II.—ZOOLOGY.

Art. XXI.—*New Zealand Sponges: Third Paper.*

By H. B. Kirk, M.A.

[*Read before the Wellington Philosophical Society, 8th December, 1895.*]

Plates III. and IV.

It is proposed to deal in the present paper with the New Zealand Reticulate Ascons, so far as they are yet known to the writer. It is not necessary to review here the various schemes that have been proposed for the classification of these sponges. I simply state, therefore, that I follow the plan proposed by Bowerbank, and followed by Poléjaeff and others, of regarding the ascons as constituting a single genus, and adopt Dendy's subdivision into simple, reticulate, and radiate, and, with the modifications that I am about to mention, his further subdivision of the Reticulata. In Dr. Dendy's classification* the ingrowths of mesoderm, covered or not by collared cells, constitute an important feature. In the New Zealand ascons, at all events, this feature is too variable to be a reliable element in classification, and it is probable that the same variableness in this respect exists in the ascons of other countries. The mesodermal ingrowths may not be found at all in one specimen, and in another, undoubtedly of the same species, they may be found to be very well marked indeed. I think I am right in saying that Dr. Dendy does not now attach to this feature the weight that he attached to it when the Monograph was begun.

Abandoning this feature as an element in classification, Dr. Dendy's scheme, as applied to the New Zealand sponges, takes this form:—

Order Homocœla.

Genus **Leucosolenia.**

Section II. *Reticulata.*

Division I.—Pseudoderms not present. *Leucosolenia clathrus.*
Division II.—Pseudoderms present.

*See "Monograph of the Victorian Spoñges," Trans. Roy. Soc. of Vict., vol. iii., p. 1.

Subdivision 1.—"The exhalent openings through which the water leaves the sponge are true oscula—*i.e.*, they lead directly into a space lined by collared cells, and formed by the union of a number of ascon-tubes."

Leucosolenia challengeri.		*Leucosolenia intermedia.*	
"	*cerebrum.*	"	*laxa.*
"	*proxima.*	"	*depressa.*

Subdivision 2.—"The exhalent openings through which the water leaves the sponge are pseudoscula—*i.e.*, they lead at first into a space not lined by collared cells, but, presumably, by ectoderm. This space is a *pseudogaster*. It really lies outside the colony, and is formed, probably, by the upgrowth of the colony around it. The ascon-tubes open into the pseudogaster." *Leucosolenia rosea.*

I hope to have an opportunity, in a future paper, of making some remarks on the histology of the New Zealand reticulate ascons.

Leucosolenia clathrus, Schmidt. ("Supplement der Spongien des Adriatischen Meeres," p. 24.)

As Mr. Carter has pointed out,* Schmidt's sponge is not the one afterwards described and figured by Haeckel.† In Haeckel's sponge the ends of the spicules are obtusely rounded, or even knobbed, and the rays are often wavy.

I see no reason for regarding as different from *L. clathrus* a white ascon of considerable size that occurs freely along the shores of Cook Strait, in the neighbourhood of Wellington. Its spicules are more sharply pointed than the one figured by Schmidt; but they are almost exactly like those of a specimen, sent me by Dr. Dendy, of a sponge collected at Budleigh Salterton by Mr. Carter, and identified by him as Schmidt's *L. clathrus*. Moreover, the specimen referred to shows mesodermal ingrowths exactly like those of Wellington specimens —Dendy's type E. The sponge shows at death the colour-changes described by Carter.

I also place under *L. clathrus*, for the present at all events, the large white ascon that occurs so freely in Paterson's Inlet, Stewart Island. In this handsome sponge the spicules are often blunt, and approach those of *L. coriacea*, and the mesodermal ingrowths are less pronounced than in the Wellington sponge. Moreover, it differs from the Wellington sponge in the fact that its oscules are conspicuous, and borne at the apex of pronounced papillæ.

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* A.M.N.H., 5, xiv., p. 17.

† "Kalkschwamme," ii., p. 30.

Leucosolenia challengeri, Pol. ("Report on the Calcarea of the 'Challenger' Expedition," p. 38.)

This sponge occurs in Cook Strait, in the neighbourhood of Wellington. The "Challenger" specimen is from Cape York. My specimens are all of the *Auloplegma* form. I have not yet seen the *Soleniscus* form, which is that of the "Challenger" specimen. Length of the sponge, as found near Wellington, about 20mm. Half the length is made up by the slender, solid peduncle. Of two specimens that I have sectioned, one has no mesodermal ingrowths, and the other has ingrowths of Dendy's type F.

Leucosolenia cerebrum (*Ascaltis cerebrum*), Haeckel. ("Kalkschwämme," ii., 54.)

A sponge with the apical rays of the 4-radiate spicules beautifully spined in their distal portion occurs—not very freely—in Cook Strait. These apical rays echinate the inner surface of the ascon-tubes in the usual manner. I have no hesitation in referring it to Haeckel's *Ascaltis cerebrum*. A pseudoderm is always present, so far as I have been able to observe, but I have not noticed the irregularity in the pseudodermal spicules referred to by Haeckel. I have found these spicules regular and massive, with the tips of the rays incurved in the regular tripod fashion. Size, 0·08mm. × 0·002mm. They closely resemble those of *L. intermedia* (Plate IV., fig. 2). Well-marked ingrowths of the mesoderm, of Dendy's type E, occur.

Haeckel's locality for this sponge is Lesina, in the Adriatic.

Leucosolenia proxima, Dendy.

If my identification of this sponge is right, it forms in New Zealand handsome yellow- or orange-coloured colonies from 10mm. to 25mm. in diameter, and with numerous oscules. The spicules of the pseudoderm have the rays slightly incurved, so that the centre is raised a little from the plane in which the points of the rays lie; the rays themselves taper rather less regularly than in the type, and they are a little more sharply pointed. It is quite possible that this is a different sponge from *L. proxima*, but at present I do not regard the differences as specific.

The canal system shows ingrowths of type E and also of type F.

The sponge forms colonies of two external characters: light-yellow in colour and loose in texture, and orange in colour and compact in texture. Slight differences in spiculation occur, but not constant and pronounced enough to justify,

according to my present view, the separation of the two forms, much as they appear at first sight to differ.

Locality: Cook Strait.

Leucosolenia intermedia, n. sp. (Plate IV., fig. 2.)

Sponge compact; yellow or yellowish-white when alive. Oscules numerous, each one at the apex of a small conical papilla: they often become obscured at death. There is a well-marked pseudoderm, characterized by stout tripod spicules. The spicules are all triradiates.

Spicules:—

The rays of the stout, pseudodermal spicules are strongly incurved, and are of about the same length as those of the deep spicules; they are blunt. The spicule forms a massive tripod, stouter than that of *L. tripodifera*, and with the rays a little more widely spread. Viewed from below, in certain positions the effect of perspective is to give a sagittal appearance that is illusive (figs. 2*d*–2*f*). A few stout 3-radiates are regular, and have straight rays (fig. 2*a*). Size, 0·13mm. × 0·04 mm.

The spicules of the deep parts of the sponge are regularly-tapering 3-radiates, with fairly sharp points. Size, 0·09mm. × 0·01mm. The canal system is of Dendy's type E.

In spiculation this sponge occupies a position intermediate between *L. pulcherrima* and *L. proxima*. From the former it is broadly distinguished by the fact that its pseudodermal spicules are larger instead of smaller than its deep ones, and from the latter by the marked tripod character of the pseudodermal spicules. This last characteristic seems also to distinguish it from *L. stipitata*.

Locality: Cook Strait.

Leucosolenia laxa, n. sp. (Plate IV., fig. 1.)

Texture loose; colour white. A pseudoderm, characterized by oxeote spicules, is present, but is not well developed except at the sides of the sponge. Mesodermal ingrowths occur sparingly, and they may or may not be covered by collared cells. Skeleton consisting of 3-radiate, 4-radiate, and oxeote spicules, the two former occurring throughout the sponge, and the last being confined to the pseudoderm, and echinating feebly the surface of the sponge.

Spicules:—

Triradiates: Regular; rays tapering evenly to a sharp point; 0·17mm. × 0·015mm.

Quadriradiates: Basal rays sometimes slightly curved, tapering evenly to a sharp point, 0·15mm. × 0·013mm.; apical ray straight, 0·1mm. × 0·013mm.

Oxea: Clavate, generally obtuse at both ends, uneven; 0·37mm. × 0·025mm.

This sponge is closely allied to Haeckel's *Ascandra reticulum*, from which, however, it may easily be distinguished by the character of its oxea. In *A. reticulum* these are fusiform, even in outline, and pointed at both ends. In *L. laxa* they are clavate, wavy in outline, and obtuse at the broader end, generally at both. Dr. Dendy's *L. dubia* is very like this sponge, but its quadriradiates are occasional and not constant.

The external appearance of this sponge is that of *L. clathrus*.

Leucosolenia depressa, Dendy. (Monograph.)

Occurs in the neighbourhood of Wellington.

Leucosolenia rosea, n. sp. (Plate III.)

This sponge forms spreading masses, which may attain a diameter of 75mm. The surface is for the most part remarkably even, but it rises into rounded lobes and ridges, along which the pseudoscula are placed. The pseudoscula are generally oval in shape, and are from 0·6mm. to 8mm. long. Around the margin of each is a pseudoscular membrane, slightly developed, and not rising above the general surface of the sponge. The pseudopores are evenly distributed over the whole surface. The pseudoscula open into pseudogasters. A colony often contains a large number of these spaces. The canal system is of Dendy's type D.

When alive the sponge is of a pale-pink or salmon colour, and the colour remains for a long time in dried specimens.

Spicules:—

Triradiates: The pseudoderm consists mainly of enormous 3-rayed spicules, which show an approach to the tripod condition. Their outline is often wavy, and the broadest part of the ray is often at about a third of the distance from the base to the point. The points of the rays are blunt. Length of ray, 0·3mm.; greatest breadth, 0·07mm.

Deep triradiates: The 3-radiates of the inner part of the sponge are regular and sharp-pointed; the rays tapering evenly. 0·2mm. × 0·018mm.

The triradiates of the wall of the pseudogaster, and especially those around the pseudosculum, often become sagittal, the oral rays being curved, either towards or away from each other, and the basal ray being shortened. In these regions of the sponge occurs a curious 2-rayed spicule, the third ray having failed to appear, or, having appeared, to develope. Fig. *h* shows a spicule in which the third ray is incipient.

Quadriradiates: These are generally rather smaller than the 3-radiates, and the main rays are a little less sharp. The

apical ray, however, is very slender, and sharply pointed: it is slightly curved. Basal rays, 0·14mm. × 0·01mm.; apical ray, 0·11mm. × 0·008mm.

EXPLANATION OF PLATES III. AND IV.

PLATE III.

Leucosolenia rosea.

a–c, spicules of pseudoderm.
d, *e*, regular 3-radiates of parenchyma.
f, *g*, sagittal 3-radiates.
h–k, arrested or abnormal spicules.
l–n, 4-radiates (*a.r.* = apical ray).

PLATE IV.

Leucosolenia laxa.

1*a–1c*, oxea of pseudoderm.
1*d–1f*, 3-radiates.
1*g–1i*, 4-radiates (*a.r.* = apical ray).

Leucosolenia intermedia.

2*a*, large regular radiate of pseudoderm.
2*b–2f*, pseudodermal "tripod" spicules viewed at different angles.
2*g–2h*, " " " in profile.
2*i–2j*, 3-radiates of parenchyma.

ART. XXII.—*Notes on New Zealand Land Planarians: Part II.**

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[*Read before the Philosophical Institute of Canterbury, 3rd July, 1895.*]

THE present contribution to our knowledge of the land planarians of New Zealand deals exclusively with a number of specimens collected during a month's stay at Springburn, at the foot of Mount Somers, in November and the early part of December of last year (1894). In the immediate vicinity of the thick bush-scrub of the Alford Forest the locality appeared a good hunting-ground for cryptozoic animals, and experience showed that this was indeed the case. The very luxuriance of the vegetation, however, with its unlimited hiding-places for cryptozoic animals, made the task of collection more difficult than it would have been in a clearer neighbourhood, where the animals are concentrated, as it were, in a comparatively few spots.

* For Part I. see Trans. N.Z. Inst., vol. xxvii., art. xvii.