar distribution, and (b) the fact that its varieties and phases afford an almost complete bridge between the genera *Spongilla* and *Ephydatia*.

^a Annandale, Rec. Ind. Mus., vol. 1, p. 387, pl. 14, fig. 1.

^b Annot. Zool. Jap., vol. 2, p. 106, pl. 2, fig. 1.

As regards its distribution, it has long been known from the United States and was recorded doubtfully by Hanitsch ^a from Ireland some years ago. There is no doubt left in my mind, however, after examining American specimens, that my *E. indica* is identical with *E. crateriformis*. In India it appears to be an extremely variable species and its skeleton spicules are sometimes quite blunt at the tips.

As regards the different forms assumed by the gemmule spicules, the variation appears to be to some extent a seasonal one, but examples from different localities and even individual sponges taken in the same pond at the same time often differ very much from one another. The extreme limit of variation in the direction of *Spongilla* is well illustrated by the accompanying cut (fig. 1), which is the reproduction of a camera lucida sketch of some spicules of a specimen taken in Calcutta in June, 1907. This figure may be contrasted with that published by Potts on plate 10 of his monograph, but every gradation is to be found between the two forms of gemmule spicules. My figure in the Journal of the Asiatic Society of Bengal was badly reproduced and is not satisfactory. I have obtained *E. crateriformis* from the following Indian localities: Calcutta; Moulmein (Lower Burma); Madras, and Igatpuri, Western Ghats, Bombay Presidency.

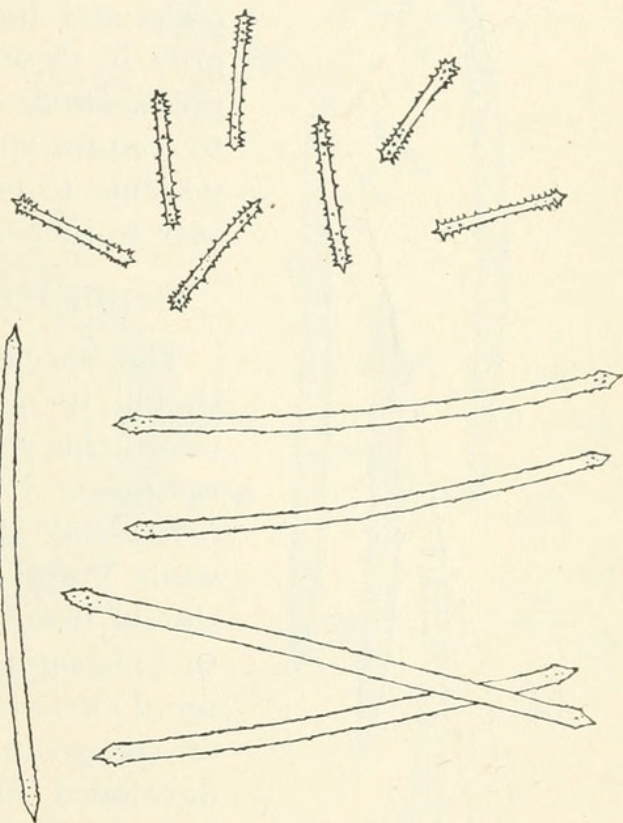


FIG. 1.—SKELETON AND GEMMULE SPICULES OF SPONGILLA-LIKE FORM OF EPHYDATIA CRATERIFORMIS, $\times 240$.

Genus TUBELLA Carter.

TUBELLA PENNSYLVANICA Potts.

Tubella pennsylvanica POTTS, Monogr., p. 251, pl. 6, fig. 2; pl. 12, figs. 1, 2, 3.—ANNANDALE, Rec. Ind. Mus., vol. 3, p. 102.

As I have said in the paper previously cited, this species occurs in Travancore near the west coast of southern India. It appears, wherever it occurs, to be averse to light and to be found as a rule under stones or roots. It has probably escaped observation for this reason in many places in which it occurs. (See fig. 2.)

^a Nature, vol. 51, p. 511.

Genus TROCHOSPONGILLA Vejdovsky.

TROCHOSPONGILLA LEIDYI (Bowerbank).

Spongilla leidy BOWERBANK, Proc. Zool. Soc. London, 1863, p. 445.

Meyenia leidy POTTS, Monogr., p. 212, pl. 5, fig. 3; pl. 10, fig. 1.

In a recent note^a I referred my *Trochospongilla phillottiana* to the synonymy of this species, being of the opinion that I had found intermediate forms. I have now no doubt, however, that in this belief I was wrong, and that both the Indian species of *Trochospongilla* (*T. latouchiana* and *T. phillottiana*) are in reality distinct both from *T. leidy* and from one another. They often grow in close association, and microscopic preparations of the one are therefore liable to contain spicules of the other. Were it possible to unite them, it would be necessary to include *T. leidy* also.

Genus HETEROMEYENIA Potts.

The species of the "genus" *Carterius* should, in my opinion, be distributed between this genus and *Ephydatia*. To *Heteromeyenia* I would assign Mills' *Carterius tubisperma* and *C. stepanowii* (Dybowski), while Potts' *C. latitenta* and *C. tenosperma* should, if my views are correct, be relegated to *Ephydatia*. The one distinctive character of *Carterius* is the fact that the aperture of the gemmule is provided with highly developed filaments or processes, which, however, differ greatly in the different species. This is undoubtedly a specific character of importance, but it would be more convenient to base the generic diagnoses of the Spongillinæ (the genera of which, it must be admitted in view of the connecting links that occur, are largely artificial) on the nature of the gemmule spicules—a

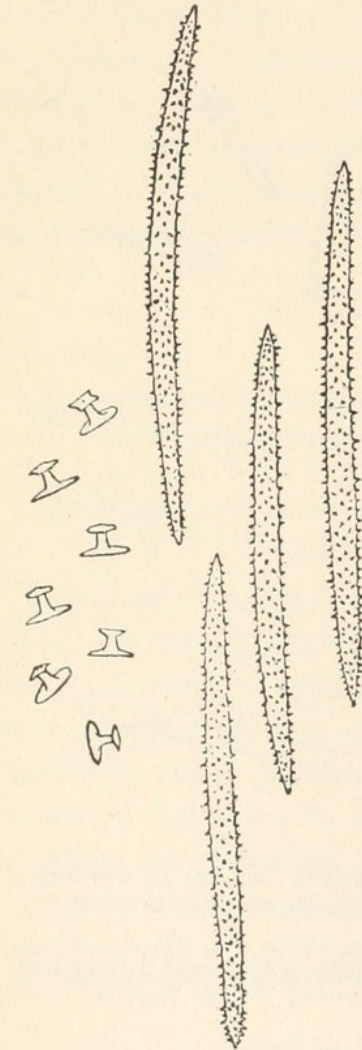


FIG. 2.—SKELETON AND GEMMULE SPICULES OF *TUBELLA PENNSYLVANICA* FROM S. INDIA, $\times 240$.

course to which the only objection that can be urged is that in some forms the gemmules are unknown. There can be little doubt, however, that in many such cases gemmules will be found when specimens in the fully mature condition are examined; while the right of certain other forms (as for instance, those genera characteristic of Lake Baikal) to occupy a position in the subfamily is more than doubtful.

^a Records of the Indian Museum, vol. 3, p. 103.

HETEROMEYENIA PLUMOSA Weltner (Potts MS.).

Heteromeyenia plumosa WELTNER, Archiv für Naturgesch., 1895, part 1, p. 127.

Specimens from the U. S. National Museum are labeled "These are fragments of a single specimen 3 inches in diameter." Weltner, who examined similar specimens, gives a short comparative description, noting those characters in which the form differs from *H. radiospiculata* Mills. As Mr. Potts apparently no longer intends to describe *H. plumosa* it may be as well to give a fuller description.

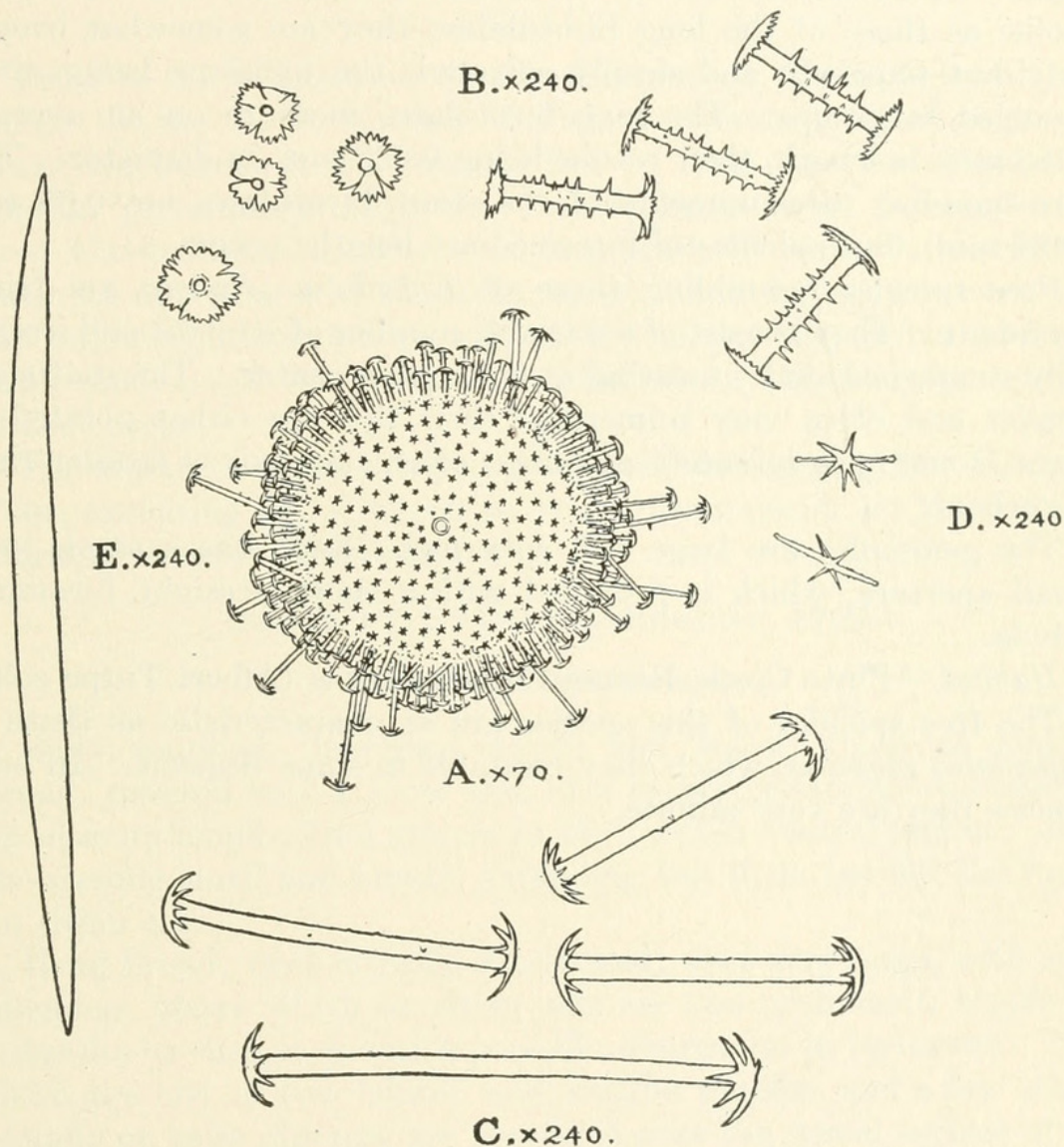


FIG. 3.—GEMMULE AND SPICULES OF *HETEROMEYENIA PLUMOSA*. A. GEMMULE, $\times 70$, SHOWING APERTURE IN CENTER. B. SHORT BIROTULATES, $\times 240$. C. LONG BIROTULATES, $\times 240$. D. FREE MICROSCLERES, $\times 240$. E. SKELETON SPICULE, $\times 240$.

The sponge appears to have been rather massive, although very brittle and friable. The radiating fibers, which have an oblique course, and some of the transverse ones, are easily visible to the naked eye. The color (dry) is a sooty black in the external parts, but becomes paler toward the base.

A vertical section examined under the microscope shows that the radiating fibers, although not very slender, are loosely compacted. Apparently little if any spongin is present.

The skeleton spicules are slender, smooth, sharply pointed at either end, and nearly straight. They measure on an average 0.384 mm. in length and 0.016 mm. in greatest transverse diameter.

The long gemmule spicules (birotulates) are much longer than the short ones and have slender, straight, almost smooth shafts with only an occasional spine. Their rotulæ consist of a circle of curved hooks joined together at their base. The short birotulates have stouter shafts, which are profusely, irregularly, and somewhat strongly spined. Their rotulæ are not so markedly convex when viewed in profile as those of the long birotulates; they are somewhat irregularly but narrowly and deeply serrated, the incisions being often arranged in groups. The long birotulates measure on an average 0.188 mm. in length, their rotulæ being 0.028 mm. in diameter. The corresponding measurements of the short birotulates are 0.06 and 0.028 mm.; but spicules of intermediate lengths occur.

Free spicules resembling those of *Ephydatia plumosa* are fairly abundant. They consist of a variable number of straight and irregularly roughened shafts meeting at a common center. The shafts are slender and often very numerous; their tips are either pointed or blunt, sometimes minutely globular; often one axis is stouter than the others.

The gemmules are large and spherical. Each has a single very small aperture, which is provided with a short, straight, foraminal tubule.

Habitat.—Pinto Creek, Kinney County, Texas (Albert Turpe coll.).

The free spicules of this species are as characteristic as those of *Ephydatia plumosa*, which they resemble in some respects. In both species they are very minute.



Annandale, Nelson. 1909. "Fresh-water sponges in the collection of the United States National Museum..Part II. Specimens from North and South America." *Proceedings of the United States National Museum* 37, 401–406.

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