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STUDIES ON FRESH-WATER SPONGES FROM AUSTRALIA. No. I.

By

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(Plate lvii, and Figures 1-4.)

A NEW LOCALITY IN AUSTRALIA FOR EPHYDATIA MULTIDENTATA (WELTNER).

(Plate lvii.)

IN the writer's article on the fresh-water sponges from Australia and New Zealand¹ *Ephydatia multidentata* was recorded (pp. 25, 53) from Burnett River, Queensland, and from Cooper's Creek in south Central Australia.

In October, 1931, the Director of the Australian Museum submitted a small fragment of fresh-water sponge which had been donated to the Museum for determination. With the sponge was a good photograph and also the following notes: "The fragment of sponge is from a growth of considerable size donated by Mr. L. A. Ducker (regd. Z 2646); the specimen was found on the submerged root of a tree in a creek at Merigol, Wanko Siding, near Charleville, Western Line, Queensland, and was received at the Museum alive on the 23rd September, 1931."

The excellent photograph, which is published with this note, gives a splendid idea of the size, the habit of growth, the irregularities of the surface and of the numerous pores upon the surface of the sponge. Our small dry specimen is a light yellowish-brown, and the gemmules, which are very numerous and are crowded throughout all parts of the specimen, are somewhat lighter in colour than the sponge itself.

In order that the records may be kept up to date, it is desired that the reports of specimens of these sponges found be reported. It is hoped that scientists and collectors in all parts of the country will keep a keen lookout for these sponges when collecting in fresh-waters.

A NEW FRESH-WATER SPONGE FROM AUSTRALIA.

(Figures 1-4).²

The RECORDS OF THE AUSTRALIAN MUSEUM, Vol. xviii, No. 2, pp. 25-62, January 15, 1931, contain a paper by the present writer on the subject of the fresh-water

¹ Gee.—Rec. Austr. Museum, xviii, 2, 1931, pp. 25-62.

² The drawings have been prepared by the artist of the Department of Biology of Yenching University, Peiping, China, under the direction and with the assistance of Dr. C. F. Wu. I am much indebted to them for the excellent results which have been obtained.

sponges known from Australia up to that date. Since that time the Museum has kindly sent small bits of the sponges as they were collected, and the following notes describe a new species which has just been received.

Spongilla multispinifera, sp. nov.

(Figures 1-2.)

Historical Statement.—Numerous small specimens of this sponge were collected during the month of February, 1932, by Mr. M. E. Gray from Heathcote Creek, near Waterfall, about twenty miles south of Sydney, N. S. Wales.

Habitat.—The sponges were taken from the undersides of small sandstone rocks in running water. They were all collected within a radius of from six to eight feet.

General Characteristics.—All of the specimens sent me were growing in very small, thin, more or less irregular circular patches of only a few millimetres in diameter. They are smooth on the surface and the oscula are inconspicuous. The area where the sponges were found was periodically searched over a period of two months, and during that time no specimens of great size were observed.

Colour.—When fresh, the sponges were of a "dirty cream" colour, or in some cases they were originally "lettuce green", this colour being without doubt due to the presence of green algæ growing symbiotically within the sponge.

Structure.—The sponge colonies are so small that they present no characteristic, clearly defined arrangement of the spicule rays. The sponge body seems to be made up of a rather thickly woven lot of spicules massed together and held tightly and firmly in position by a good supply of spongin.

Skeleton Spicules.—The skeleton spicules are curved, are larger in the centre and gradually tapering toward their ends; now and again thicker spicules, which are more nearly straight, are found, and these are generally almost uniform in diameter up to near the ends, where they become abruptly sharp pointed. The spicules are all thickly covered with conspicuous spines right up to their tips in most cases; a few spicules have their sharpened tips free of spines for only a very short space; in a few cases we have found the spines to become lengthened at a short distance

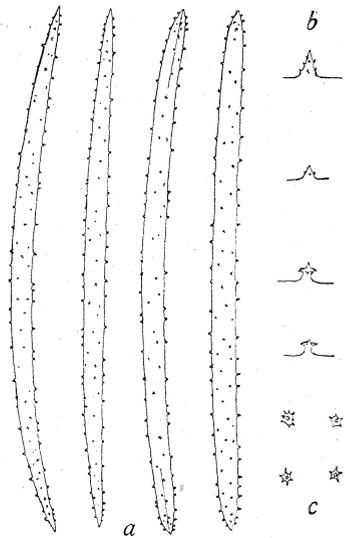


Figure 1.

Spongilla multispinifera,
sp. nov.

a.—Two general types of skeleton spicules, one with gradually sharpened ends, the other with abruptly sharpened ones. The spicules of both types are covered all over with spines, even to their very tips.

b.—Enlarged drawings of several of the different kinds of spines found on the skeleton spicules. Some are cone shaped with fine spines upon them and others have a row of fine spines forming a circle near their tips.

c.—These drawings show the spines of this second kind as they appear when looked down upon from above.

from the end of the spicule, though usually they become somewhat smaller in size. The spines (Fig 1, *b*) are very variable: some are simple cone-shaped ones with very sharp points; others seem to bear a few minute spines near the outer end of the spine and from that point the size of the spine becomes much reduced, and it ends in a small spine much thinner than the other portion of the spine; some of the others seem to end more or less as knobs or with flattened tips. The spicules vary in length from about 229 to 280 microns, and from 9 to 16 microns in thickness.

Flesh Spicules.—There are no flesh spicules present in this sponge.

Gemmules.—Unfortunately there were very few gemmules present in the specimens sent me. Those found were a rather dark brown in colour when mature, and in every case they were located at the base of the sponge. They occur singly, and are thickly covered with a granular coat in which are embedded large numbers of coarse gemmule spicules mingled with quite a number of skeleton spicules all tightly bound together. This mingling of the spicules holds the gemmules strongly in place, and it was not easy to tease them out of the sponge without crushing them. The arrangement of the spicules around the gemmule is irregular; in the main they are tangentially placed, though in the outer portion of the coat they are found at all kinds of angles, some of them even being perpendicular to the surface of the gemmule. The pore-tube is simple and opens upon the surface of the coat. The gemmules also vary a good deal in diameter due to the great variation in the thickness of the spicule layer covering them. The smallest gemmule, including its covering, measured about 340 microns, while the larger ones were as much as 510 microns or even more.

Gemmule Spicules (Fig. 2).—The gemmule spicules are usually gently curved, sometimes straight, rod-like structures in general shape; they are of almost uniform diameter, though in

many cases the concentrating of the heavy spines around the ends of the spicules may cause them to become enlarged into club-like structures with both ends enlarged alike. Sometimes the spicule may terminate in a sharp point or spine or in a knob-like structure, or it may end in one of the spines similar to those which occur on other parts of the spicule. These spines are straight and, as a rule, are perpendicular to the length of the spicule; they are much more abundant near the ends, while frequently the central portion of the spicule may have only very few and much smaller

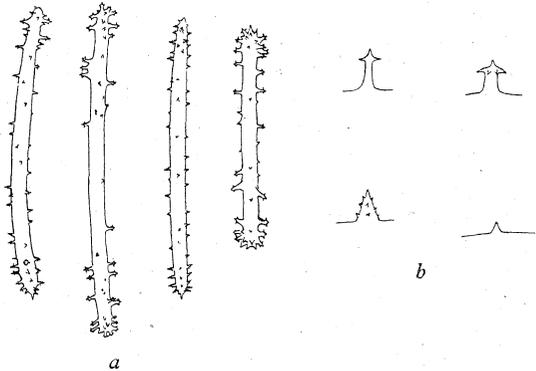


Figure 2.

Spongilla multispinifera.

a.—Four different gemmule spicules, showing differences in shape and length. Often club-shaped spicules are formed by the massing of the larger spines around the ends of the spicules.

b.—Various types of spines on the gemmule spicules. These spines are similar in every way to those of the skeleton spicules, but they average a good deal larger.

spines than those near the ends; this is not always true, however, for sometimes the spines are scattered more abundantly over this part of the spicule also. The spines (Fig. 2, *b*) are large and thick, some of them simple, straight, smooth and cone-shaped, sharpened at their upper ends, often these have minute spines on them. Most of them, however, are of a rather peculiar type; near their ends they become very much decreased in size and terminate in a very much attenuated spine, out of all proportion to the size of the rest of the spine; just where the sudden decrease in size takes place in the heavy spine are a few very minute spines causing that part of the larger spine to appear to be swollen out a bit—these small spines are at right angles to the larger spine. This is the typical form of the spines on the gemmule spicules, though other variations of several kinds occur in addition to these. I could find none of the spines divided at their ends such as are characteristic of *Spongilla proliferens*.

The gemmule spicules range in length from 86 to 122 microns, and they have a diameter of from 4 to 6 microns in the centre.

Type.—This species is described from small specimens sent to me by the Trustees of the Australian Museum. The type is No. 55043 in the collection of the writer; a slide from, and portion of, the type is being deposited with the Australian Museum, which also holds the other specimens collected at the same time. The writer is very much indebted to the authorities of the Australian Museum and to Mr. Gray for the opportunity to study this sponge.

Distribution.—The sponge is as yet known only from the type locality, Heathcote Creek, near Waterfall, near Sydney, N. S. Wales, where it was collected by Mr. M. E. Gray.

Remarks.—Of the fourteen named fresh-water sponges recorded from Australia and New Zealand in the article referred to in the first paragraph of this paper, only five are *Spongillas*, the others being the peculiar type of *Ephydatias*, up to the present known only from Australia, with the rotules uniformly unequal.

Two of the five species of *Spongillas* are the cosmopolitan species, *Spongilla lacustris* and *Spongilla fragilis*; neither of these two species was represented in the materials from Australia which the writer has studied, but were included in our list because of the records of other previous students of Australia's fresh-water sponges. Both of these forms have smooth skeleton spicules.

A third form, called a variety of *Spongilla lacustris*, that is var. *spherica*, is a very doubtful one and was included in our list simply to make the record as complete as possible. The writer still considers the identification of a sponge from its skeleton spicules alone without either flesh spicules or gemmules as a *new* form as a very doubtful procedure and does not accept Lendenfeld's variety, *spherica*, as final. The skeleton spicules of this sponge in most cases bore small spines. On page 62 of the paper referred to above, three additional lots of skeletal spicules are figured, but no identifications are attempted since the necessary additional data for such determinations are not available.

This leaves, then, two characteristic Australian *Spongillas*, *S. sceptroides* and *S. botryoides*, for comparison with this new sponge described above. Both of these also have spined skeleton spicules, but in neither case are there so many spines, nor do those present the peculiar characteristics of this new sponge just

described. Then, too, the spines on the spicules of the other two already recorded species are lacking on the ends, whereas in this new one they usually extend right on to very near the points.

The most marked differences, however, occur in the gemmule spicules. Those of *S. botryoides* have the simple spines grouped near their ends, while the middle portion of the spicule is free as is shown in the illustration (Figure 3). The spicules of *S. sceptroides* also have simple, thin, cone-shaped spines with very

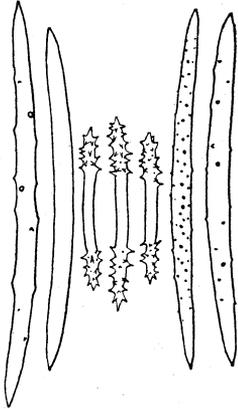


Figure 3.
Spongilla botryoides,
Haswell.

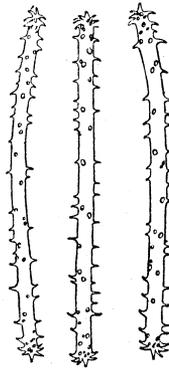


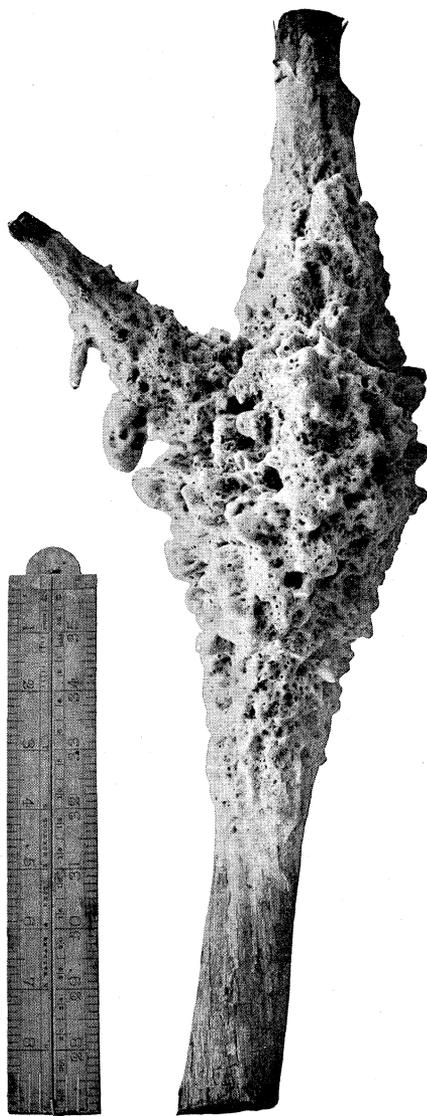
Figure 4.
Spongilla sceptroides,
Haswell.

sharp points which are distributed over the entire length of the spicule; the spicules usually terminate in prominent spines, and the spines around the ends of the spicules are recurved, while those of the middle portion are somewhat smaller and are placed at right angles to the axis of the spicule (Figure 4).

This new sponge, *S. multispinifera*, has been carefully compared with all available other *Spongillas* with spined gemmule spicules of this general type, and it is found to be quite unique. It is therefore placed as a new species.

EXPLANATION OF PLATE LVII.

Ephydatia multidentata (Weltner). Specimen attached to submerged root of a tree, Merigol, Wanko Siding, near Charleville, Queensland.



G. C. CLUTTON, photo.