

PAPERS READ.

ON SOME NEW AND RARE HYDROIDA IN THE
AUSTRALIAN MUSEUM COLLECTION.

By W. M. Bale, F.R.M.S.

(PLATES XII-XXI).

The species of Hydroida treated of in the present paper were (with one exception) included in a collection sent to me by Dr. Ramsay, from the Australian Museum, about the end of the year 1886. Besides a number of new species there were represented several which had previously been very imperfectly known, for one of which—the *Ceratella fusca* of Gray.—I have found it necessary to constitute a new family. Among the other specimens were a number of Dr. von Lendenfeld's types of the species described by him in the Linnean Society's Proceedings, several of which prove to be identical with species previously known. I have to thank Mr. T. Whitelegge, of the Australian Museum, for forwarding me additional specimens of some of the species, and also for notes of his examination of some of those in the Museum.

The type specimens from Dr. von Lendenfeld's collection, include the following—the references being to the Proceedings of the Linnean Society of N.S. Wales, Vol. IX.

SERTULARELLA MICROGONA, von Lendenfeld.

P.L.S.N.S.W. IX., p. 416, Pl. VII., figs. 1-3. (See page 763).

DIPHASIA SYMMETRICA, von Lendenfeld.

l.c. p. 414, Pl. VIII., fig. 7.

This is identical with *Sertularia bispinosa*, Gray.

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This species is found growing in tufts, the largest of which among my specimens is about $1\frac{1}{2}$ inch high. Branches are given off, sometimes profusely, from the main stem, but no secondary branchlets were to be found, though possibly such might be produced on older specimens. Each internode of the hydrocaulus springs from a point immediately below the origin of a hydrotheca-peduncle, forming a rather sharp curve upwards; and the upper part of the internode is very slightly curved outwards in the opposite direction, so that the stem or branch acquires a slightly zig-zag form. Thus instead of the peduncle of the hydrotheca being given off at an angle with the peduncle of the internode which bears it, the peduncle is continuous with its internode in a direct line, and the next internode springs off at an angle. The hydrotheca when immature is entire, the summit being crowned with a watch-glass-shaped cap, which ultimately falls off, leaving the margin of the hydrotheca rather irregular or ragged-looking. The rings of the hydrocaulus are very distinct and regular, sometimes spiral, at other times simply annular. When the peduncles of the calyces are longer than would be equal to the width of nine or 10 rings, the central part is smooth. The gonangia are remarkable for the length they usually attain, compared with their small diameter, being often less in width than an average calyx, and more than three times its length.

OBELIA AUSTRALIS, von Lendenfeld.

(Plate XII, figs. 1-3).

Primary shoots monosiphonic, about $1\frac{1}{2}$ inches in height, sometimes with a few small branches, stem and branches flexuous, with a few rings or spiral turns (mostly 3-5) just above the origin of each peduncle; 8 or 10 rings usually at the base of each stem and branch; peduncles ringed, those on the upper portions of the hydrophyton consisting of about 4-10 rings, those on the lower portions longer, often with 10-20 rings, or with the central part smooth. Hydrothecæ alternate, somewhat obconical, or with the upper portion almost cylindrical; not noticeably constricted at the

tissue, with irregular superficial ridges running from the base upwards. The two narrow sides of the calyx-margin are curved outwards, so as to form thick solid everted lips, one of which is higher than the other.

In Dr. von Lendenfeld's type specimens some of the hydrothecæ are more deeply excavated, and he states that deep-water specimens have thick hydrothecæ, while those from the harbour have thin ones. The specimens which I have described are, however, from the harbour.

CAMPANULARIIDÆ.

OBELIA GERICULATA, Linn.

Additional locality.—Middle Harbour, Port Jackson

OBELIA ANGULOSA, n.sp.

(Plate XII, fig. 3).

Hydrocaulus monosiphonic, 1-2 inches in height, usually with numerous sub-erect branches given off from the main stem; stem and branches more or less zig-zag, with a few rings or spiral turns (mostly 3-5) just above the origin of each peduncle; peduncles ringed, those on the upper portions of the hydrophyton consisting of 2-4 rings, those on the lower portions often twice the length of the calyx, usually having the central part smooth; hydrothecæ alternate, funnel-shaped, generally slightly constricted at the level of the "floor," which is some distance above the base, and situated somewhat obliquely; margin slightly everted, not toothed, somewhat uneven.

Gonothecæ urn-shaped, mostly very long and slender, with an elevated neck; peduncle with about 3-5 rings; upper part of the capsule often marked with faint, not prominent rings. One variable in number (often about 15), in two or three rows, irregularly arranged. Gonozoids not observed.

Hab.—Parramatta River.

CAMPANULARIA CALICULATA, Hincks.

(Plate XIII., figs. 1-3).

Two gatherings of this species have been obtained from Port Jackson, in one of which the calyces are for the most part wholly without the thickened wall which usually characterizes the species; occasionally however they conform to the type. In the other specimens, the calyces agree pretty closely with those figured by Mr. Hincks, and vary to about the same extent. The peduncles are exceedingly variable in length, sometimes being 16-18 times the length of the calyx. They may be closely undulated throughout, or almost smooth, the latter condition occurring principally in the longer peduncles. The gonangia contain two sporosacs, and are borne in extraordinary profusion, their number often greatly exceeding that of the hydrotheca.

CAMPANULARIA CALICULATA, var. *makrogonia*, von Lendenfeld.

(Plate XIII., figs. 4-8).

In this variety the hydrotheca-wall is thickened throughout, but more particularly at the base, and at the upper portion, where the chitinous substance forms an external band encircling the upper $\frac{1}{2}$ or $\frac{3}{4}$ of the calyx, very thick in the centre, and gradually thinned away above and below. In most of the hydrothecae the cavity is exactly cylindrical, with a flat floor, but in some of them the internal diameter slightly diminishes downward. The margin is somewhat everted, and often becomes doubled or tripled by successive circles of growth. The peduncles are stout and usually very strongly undulated.

I am not aware whether the very large gonangia characteristic of this variety are always associated with the peculiar form of hydrotheca which I have described; if so, it may be questioned whether there is not sufficient ground for separating this form as a distinct species.

level of the "floor," which is a little above the base, and situated obliquely; margin very slightly everted, not toothed, somewhat uneven.

"The gonophores have the ordinary elongate shape. At the time of liberation the medusa is similar to a newly-born *O. geniculata*." (Von Lendenfeld).

Hab.—East coast of N. Zealand, Laminarian Zone.

Dr. von Lendenfeld says of this species:—"The stem of this *Obelia* is creeping, adnate to foreign bodies, to which it clings like a hydrorhiza. The stem bears hydranths on very short annulated stalks, and also a few very short branches with nearly sessile hydrothecae. These creeping stems are short, and take their origin from a distinct hydrorhiza, which differs from the creeping stem by the much greater thickness of its perisarc, and by the numerous anastomoses which cause it to attain a reteform appearance."

I have not been able to verify this description, nor distinguish the "creeping stems" from a true hydrorhiza, but in any case the stems which bear the hydranths and short branches are not the "creeping stems," but the erect shoots. Dr. von Lendenfeld refers to this species (but apparently not with absolute certainty), an adult medusa which he found in large numbers in Port Jackson. The tentacles are said to be from 30 to 40, and the umbrella always in a reverted position. This is not the case with the young medusae which were obtained with the trophosome.*

O. australis is somewhat coarser and more rigid than *O. angulosa*. It may be distinguished from that species by the internodes of the stem, which are not abruptly curved outwards at their origin, but are more or less curved alternately in opposite directions throughout their whole length, so that the stem is flexuous. The hydrothecae are less conical than those of *O. angulosa*, without the distinct constriction at the level of the floor, which is also nearer the base of the cell, and rather more oblique.

*On p. 920, Vol. IX., Dr. von Lendenfeld says, "I have described this species from the polyp-colonies and the young larvae which I obtained in Port Jackson." In the original description, however, the only locality mentioned is the East coast of New Zealand.

original stem. When it reaches the object on which the zoophyte is growing it becomes attached thereto, and assuming the character of the hydrorhiza, gives off fresh shoots. In nearly all my specimens the downward growth of the supplemental tube was arrested by the death of the organism before it could reach the base of the stem, leaving it with an obliquely truncated extremity.

CAMPANULARIA (?) SERRULATA, n.sp.

(Plate XII, fig. 4).

Hydrorhiza slender, climbing; hydrothecæ borne on long peduncles, which spring either directly from the hydrorhiza or from the side of other peduncles; peduncles slender, with about 8-16 rings at the base and a less number (mostly 2 or 3) at the summit, smooth throughout the rest of their length. Hydrothecæ large, campanulate, constricted at the "floor," which is raised above the base so as to enclose a nearly cylindrical cavity; margin not expanding, armed with about 10-14 rather large, triangular, pointed teeth.

Gonosome unknown.

Hab.—Port Jackson, on a Tubularia.

This is a delicate species, with no proper stem, but the primary peduncles generally give origin to secondary ones exactly resembling them, the habit in this respect being similar to that of *C. marginata*, a species otherwise very different to the present. The rings of the peduncles are distinct and regular, as in *C. spinulosa*. The specimens were less than half an inch in height.

CAMPANULARIA COSTATA, Bale.

Near Peel Island, Moreton Bay, parasitic on *Pasythea hexodon*. (Mr. J. D. Ogilby).

The aperture is more or less oblique in most of the specimens. Perhaps this species might best be placed in the genus *Lafœa*.

CAMPANULARIA (?) SPINULOSA, n.sp.

(Plate XII, figs. 5-7).

Hydrorhiza slender, climbing; hydrocaulus about $\frac{1}{2}$ inch high, slender, unbranched or with numerous sub-erect branches; stem and branches nearly straight, with a few rings or spiral turns (mostly 4-6) just above the origin of each peduncle, 6-12 rings usually at the base of each stem or branch; peduncles ringed, those on the upper parts of the hydrophyton consisting of about 5-6 rings, those on the lower portions often with 8-10. Hydrothecæ alternate, sub-cylindrical in their upper half, tapering below, slightly constricted at the "floor," which is a little above the base, and somewhat oblique; margin armed with a number of minute slender compressed spines (usually 20-24) arranged in pairs, the margin very slightly sinuated between the two spines of a pair, more deeply sinuated (almost semi-circularly) between the pairs; hydrotheca marked with faint longitudinal lines, one between every two pairs of spines.

Gonosome unknown.

Hab.—Port Jackson, on a Tubularia.

In the form of the hydrothecæ, and the arrangement of their marginal teeth, this species is similar to a hydroid described by Clarke under the name of *Obelia bidentata*,* but that species is polysiphonic and grows to the height of six inches, while the specimens of *C. spinulosa*, which I have examined, are of delicate growth and not more than half an inch in height. It is possible, though perhaps not probable, that the present species is a young form of *O. (?) bidentata*; at present it may be provisionally regarded as distinct. Most of the shoots exhibit the rudiment of a polysiphonic structure, consisting of a delicate stolon which originates from an aperture formed at the outer side of the base of the most proximal peduncle, and grows downward along the

* Descriptions of new and rare species of hydroids from the New England coast. (Transactions of the Connecticut Academy of Arts and Sciences, Vol. III, Part I.)

plentiful, and in various stages of development; those which were entire and unopened contained a slender blastostyle bearing two gonophores. The summit of the blastostyle is trumpet-shaped and apparently open, but no tentacles are present. The terminal portion appears to fall off before the maturity of the second gonophore; at least it was absent from those capsules from which the primary gonophore had been extruded. The gonophore seemed to contain three or four large ova grouped above a stout spadix, but the specimens were not sufficiently well preserved to place the structure beyond doubt. The aperture of the ripe gonotheca, with its three or four emarginations and corresponding opercular divisions, strongly resembles the aperture of the hydrotheca in some species of *Sertularella*.

HALECIDÆ.

HALECIUM GRACILE, n.sp.

(Plate XIV., figs. 1-3).

Hydrophyton slender, monosiphonic, attaining a height of about 1 inch; hydrorhiza climbing over other hydroids; branches somewhat straggling, variable in length, stem and branches slightly flexuous, divided into moderately long internodes, by twisted oblique joints which slope alternately in opposite directions, each internode bearing a calyx close to its upper extremity. Calyces alternate, varying from almost tubular to funnel-shaped, and often with other calyces springing from within them; margin expanding, strongly everted; basal part of the calyx sometimes ringed.

Gonothecæ, — female, large, ovate, compressed, sporosac decidedly narrower than the capsule, with a space at the upper part not occupied by ova; — male smaller, club-shaped in outline.

Hab. — Port Stephens, on an *Aglaophenia*; Port Jackson, on a *Tubularia*.

This species differs from most others in being slender and monosiphonic. Each internode gives off primarily a single calyx,

CARPANULARIA MARGINATA, Bale.

Bondi; Coogee (plentiful), (Mr. T. Whiteleggo).

I have mentioned in the "Catalogue" that some of the hydrothecæ of this species have the remains of an operculum visible, but in these specimens the structure alluded to is not present. It is a very delicate membrane, and in the few cases where I have met with it was incomplete. It may probably be a temporary structure like that which covers the immature hydrothecæ of various species of *Obelia*.

LAFOEIDÆ.

LAFOEIA SCANDENS, n.sp.

(Plate XIII., figs. 16-19).

Hydrophyton parasitic on other hydroids; hydrorhiza slender, hydrothecæ springing directly from the hydrorhiza, tubular, straight or slightly curved, rounded below to the level of the "floor," basal portion short, contracted, pedicle very short, aperture simple, margin very slightly everted, often double or triple.

Gonangia about double the length and diameter of the hydrothecæ, tapering downwards in the lower half; with more or less distinct transverse undulations; margin with three or four shallow emarginations; summit of the blastostyle forming a trumpet-shaped expansion; gonophores two, both on the same side of the blastostyle.

Hab. — Port Stephens; Port Jackson; mostly on *Sertularia divaricata*, var. *sub-dichotoma*.

The specimens of *Sertularia divaricata* from Port Stephens were quite overrun by this species, its hydrothecæ in some parts equalling or even exceeding in number those of the *Sertularia*. So far as I am aware, it is the first species of *Lafœia* in which the gonosome has been observed. The gonothecæ were fairly

PLATE XV.

- Fig. 1.—*Sertularella indivisa*, Bale. Port Phillip.
 Fig. 2.— " " Portland, Vict.
 Fig. 3.— " *solidula*, Bale. Port Phillip.
 Fig. 4.— " " Bondi.
 Fig. 5-7.— " *variabilis*, n.sp. Port Jackson.
 Fig. 8.— " " a variety with longer teeth.
 Fig. 9.— " " a slender variety, with calyces nearly smooth, and directed to the front so as to show inside the aperture.
 (All magnified 40 diameters.)

PLATE XVI.

- Fig. 1-2.—*Sertularella divaricata*, Busk, var. *dubia*, n. var. Bondi.
 Fig. 3-4.— " *divaricata*, var. *sub-dichotoma*, n. var. Port Jackson.
 Fig. 5-6.— " *longitheca*, n.sp. Port Denison.
 Fig. 7.— " *cylindrica*, n.sp. Port Jackson.
 Fig. 8.— " *microgona*, v. Land. Port Phillip. (From one of Dr. von Lendenfeld's types)
 (All magnified 40 diameters.)

PLATE XVII.

- Fig. 1-2.—*Synthecium orthogonia*, Busk. Port Jackson.
 Fig. 3.— " " a specimen with calyces directed towards the front.
 Fig. 4.—*Synthecium orthogonia*, gonotheca, narrower aspect.
 Fig. 5.— " " broader aspect.

- Fig. 6-9.—*Sertularia geniculata*, n.sp. Port Jackson.
 Fig. 10-11.— " " gonothecæ.
 (All magnified 40 diameters.)

PLATE XVIII.

- Fig. 1-2.—*Sertularia complexa*, Clarke. Bondi. × 40.
 Fig. 3-4.— " " gonothecæ. × 40.
 Fig. 5.—*Thuiaria subarticulata*, Coughtrey. New Zealand. × 25.

- Fig. 4.—*Campanularia* (?) *serrulata*, n.sp. Port Jackson.
 Fig. 5.— " (?) *bispinosa*, n.sp. Port Jackson.
 Fig. 6.— " " a portion of the calyces from outside.
 Fig. 7.—*Campanularia bispinosa*, one of the marginal teeth, lateral view.
 (All except 6 and 7 magnified 40 diameters.)

PLATE XIII.

- Fig. 1-3.—*Campanularia calculata*, Hincks. Port Jackson. (All from one colony).
 Fig. 4-7.—*Campanularia calculata* var. *makrogonia*, v. Land. Port Jackson. Different hydrothecæ from the same colony.
 Fig. 8.—*Campanularia calculata* var. *makrogonia*, outline of gonotheca.
 Fig. 9-10.—*Eucopella campanularia*, v. Land. Bondi.
 Fig. 11.— " " irregular calyx, from the same colony.
 Fig. 12-14.—*Eucopella campanularia*, from another variety.
 Fig. 15.— " " gonotheca, same specimen.
 Fig. 16.—*Lafŕea scandens*, n.sp., on *Sertularella divaricata*. Port Jackson.
 Fig. 17.— " " base of hydrotheca, from behind.
 Fig. 18.— " " gonotheca, with contents.
 Fig. 19.— " " " less advanced.
 (All except 17 magnified 40 diameters.)

PLATE XIV.

- Fig. 1.—*Halecium gracile*, n.sp., with male gonotheca. Port Jackson. × 40.
 Fig. 2.— " " " Port Stephens. × 40.
 Fig. 3.— " " " female gonotheca. × 40.
 Fig. 4.— " *parvulum*, n.sp. Bondi. × 40.
 Fig. 5.— " " " with female gonotheca. × 40.
 Fig. 6.—*Pasythea quadridentata*, Ellis and Sol. Bondi. × 25.
 Fig. 7.— " " " Coogee. × 25.
 Fig. 8-9.— " *hexodon*, Busk. Moreton Bay. × 25.

