II. NOTES ON FRESHWATER SPONGES.

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X.—REPORT ON A SMALL COLLECTION FROM TRAVANCORE.

Genus SPONGILLA.

Subgenus Euspongilla.

Spongilla travancorica, sp. nov.

Sponge small, encrusting, without branches, hard but brittle; its structure somewhat loose; colour dirty white. Dermal membrane in close contact with the skeleton; pores and oscula inconspicuous. Surface minutely hispid, smooth and rounded as a whole.

Skeleton consisting of moderately stout and coherent radiating fibres and well-defined transverse ones; a number of horizontal spicules present at the base and surface but not arranged in any definite order No basal membrane.

Spicules.—Skeleton spicules smooth, pointed at either end, moderately stout, straight or curved, sometimes angularly bent; curvature usually slight. Free microscleres abundant in the dermal membrane, slender, nearly straight, gradually and sharply pointed, profusely ornamented with short straight spines, which are much more numerous and longer in the centre than near the ends. Gemmule spicules stouter and rather longer, cylindrical, terminating at each end in a sharp spine, ornamented with shorter spines, which are more numerous and longer at the ends than in the centre; at the ends they are sometimes directed backwards, without, however, being curved.

Gemmules firmly adherent to the support of the sponge, at the base of which they form a layer one gemmule thick; each provided with at least one foraminal tubule, which is straight and conical; two tubules, one at the top and one at one side, usually present. Granular layer well developed. Spicules arranged irregularly in this layer, as a rule being more nearly vertical than horizontal but pointing in all directions, not confined externally by a membrane; no external layer of horizontal spicules.

Length of skeleton spicule	0·289—0·374 mm.
Greatest diameter of skeleton spicule	0·012—0·016 ,,
Length of free microscleres	0·08 —0·096 ,,
Greatest diameter of free microscleres	0·002 mm.
Length of gemmule spicule	0·1 —0·116 ,,
Diameter of ,, ,, ...	0·008 mm.
,, ,, gemmule	0·272—0·374 ,,

Habitat.—Backwater[1] near Shasthancottah, Travancore, in slightly brackish water; on the roots of shrubs growing at the edge; November, 1908.

This species is easily distinguished from its allies of the subgenus *Euspongilla*, all of which are closely related, by its adherent gemmules with their (usually) multiple apertures and rough external surface.

Genus TUBELLA.

Tubella pennsylvanica, Potts.

Potts, *Proc. Acad. Nat. Sci. Philadelphia*, 1887, p. 251, plate xii.

By the kindness of the authorities of the Smithsonian Institution I have been able to obtain pieces of the freshwater sponges in the collection of the United States National Museum. As the majority of these were named by Potts, the acquisition is an extremely valuable one. It enables me to identify with certainty several Indian species with American forms, amongst others the one of which the name is printed above, *viz.*, *Tubella pennsylvanica*. This species, found by Potts in Pennsylvania, New Jersey and other parts of the Eastern United States, was afterwards reported from the west of Ireland by Hanitsch (*Irish Naturalist*, iv, p. 129, 1895) and from the Inner Hebrides of Scotland by myself (*Journ. Linn. Soc.*, xxx, p. 248, 1908). None of the European specimens as yet discovered, however, have contained gemmules, and their identification has therefore remained a little doubtful. Specimens recently collected in Travancore are full of gemmules and agree more closely in every respect with one of the American specimens examined than this specimen does with a second one from the United States. They have the somewhat slender pointed skeleton spicules and markedly unequal rotules of the gemmule spicules of the typical form of the species. Indeed, the American specimen which they resemble so closely is apparently part of the same specimen as that of which the spicules are figured by Potts in fig. 1 of plate xii of his monograph.

The measurements of the spicules of an Indian specimen and of one from Lehigh Gap, Pennsylvania, are given for comparison:—

	Travancore.	Pennsylvania.
Length of skeleton spicule	0·189 — 0·242 mm. (average 0·203 mm.)	0·16 — 0·21 mm. (average 0·195 mm.)
Breadth ,, ,, ,,	0·0084 — 0·0155 mm.	0·0084 mm.
Length of birotulate	0·0126 mm.	0·0099 ,,
Diameter of upper rotule	0·0084 ,,	0·0084 ,,
,, lower ,,	0·0189 ,,	0·0168 ,,
,, gemmule	0·243 — 0·348 mm.	0·174—0·435 mm.

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[1] The backwaters of Cochin and Travancore are a series of lagoons directly connected at intervals with the sea, from which they are separated by a more or less narrow extent of land. They have been artificially joined together by canals and receive a good deal of fresh water. Their salinity varies with the place and the season.

The spicules of the Travancore specimen are, therefore, a trifle larger than those of the American one, but the proportions are closely similar.

The other Indian species I have been enabled by the gift of the Smithsonian Institution to identify with American ones are my *Ephydatia indica,* which becomes a synonym of *E. crateriformis* (Potts), and *Trochospongilla phillottiana,* which is identical with *T. leidyi* (Carter).

It is interesting to note that none of these American species is confined in India to the immediate neighbourhood of the sea. *E. crateriformis* has been found not only in Calcutta but also at Igatpuri in the Western Ghats and at a place some miles inland from Moulmein in Lower Burma. *T. leidyi* occurs both in Calcutta and in the interior of Tenasserim ; while my specimens of *Tubella pennsylvanica* were taken (in November, 1908) in Shasthancottah lake, which is situated about three miles inland from the village of the same name on the backwater and about twelve miles N.-N.-E. from Quilon on the coast of Travancore.

The South Indian specimens were taken on the roots of floating water plants so matted together as to form large floating islands on which shrubs and even trees were growing. The sponges were only found on roots dragged out from under the islands and seemed to shun the light.

Genus PECTISPONGILLA, gen. nov.

Structure of the sponge resembling that of *Ephydatia.* Gemmule spicules bearing at either end, *on one side only*, a double row of spines, so that they resemble, when viewed in profile, a couple of combs joined together by a smooth bar.

This new genus is distinguished, as are most of those previously described in the Spongillinæ, by the form of its gemmule spicules. These differ from the spicules of any form hitherto described in having the armature of the extremities bilateral instead of radial. Probably this arrangement is derived from that of a spicule such as the birotulate of *Ephydatia* by a rotation of the axis of the rotules.

Pectispongilla aurea, sp. nov.

Sponge forming small, soft, cushion-like masses of a deep golden colour (dull yellow in spirit) on a solid support ; the surface smooth, minutely hispid. One relatively large, depressed osculum usually present in each sponge ; pores inconspicuous ; dermal membrane in close contact with the parenchyma.

Skeleton consisting of slender and feebly coherent radiating fibres as a rule two or three spicules thick, with single spicules or ill-defined transverse fibres running horizontally. Towards the external surface transverse spicules are numerous, but they do not form any very regular structure.

Spicules.—Skeleton spicules smooth, sharply pointed, straight or nearly so. Gemmule spicules minute, with the stem smooth and cylindrical, relatively stout, and much longer than the comb at either end; the two combs equal, with a number of minute, irregularly scattered spines between the two rows of stouter ones. No free microscleres.

Gemmules minute, spherical, with a single aperture, which is provided with a very short foraminal tubule; the granular coat well developed; the spicules arranged in a slanting position, but more nearly vertically than horizontally, with the combs pointing in all directions; no external chitinous membrane.

Length of skeleton spicule	0·2859 mm.
Greatest diameter of skeleton spicule ..	0·014 ,,
Length of gemmule spicule	0·032—0·036 mm.
Length of comb of gemmule spicule ..	0·016 mm.
Greatest diameter of shaft of gemmule spicule.	0·004 ,,
Diameter of gemmule	0·204—0·221 mm.

Habitat.—Artificial pool on the road near Tenmalai on the western side of the Western Ghats, Travancore; on the roots of trees growing at the edge; November, 1908.

I have not been able to detect vesicular cells in the parenchyma of this species, although my specimens are in good condition. *Pectispongilla aurea* is by far the most brilliantly coloured freshwater sponge I have seen.

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EXPLANATION OF PLATE XII.

Fig. 1. Fragment of the skeleton of *Spongilla travancorica*, × 70.
,, 1*a*. Skeleton spicules of the same species, × 240.
,, 1*b*. Free microscleres of the same species, × 240.
,, 1*c*. Gemmule spicules of the same species, × 240.
,, 1*d*. Outline of the gemmule of the same species as seen from the side, × 70.
,, 2. Fragment of the skeleton of *Pectispongilla aurea*, × 70: *g.* = gemmule.
,, 2*a*. Skeleton spicules of the same species, × 240.
,, 2*b*. Gemmule spicules of the same species, × 240.
,, 2*c*. The same more highly magnified (× 720).
,, 2*d*. Gemmule of *Pectispongilla aurea* viewed from the side, × 240.

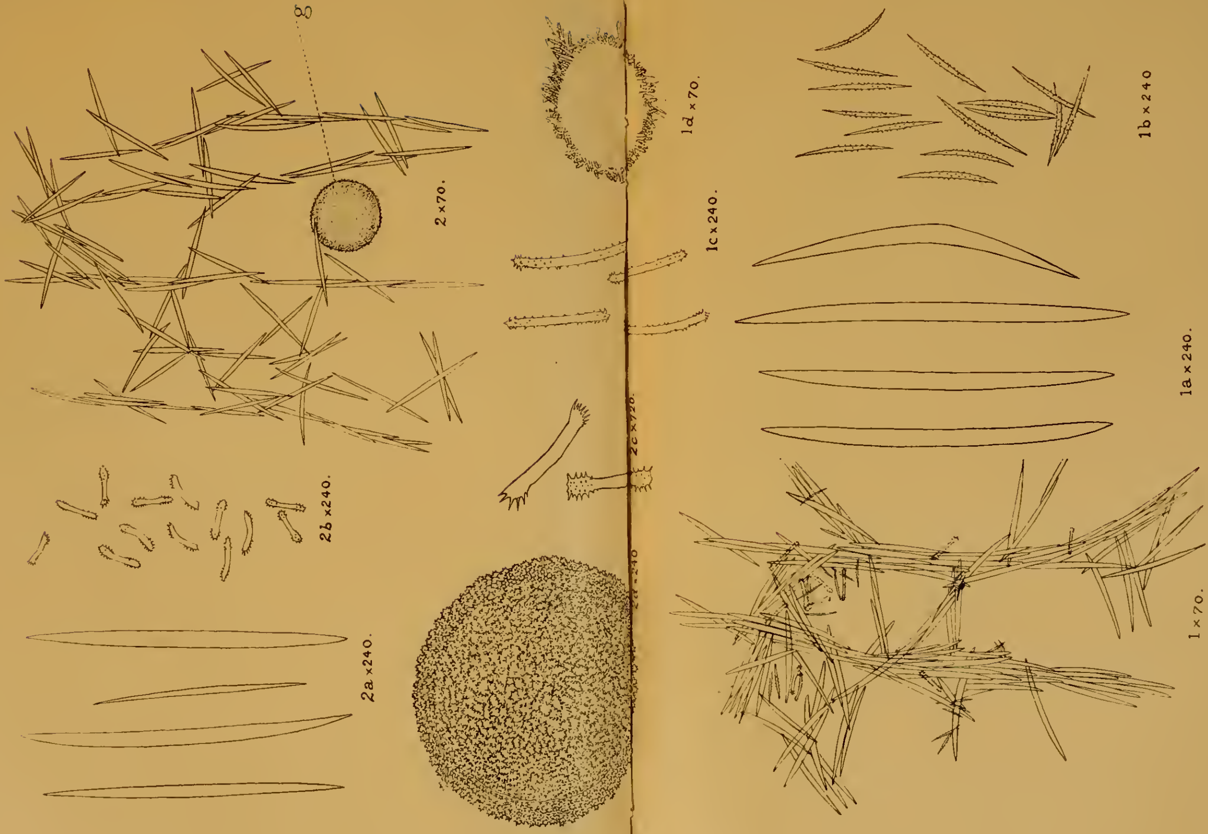

Fig. 1. Spongilla travancorica sp. nov.

Fig. 2. Pectispongilla aurea, gen. et sp. nov.