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rostrum and the inner canthus of the eye, and the third joint is slender, cylindrical, and longer than the second. The merus of the exterior maxillipedes is considerably dilated at the antero-external angle. A few hairs upon the carapace and legs. Colour brownish.

Hab. —? (South Australia, Port Lincoln: *coll. Brit. Mus.*)

The description, slightly amplified, is adapted from Milne-Edwards's work; the figure from sketches, very kindly sent by Prof. A. Milne-Edwards, of the type specimen in the Paris collection. The eye-peduncles should probably be represented as more distinctly constricted near to the distal extremity, and the second antennal joint as more dilated, as in Milne-Edwards's description and the type of *M. parvirostris* in the British Museum. This latter further differs from the figure now given only in having the penultimate as well as the antepenultimate joints of the legs sometimes armed with a few tubercles.

EXPLANATION OF PLATE I.

Fig. 1. Paramicippa tuberculosa, M.-Edw. Adult female, magnified (from a sketch of the type specimen in the collection of the Muséum d'Histoire Naturelle, Paris).

Fig. 1 a. Dorsal view of the front of the cervical region.

Fig. 1 b. Inferior view of part of the cervical region, showing the form of the basal antennal joint and exterior maxillipedes.

Fig. 1 c. Chelipede.

II.—*Observations on some Freshwater Sponges.*

By Professor FRANZ VEJDOSKY *.

DR. W. DYBOWSKI not long since sent me some specimens, well preserved in alcohol, of the freshwater sponge designated by him *Spongilla sibirica*, with the request that I would submit them to an examination, and prepare the figures thus obtained for his memoir relating to the above-mentioned species †. I undertook this investigation the more willingly because, since the appearance of Dr. Dybowski's work upon the freshwater sponges of the Russian empire, I was very

* Translated by W. S. Dallas, F.L.S., from a separate copy, furnished by the author, of the paper in the 'Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften,' 1884, pp. 55-60, pl. ii.

† As Dr. Dybowski's parcel was rather late in reaching me and he had in the meantime sent his memoir to press, I publish these observations as a supplement.

anxious to convince myself as to the rank of the species in question, as also with regard to its relationships with the freshwater sponges occurring in Europe. As is well known I have compared *Spongilla sibirica* with *S. (Euspongilla) jordanensis*, while Carter has recently regarded it as identical with *Spongilla fragilis*, Leidy (*S. Lordii*, Bow.). From my examinations and comparisons of the American species with *Spongilla sibirica*, the latter proves to be really identical with *S. fragilis*, Leidy; nevertheless, in the form observed by Dybowski, some not unessential differences occur, to which I propose to refer in the following remarks, and at the same time to append some observations upon other freshwater sponges.

The specimens at my disposal are stated to be from the river Danici, in the neighbourhood of Charkow, and usually form small nodules 2-3 centim. in diameter; whilst a small irregularly triangular fragment represents a nearly flat cushion-like plate, furnished with a large regularly circular osculum and numerous smaller pores. At the surface of the nodules and of the lamella I find no gemmules; but, on the other hand, the latter occur in the interior of the nodules in great numbers and of two different forms and colours, namely:—

1. Pale whitish-yellow gemmules, which do not cohere, but appear to be irregularly scattered in the tissue of the sponge. The general form and structure of these gemmules are the same as I have indicated in the case of the young gemmules of *Euspongilla lacustris* (see my memoir on the freshwater sponges of Bohemia, p. 17, pl. ii. fig. 13). In point of fact such an immature gemmule of *Spongilla fragilis*, Leidy (*S. sibirica*, Dyb.), agrees with that of *Euspongilla lacustris*, inasmuch as it is quite naked, possesses a single horny membrane, and at the superior pole is destitute of the air-tube which is so characteristic of this species. Somewhat older gemmules indeed are still naked, but, at the pole indicated, they bear around the process which is generally regarded as an aperture a short, straight, somewhat inflated tube, which later on curves like a horn and becomes completely closed at the extremity.

2. Among the pale-coloured gemmules we find now and then, although rather rarely, an isolated brownish gemmule. On the other hand, such gemmules, generally of a dark brown colour, are present in great numbers united in groups of three or more, usually of eight, thirteen, or fifteen, but sometimes of from twenty to thirty, completely enclosed by the surrounding skeletal tissue of the sponge. In examining such

a group of gemmules, even under a low power, it is soon seen that the above-mentioned horn-like tube projects externally from each gemmule. As to the mode in which such groups of gemmules are produced, transverse sections give the most reliable evidence. Thus in a transverse section, showing five gemmules immersed in a common envelope, we see one gemmule placed in the centre of the group, while the other four lie in the periphery of the first. In other sections we may find several more gemmules both at the periphery and in the centre. Every peripheral gemmule projects outwardly by the horn-like tube from the common envelope. The walls of the tube appear much weaker than the thick, dark-brown, horny, proper enveloping membrane of the gemmules, the cellular contents of which contain very numerous elliptical starch-granules. The common envelope of a group of gemmules consists of hollow indented columns, which appear to be divided into a series of superimposed chamberlets by transverse lamellæ. We find here the same arrangement which has already been made known for one series of the freshwater sponges, especially by Carter's writings, and which I have also demonstrated in *Trochospongilla erinaceus*, and interpreted as an air-chamber layer. It probably represents a modification of the ordinary granular parenchyma-envelope which I have demonstrated in the indigenous species of *Euspongilla* and *Ephydatia*, but have also found in the exotic Spongillidæ, which I obtained by the kindness of MM. H. J. Carter and E. Potts, namely *Tubella pennsylvanica**, *Parmula Batesii*, *Meyenia Leidy*†, *Heteromeyenia argyrosperma*, *Carterius latitenta* and *tenosperma*, &c. In *Meyenia Leidy* and *Tubella pennsylvanica* the parenchymatous envelope is very deep, so that the amphidisci attached to the horny membrane seem to be quite concealed. The gemmules of *Parmula Batesii* have the same form as those of species of *Ephydatia*, namely globular. On the thick horny membrane there stand three alternating series of the scutiform amphidisci, which appear to be enveloped by a deep parenchymatous layer, as already represented by Carter.

This parenchymatous layer therefore becomes modified into

* The form and arrangement of the skeletal spicules of *Tubella reticulata* agree with those represented by Marshall in his *Potamolepis Leubnitzæ*.

† *Meyenia Leidy* certainly contains amphidisci of the same form as *Trochospongilla erinaceus*, but is by no means identical with the latter. The smooth skeletal spicules and the peculiar form of the depressed flask-shaped gemmules, flattened at the inferior pole, as well as their deep granular parenchyma-layer, are characters which mark *Meyenia Leidy* as a distinct species.

a peculiar aerostatic apparatus, which is already well known through the older observations of Carter in *Spongilla Carteri* ("microcell-structure," 'Annals,' 1881, vol. vii. p. 83) and more recently in *S. fragilis*, but also by the careful investigations of Marshall in *S. nitens*. Dybowski also mentions this layer ("Belegmembran"), which consists of "non-nucleate, polygonal cells, from 0.006–0.09 millim. in size."

This statement is correct, for even the above-mentioned isolated brown gemmules are surrounded by the corresponding envelope; it is, however, comparatively feebly developed, inasmuch as the cell-spaces, or rather air-chambers, exist only in one layer, and appear like a network, consisting of depressed, usually six-sided chamberlets. In the groups of these gemmules this network is already united; and when several more gemmules come together to form the above-mentioned balls, the air-chambers also increase in number, and the thickness of this layer accordingly becomes more considerable. In the spaces between the gemmules especially a thick layer of air-chambers is produced, while the upper poles of the peripheral gemmules (*i. e.* the poles projecting outwards) are covered only by a single layer of chamberlets.

The coating-spicules certainly appear upon the surface and also scattered in the interior of the air-chamber layer; but for the most part they group themselves around the horny membranes of the gemmules. The peculiarities of these coating spicules are already sufficiently well known through Dybowski's memoir.

From what has just been stated it appears that the sponge from the river Danici, which Dr. Dybowski names *Spongilla sibirica*, agrees essentially with the North-American *Spongilla fragilis*, Leidy. The more detailed comparison of the two forms shows the following differences and distinctions:—

1. In *Spongilla fragilis*, Leidy, the groups of gemmules also occur in fours (var. *segregata*, Potts); but I have also found isolated gemmules, as well as groups of two, three, and up to six. Out of a hundred examples I found no such large number of gemmules in one group as in "*S. sibirica*."

2. The horny membrane in *S. fragilis*, Leidy, is always enveloped by a deep air-chamber layer, in consequence of which the true gemmules seem to be quite concealed, so that they cannot be observed from the surface. In "*S. sibirica*" the horny membranes are always to be seen distinctly.

3. The air-tube of *Spongilla fragilis*, Leidy, possesses walls of the same thickness as those of the gemmule proper.

The polar air-tube of *Spongilla fragilis* plays an important part in the existence of the gemmules. It is in direct connexion with the low superior process of the gemmule, which is generally regarded as an aperture of issue for the young sponge enclosed in the chitinous membrane. Whether it is really an aperture, however, I cannot state with certainty, as I never succeeded, either in living gemmules or in longitudinal sections, in demonstrating anything of the kind. It rather appears to be much more probable that the polar process is also completely closed by the horny membrane, by which the space within the gemmule appears to be completely cut off from the air-tube. The air-tubes of the dry gemmules of *Spongilla fragilis* are occupied by large air-bladders. A similar apparatus has been demonstrated by Carter and Marshall in *S. Carteri*, and I can confirm the statements of those naturalists from my own investigations. Moreover I am acquainted with similar arrangements in *Tubella reticulata*, Cart., in which the air-tube is inconsiderably inflated. The apparatus in question is very interesting in the remarkable North-American genus *Carterius*. In this it forms a high hollow tube, which, when the gemmules are thrown into water, is always directed upwards. The gemmules in this genus, however, are not globular, but only slightly convex above, while below they are hemispherical, so that the median longitudinal section through a gemmule resembles a little boat, the air-tube rising in the centre appearing not unlike a mast. The air-bubble enclosed within it evidently assists not a little in maintaining the gemmule at the surface of the water. In *Spongilla fragilis* the air-tubes are of comparatively more considerable dimensions than in any other species that I have examined; they must, however, contain a larger quantity of air, in order to sustain the certainly heavier groups of gemmules for a time at the surface of the water.

The memoir by Wilhelm Retzer ('Die deutschen Süßwasserschwämme,' Inaugural Dissertation, Tübingen, 1883), which probably appeared simultaneously with my previous work, contains descriptions of some freshwater sponges which had been already established by Noll ('Zoologische Garten,' 1870), but which require a fresh investigation in order to determine their rank and their relations to those described in my monograph. This applies especially to *Spongilla Lieberkühni*, Noll, and also to *S. contecta*, Noll, which, in my opinion, must agree with *S. fragilis*. Whether *Spongilla*

mirabilis, Retzer, is identical with the *Ephydatia amphizona* described by me cannot be decided from Retzer's description and sketchy figures; a comparison of the types described by Retzer is very desirable.

P.S.—After I had completed the manuscript of these remarks I received from Dr. Anton Wierzejski, of Cracow, some preparations of the freshwater sponges occurring in Galicia, among which, to my surprise, I also found *Spongilla fragilis*, Leidy. We must await Dr. Wierzejski's monograph of the Spongillid fauna, which is shortly to appear, for details as to the peculiarities of this freshwater sponge, which is evidently very characteristic of the Palæarctic and Nearctic regions.

III.—*Note on Spongilla fragilis, Leidy, and a new Species of Spongilla from Nova Scotia.* By H. J. CARTER, F.R.S. &c.

WITH reference to the "P.S." to Prof. F. Vejdovsky's 'Observations' (*supra*), I would here remark that Mr. Stuart O. Ridley, F.L.S., of the British Museum, has lately sent me a specimen of *Spongilla fragilis*, Leidy, as I have described it under the name of *S. Lordii*, Bk. ('Annals,' Feb. 1881, vol. vii. p. 89), which he discovered in the river Wye, about ten miles above Hereford, England, in August last, growing over the internal surface of a valve of *Unio margaritiferus*. This is the first time that this species of freshwater sponge has been recognized in England. The prolonged aperture of the chitinous coat is not turned to one side, but simply vertical, as in *S. Lordii*, with a delicate film (for the specimen is dry) of sarcode stretched across its mouth.

On the 8th August last, too, I received from A. H. MacKay, B.A., B.Sc., of the Pictou Academy, Pictou, a similar specimen growing over a small branch of wood, together with the variety called "*segregata*" by Mr. Edward Potts, of Philadelphia, which Mr. MacKay had found in MacIntosh Lake, Nova Scotia.

Further, on the 26th August following I received another collection of freshwater sponges, obtained by Mr. MacKay from the lakes near Pictou, in Nova Scotia, among which are good-sized specimens of the following :—