

anus in a broad curve. Exactly the same irregularity exists in another specimen; only in this instance it occurs on the opposite side of the test.

In other characters *L. australis* does not seem to be a species subject to much variation, judging from the specimens (fourteen in number) which I have seen. The form, direction, and length of the ambulacra and position of the vertex differ but very slightly in any of them; and this constancy of characters strengthens the supposition that the present, which offers such marked differences, is decidedly specifically distinct.

IX.—On *Wagnerella*, a new Genus of Sponge nearly allied to the *Physemaria* of Ernst Hæckel. By C. MERESCHKOWSKY*.

[Plate VI.]

I HAVE just received the October number of the 'Annals and Magazine of Natural History,' which contains an article by Mr. Carter, entitled "Remarks on Professor E. Hæckel's Observations on *Wyvillethomsonia Wallichii* and *Squamulina scopula*."

M. Hæckel, in his monograph on the *Physemaria*, has been very hard upon Mr. Carter, and reproaches him with having imperfectly observed the facts of which he speaks. Mr. Carter, in the article above mentioned, complains bitterly of the want of delicacy on the part of M. Hæckel, and brings against him the same charges as to the want of exactitude which his works display, and their bad illustrations, which he regards as "more fitted for a caravan at a fair than for scientific purposes."

It is clear that impartial logic has taken leave of both writers in this matter, and that feeling interferes in the decision of the scientific question. In such cases it becomes more than ever necessary to stand exclusively upon facts, and to allow nothing but reason to say a word. Hence every new fact that may serve to throw light upon the question becomes very desirable.

My opinion is, that we must neither "laugh" nor "be angry," and that, instead, both sides must repeat their observations, criticise them better, and, taking into consideration all the facts acquired, bow to the power of truth, remembering that he alone never deceives himself who never thinks.

* This paper must be considered as a preliminary note of a memoir on White-Sea Sponges.

It is with the purpose of adding some new facts which may serve to elucidate the nature of the creatures in question that I have set myself at once to describe my observations made at the White Sea upon a new organism very nearly allied to the *Physemaria* of Hæckel, and especially to *Haliphysema echinoides* = *Tisiphonia agariciformis*, but which, at the same time, must undoubtedly be placed among the sponges. I shall therefore pass at once to the description of this interesting creature.

In my first journey to the White Sea in 1876, I found in two localities*, upon the stems of *Sertulariæ*, a singular organism, which I met with again in 1877, in my last visit to this sea, so fertile in unknown and often very remarkable animals. This time I found it seated upon a branch of a Bryozoon, quite close to the islands of Solowetzky, at a depth of 2 fathoms.

At first, considering its small size (the sponge measures only about 0.5 millim.), I thought I had to do with some Rhizopod, such as the graceful *Clathrulina elegans* of Cienkowski for example, and the more as the form of this sponge, which consists of a spherical head placed upon a long and thin peduncle, very much resembles that of the above-mentioned freshwater organism. But closer acquaintance convinced me that the object in question was nothing but a very small sponge.

The entire sponge is composed of two very distinct parts—namely, a very long and very fine peduncle, and a round ball placed at one extremity of the peduncle, the other end serving to attach it to Hydroids or to Bryozoa. The peduncle itself is composed of two parts, one of which is a very long and fine cylinder, sometimes a little enlarged at its upper extremity where the ball is attached (Pl. VI. fig. 1). The approximate† width of this cylinder is 0.02 millim.; at its lower extremity it passes into the second part of the peduncle, which is nothing but a conical enlargement by means of the base of which the sponge is attached to foreign objects. This basal cone, as well as the cylinder, which is simply a prolongation of it, is composed of a very thin layer of organic material, probably consisting of syncytium, and of a great quantity of very small, rather stout spicules, which are placed horizontally in this organic layer, the whole forming together a fine although tolerably firm and elastic membrane, which serves as a wall

* Once between the islands of Solowetzky and the town of Kem, at 35° 25' longitude, at a depth of 12 fathoms, on a stony bottom; a second time in the Bay of Onega, not far from Belogousicha, at a depth of 16 fathoms on stony ground.

† I shall give more exact measurements further on.

to the internal cavity of the sponge. This cavity passes without interruption through the whole body, from the basal cone all along the cylinder, to join the cavity of the globe, in such a manner that the whole organism presents us with a combination of a hollow cone with a hollow cylinder and a hollow globe. This great cavity, no doubt, corresponds to the gastral cavity of the other sponges, which would thus differ from *Wagnerella* (as I propose to name this sponge) only by their much thicker walls. The average length of the peduncle is 0.4 millim.; in most cases it is completely straight or very slightly curved: by force it may be bent at a right angle without breaking; but the moment the pressure ceases it returns again to its original rectilinear position. The head or globe is about 0.1 millim. in diameter, making only one fifth of the whole length of the animal. As I have already stated, the head is nothing but the direct continuation of the general cavity which passes through the peduncle, covered like it by a fine membrane. In fact, this head, as is shown by young individuals (Pl. VI. fig. 2), may be regarded as a dilatation of the peduncle at its extremity, which would render it analogous to the conical dilatation situated at the other extremity of the peduncle.

The most striking character of the head is the presence of long and excessively fine spicules (Pl. VI. fig. 5, *a-d*), which stand out all over the surface of the ball in a radiating manner, and give it a spiny aspect, like that of a sea-urchin. It is owing to these spicules that it is impossible to see distinctly the surface of the globe, and to determine whether there are or are not pores establishing a communication between the general cavity and the external water. The walls of the head are also furnished with small, short, and comparatively stout spicules (Pl. VI. fig. 6, *a-c*), only differing by their greater length from those which are implanted in the peduncle. Here, as in the peduncle, these fusiform spicules are implanted in the thin organic layer, so that their extremities do not project; but their position is not regular in the head, the spicules being arranged in all possible directions, although always in a position parallel to the surface.

As in all the *Calcispongiæ*, the spicules are composed of calcareous salts which dissolve in hydrochloric acid. Glycerine may also serve as a good reagent for determining the nature of the spicules without the necessity of destroying the specimen. On putting the animal, or merely a fragment of it, into glycerine, it is easy to see whether the contours of the spicules become more distinct than when seen in water or in alcohol.

If this is the case, we may be sure that we have to do with a calcareous body; on the contrary, when the contours gradually disappear and the spicules can hardly be perceived, we may conclude that they are siliceous.

The following are the comparative measurements of this sponge :—

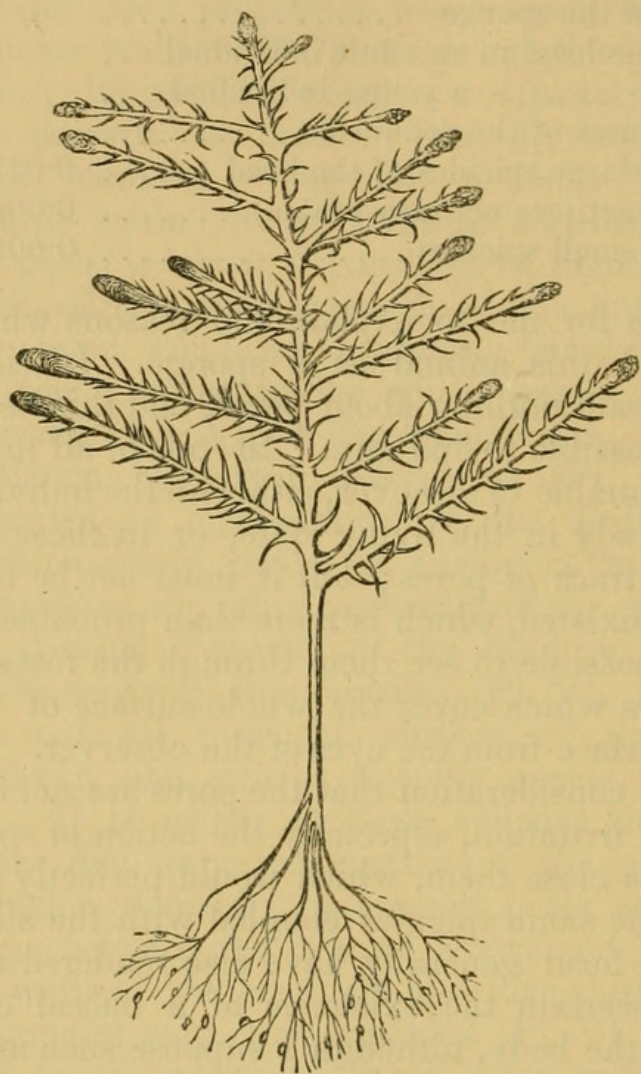
	millim.
Total length of the sponge	0·5–0·8
Diameter of the head in an adult individual ..	0·1012
" " a young individual ..	0·05885
Average thickness of the peduncle	0·018
Length of the large spicules of the head	0·01175–0·05875
Thickness (sometimes not measurable)	0·00047–0·00117
Length of the small spicules	0·00964–0·01605*

It remains for me to explain the reasons which have led me to regard this animal as a sponge. It will be noticed that I have said nothing about pores, and this because I have found it impossible to find any. In spite of all my endeavours I have been unable to discover, either in the individual which I selected to study in the living state, or in those preserved in alcohol, any trace of pores; but it must not be forgotten that even if they existed, which is more than probable, it would be perfectly impossible to see them through the forest of innumerable spicules which cover the whole surface of the head and conceal its surface from the eyes of the observer. It must also be taken into consideration that the pores are not constant, and that the least irritation, especially the action of spirits of wine, is sufficient to close them, which would perfectly explain their absence. The same spicules coupled with the slight transparency of the head generally have also rendered it impossible for me to ascertain the existence of a buccal orifice at the extremity of the body, although I suppose such an orifice must exist from the analogy of what we see in the *Physemaria*.

But even if we admit that the existence of pores in *Wagnerella* is a fact unproved and even improbable, their absence cannot in any way lead us to doubt its spongiarian nature. In fact we are acquainted with several sponges the spicules of which have been described, but of which the pores, for different reasons, have not been discovered (see, for example, Bowerbank's monograph); and nevertheless we do not hesitate to admit that these are true sponges. Moreover we are acquainted with a marvellous sponge described by G. O. Sars in his interesting book 'On some remarkable Forms of Animal Life from the Great Deeps off the Norwegian Coast'

* The latter number refers to the head.

(1872). I refer to the *Cladorhiza abyssicola* of M. Sars. This sponge, which lives only at great depths, and which resembles rather a Hydroid or a Bryozoon than a sponge, has as a characteristic feature that the whole of it is entirely massive, absolutely without even traces of canals or of any cavity, and consequently without either buccal orifice or



Cladorhiza abyssicola, M. Sars*.

pores ; and yet every one who reads M. Sars's description will be convinced that he has to do with a true sponge. In the White Sea also I have met with an *Esperia* (?) with long, filiform processes, like roots, which anastomose and form a network covering seaweeds and other bodies. Throughout their length, however, these are destitute not only of pores, but in general of canals or cavities, and are entirely composed of "syncytium" with spicules.

It is with the support of these facts that I cannot be of the

* Sars, 'On some Remarkable Forms of Animal Life, &c.,' pl. vi. fig. 17.

opinion of M. Häckel that in order to be a sponge an organism must have not only spicules but also pores.

With respect to the spicules of *Wagnerella*, we have seen (and I hope it is unnecessary to dwell upon this fact) that these spicules cannot by any means be regarded as foreign to the organism and borrowed from some other sponge (besides, the White Sea has no sponges furnished with spicules resembling those of *Wagnerella*), but that, on the contrary, we are led to the opinion that these spicules are produced by the sponge itself.

It is therefore evident that *Wagnerella* belongs to the Calcareous Sponges, and notably to the family Ascones. As regards the genus, I find that the system of M. Häckel, which is founded exclusively upon the spicules, is sometimes too artificial, and will become still more so in course of time. This system is founded principally upon the fact that the form of the sponge is a character too variable and inconstant to enable a system to be based upon it. Although in general terms this may be true, we nevertheless know, among the sponges, plenty of exceptions in which the form acquires so great a constancy that it may be employed not merely to characterize a species, but may even lead to the formation of distinct genera, as, for example, in the case of *Cladorhiza*. It is the same with our *Wagnerella*, of which the extreme smallness, the globular head supported by a long peduncle dilated into a cone at its base, are all constant characters, and consequently sufficient to bear one out in establishing a distinct genus. The few species of the genus *Ascyssa*, to which the animal might otherwise belong, are so little like *Wagnerella* that one would not hesitate in ordinary circumstances to form a separate genus for this organism.

M. Häckel, who has founded his genera upon different combinations of three kinds of spicules, has by this means restricted for ever the number of genera; for all the possible combinations have been employed by him; but it may be foreseen that Calcispongiæ will probably be found so different from the known forms, that it will be perfectly artificial to range them in one of M. Häckel's genera, and that, consequently, sooner or later it will be necessary to break through the boundaries laid down by him, and to found genera not only upon the combinations of the spicules, but also on their forms, the form of the body, and other characters.

I propose to name this genus, which has the habit of *Tisiphonia agariciformis*, and is furnished only with simple spicules, *Wagnerella*. The diagnosis of the genus and that of the species will be as follows:—

WAGNERELLA, gen. nov.

Sponges furnished with simple, long, calcareous spicules. Their body consists of a head or upper part, which is more or less globular, and of a long and slender peduncle which supports the former part, and at the opposite extremity is furnished with an enlargement of conical form, by means of which it adheres to foreign objects. Habit resembling that of the *Physemaria* (*Haliphysema*).

I give this sponge its generic name in honour of Professor Nicolas Wagner of St. Petersburg.

Wagnerella borealis, sp. nov.

Head regularly rounded into the form of a ball, placed on a very long and slender peduncle, the whole never exceeding 1 millim. in length (often 0.5 millim.). The cone of the peduncle as broad as high; the peduncle of uniform thickness throughout its whole length (sometimes a little wider above), nearly five times as long as the diameter of the head. All these parts (head, peduncle, and cone) have an interior cavity communicating freely throughout. The walls of the body are composed of a fine organic membrane, with spicules. The spicules are of two kinds: some long and excessively fine, tapering towards the two ends, adorning the head, in the surface of which they are implanted in a radiating fashion only by one end; the others shorter and stouter, fusiform, placed both in the head and the peduncle, entirely implanted in the organic layer without projecting from it at all, and all, without exception, arranged horizontally in the foot. No grains of sand or any other foreign objects adhering to the surface of the sponge. Length (average) of the long spicules 0.035 millim., of the shorter ones 0.01 millim.

Locality. White Sea, neighbourhood of the islands of Solowetzky, near the monastery (at a depth of 2 fathoms) and near Kem (at a depth of 7 fathoms).

Lastly, with regard to the two doubtful *Physemaria*, namely *Haliphysema echinoides* and *Gastrophysema scopula*, C., my opinion is as follows:—

Haliphysema echinoides.—When this is compared with *Wyvillethomsonia Wallichii*, Wright *, we see that we have to do with one organism, or, at any rate, with two varieties of a single organism, which, indeed, is admitted by M. Hæckel himself. But if this be the case, it is perfectly evident that

* Quart. Journ. Microsc. Sc. 1870, vol. x. pl. ii.

we have nothing more than one sponge bearing the three names *Wyvillethomsonia Wallichii*, Wright, = *Dorvillia agariciformis*, Kent, = *Tiphisonia agariciformis*, Wyv. Thoms. Its spongiöse nature may be further confirmed by comparing it with my *Wagnerella borealis*, to which it bears much resemblance and which is a true sponge.

With respect to *Gastrophysema scopula*, it is impossible to decide definitively whether it is a Physemarion or a Rhizopod. On the one hand, the presence of pseudopodia, which Mr. Carter has himself observed, leads us to believe in its Foraminiferous nature; on the other, its great resemblance to the other species of *Gastrophysema* observed by Häckel would make us think that both organisms belong to the Physemaria. In any case fresh observations upon *Squamulina scopula* can alone finally decide the question.

EXPLANATION OF PLATE VI.

[All the figures enlarged and drawn by the camera lucida.]

- Fig. 1.* An adult individual of average size of *Wagnerella borealis*. The peduncle is a little wider above, the head regularly rounded. There are more spicules than are here represented.
- Fig. 2.* A young individual with the head not yet round, and differing but little from the peduncle.
- Fig. 3.* Part of the peduncle, more highly magnified, with the small kind of spicules.
- Fig. 4.* Form sometimes presented by the basal cone of the peduncle, which, however, usually has the form shown in fig. 1.
- Fig. 5.* Different forms of the long spicules which adorn the head: *a*, immeasurably fine; *b*, stouter, but straight; *c*, long and curved; *d*, shorter and curved; *e*, zigzag.
- Fig. 6.* Different forms of spicules of the second category, fusiform, shorter and stouter: *a*, typical; *b*, curved; *c*, typical, with a bubble of air (?).

X.—*Descriptions of new Species of Heterocera from Japan.*
—Part II. *Noctuities*. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

Cymatophoridae.

59. *Gonophora derasoides*, n. sp.

Nearly allied to *G. derasa*, but of a greyer tint; the markings (particularly on the white costal streak of primaries) less defined; the reniform and other discoidal spots narrower and more transverse; the area between the oblique white stripe and the zigzag lines pale stramineous, with darker and lunated



Merezhkovskii

, K. S. 1878. "IX.—On Wagnerella, a new genus of sponge nearly allied to the Physemaria of Ernst Hæckel." *The Annals and magazine of natural history; zoology, botany, and geology* 1, 70–77.

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