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HYDROIDS
SCOTTISH NATIONAL
ANTARCTIC EXPEDITION

RITCHIE

1907-09

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SUPPLEMENTARY REPORT ON THE HYDROIDS OF THE
SCOTTISH NATIONAL ANTARCTIC EXPEDITION.

BY

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IV.—Supplementary Report on the Hydroids of the Scottish National Antarctic Expedition. By James Ritchie, M.A., B.Sc., Natural History Department, The Royal Scottish Museum. Communicated by W. S. BRUCE, LL.D.

(MS. received December 8, 1908. Read January 4, 1909. Issued separately May 27, 1909.)

Since the report on the Hydroids collected by the *Scotia* was completed, almost three years ago, I have had an opportunity, thanks to the kindness of Dr W. S. BRUCE, of looking through the enormous mass of material brought together by him during his Antarctic voyages. The search, begun in the hope of finding a few minute species—which, since many are epizoid on other forms of marine life, might readily be overlooked on cursory examination—has resulted in the addition of no less than 25 forms to the 36 already recorded. Deducting from this total of 61 forms two varieties, it appears that the *Scotia* collection contains in all 59 distinct species. Few, indeed, of these have been obtained in truly Antarctic latitudes—subantarctic or temperate seas having furnished the greater number—but this result is in accordance with the findings of the majority of the recent Antarctic expeditions.* Dr BILLARD, in summarising the results of the Belgian, Swedish, and French expeditions, states that the known Hydroid fauna of Antarctic regions comprises only 32 species. But from his list he has, I think unjustly, excluded South Georgian records. His list, moreover, published before the valuable paper by Professor HICKSON and Mr GRAVELY on the *Discovery* Hydroids was issued, necessarily makes no reference to the large number of forms recorded by them from Victoria Land.

The following figures indicate the wealth in species of the Hydroid fauna of Antarctic seas, the Antarctic area being defined as the region lying in “higher southern latitudes than the extreme limit of floating ice, according to the most recent research” (BRUCE, 1894, p. 208); that is, an area corresponding to the Antarctic Circumpolar Subregion of ORTMANN (1906). To this region belong the 14 species collected by the Belgian expedition (HARTLAUB, 1904), 24 of the Swedish collection of 50 species (JÄDERHOLM, 1905), the 8 species of the French expedition (BILLARD, 1906, ⁽²⁾), and 24 of the 25 English records (HICKSON and GRAVELY, 1907). From the same area the *Scotia* obtained only 9 species, although some of the most fruitful stations, Burdwood Bank, the Falkland Islands, and Gough Island, lay just beyond its boundary. Extracting the distinct species from those lists, we find that their number amounts to 68.

The Hydroid Zoophytes, then, are represented in the Antarctic circumpolar seas,

* The report on the Hydroids of the German expedition has not yet been published.

according to our present knowledge, by 68 different species, 21 of which are Gymnoblasts, 47 Calyptoblasts, while of the total, 36 must, so far, be regarded as peculiar to the Antarctic region. As regards the number of individuals as distinct from variety of species, recent results indicate that the area is a thinly populated one, for comparatively few Hydroids were brought up in any one haul of trawl or dredge, a strong contrast to the abundance of tangled masses which occur in such temperate areas as the North Sea. On the whole, the Antarctic Hydroid fauna may be looked upon as a rather meagre one, comprising comparatively few species belonging to well-established genera.

From the point of view of geographical distribution the collection to be described is of a miscellaneous character, for Dr BRUCE collected material on his outward and homeward voyages as well as at his southern stations. Thus specimens from tropical seas—from the Cape Verde Islands, from Brazil, and from St Helena—are recorded alongside specimens from subantarctic and Antarctic localities, but so little is known regarding the Hydroid fauna of those places that it seemed better to include them here, at the same time furnishing a record of all the Hydroids brought together by the *Scotia*.

Two species, *Thyrosocyphus tridentatus* and *Plumularia lagenifera*, hitherto recorded only from the South and North Pacific respectively, have been found in the South Atlantic, while the known ranges of several other species have been considerably extended.

Of new forms there have been described the trophosome and gonangium of *Sertularia heterodonta* from off Brazil, the trophosomes of *Antenella quadriaurita* from Gough Island, and of a variety of *Lafoëa gracillima* from deep water to the south of the South Orkneys, while the gonangia of *Sertularia rathbuni* and *Antennopsis scotiæ* have been described for the first time.

Some additions have been made to the existing descriptions of rare species, and noteworthy variations have been recorded in the hope that the realisation of the considerable limits within which variation is possible may tend to the better understanding of reliable specific characters.

I gladly seize this opportunity of setting right several unfortunate errors which occurred in the earlier report on the *Scotia* Hydroids. There should be substituted HINCKS for HINKS, LAMARCK for LAMARK, JOHNSTON for JOHNSTONE, and *Halecium* for *Halecium* on p. 523. *Aglaophenia dichotoma* of the former report I now identify with *A. heterodonta*, Jäderholm (*infra*, p. 96).

In the following list, which takes the place of that in the original report, I have included all the species collected by the Scottish expedition, those discussed in the present paper being indicated by an asterisk:—

GYMNOBLASTEÆ.

Family PODOCORYNIDÆ.

Podocoryne carnea, Sars, 1846.

Family MYRIOTHELIDÆ.

* *Myriothela austro-georgiæ*, Jäderh., 1904, p. 69.

Family EUDENDRIDÆ.

* *Eudendrium annulatum* (?), Norman, 1864, p. 70.

Family ATRACTYLIDÆ.

* *Perigonimus repens* (?), (Wright, 1858), p. 70.

CALYPTOBLASTEÆ.

Family HALECIDÆ.

Halecium arboreum, Allman, 1888.

(= ,, *robustum*, Allman, 1888.)

,, *beanii* (Johnston, 1838).

Halecium halecinum (Linn., 1758).

,, *interpolatum*, Ritchie, 1907, (1).

,, *tenellum*, Hincks, 1861.

Family CAMPANULARIDÆ.

* *Clytia johnstoni* (Alder, 1857), p. 71.

Campanularia angulata, Hincks, 1861.

* ,, *clytioides* (Lamx., 1824), p. 71.

,, *tincta*, Hincks, 1861.

,, sp., Ritchie, 1907, (1).

* *Obelia geniculata* (Linn., 1758), p. 72.

* ,, *hyalina*, Clarke, 1879, p. 72.

* ,, *longissima* (Pallas, 1766), p. 72.

* *Eucopeella crenata* (?), Hartlaub, 1901, p. 73.

Silicularia hemisphærica (Allman, 1888).

Hebella striata, Allman, 1888.

,, ,, var. *plana*, Ritchie, 1907, (1).

Calycella syringa (Linn., 1758).

* *Campanulina chilensis*, Hartlaub, 1905, p. 74.

* *Thyroscyphus tridentatus* (Bale, 1893), p. 74.

Family LAFOËIDÆ.

Lafoëa antarctica, Hartlaub, 1905.

,, *gracillima* (Alder, 1857).

* ,, ,, var. *benthophila*, n. var., p. 76.

Grammaria magellanica, Allman, 1888.

Brucella armata, Ritchie, 1907, (1).

Family SERTULARIDÆ.

Sertularella arborea, Kirchenpauer, 1884.

,, *contorta*, Kirchenpauer, 1884.

,, *filiformis*, var. *reticulata*, Ritchie,

1907, (1).

* ,, *fusiformis* (?), Hincks, 1861, p. 77.

* ,, *gayi* (Lamx., 1821), p. 78.

,, *rectitheca*, Ritchie, 1907, (1).

,, *tenella* (Alder, 1857).

,, *tricuspidata* (Alder, 1856).

* *Sertularia cornicina* (M'Crady, 1859), p. 78.

* ,, *heterodonta*, n. sp., p. 79.

* ,, *mayeri*, Nutting, 1904, p. 81.

* ,, *operculata*, Linn., 1758, p. 82.

* ,, *rathbuni*, Nutting, 1904, p. 83.

* *Thuiaria articulata* (Pallas, 1766), p. 84.

(= ,, *pectinata*, Allman, 1888.)

Syntheceium robustum, Nutting, 1904.

Staurotheca reticulata, Ritchie, 1907, (1).

Family PLUMULARIDÆ.

- * *Plumularia curvata*, Jäderholm, 1904, p. 86. * *Monostæchas quadridens* (M'Crady, 1859), p. 91.
 (= ,, *magellanica*, Hartlaub, 1905.) * *Antenella quadriaurita*, n. sp., p. 92.
 * ,, *echinulata*, Lamarck, 1836, p. 87. * *Aglaophenia allmani*, Nutting, 1900, p. 93.
 * ,, *lagenifera*, var. *septifera*, Torrey, 1902, p. 87. * ,, *dubia*, Nutting, 1900, p. 95.
 ,, *pinnata* (Linn., 1758). * ,, *heterodonta*, Jäderholm, 1904, p. 96.
 * ,, *setacea* (Ellis, 1755), p. 89. (= ,, *dichotoma*, of first *Scotia* Report.)
 ,, *unilateralis*, Ritchie, 1907, (1). * ,, *minima*, Nutting, 1900, p. 97.
Antennularia hartlaubi, Ritchie, 1907, (1). * ,, *latecarinata*, Allman, 1877, p. 98.
 * *Antennopsis scotiae*, Ritchie, 1907 (1), p. 90. * *Halicornaria longicauda*, Nutting, 1900, p. 98.

The localities from which the species recorded in this paper have been obtained are so scattered that, for convenience of reference, I have brought them together in list form.

STATION 313, 62° 10' S., 41° 20' W. (S. of South Orkneys).

Lafoëa gracillima, var. *benthophila*, n. var.

SCOTIA BAY, SOUTH ORKNEYS.

Myriothele austro-georgiae, Jäderholm.

BURDWOOD BANK, 54° 25' S., 57° 32' W.

Campanulina chilensis, Hartlaub.

PORT STANLEY, FALKLAND ISLANDS.

Perigonimus repens (?) (Wright).

Plumularia curvata, Jäderholm.

GOUGH ISLAND.

Obelia longissima (Pallas).

Thyroscyphus tridentatus (Bale).

Antenella quadriaurita, n. sp.

CAPE COLONY.

Houtjes Bay (Saldanha Bay).

Plumularia echinulata, Lamk.

Saldanha Bay, entrance to.

Eudendrium annulatum (?), Norman.

Obelia geniculata (Linn.).

Sertularia operculata, Linn.

Thusaria articulata (Pallas).

Plumularia lagenifera, var. *septifera*, Torrey.

Antennopsis scotiae, Ritchie.

Aglaophenia heterodonta, Jäderholm.

ST HELENA.

Sertularella gayi (Lamx.).

STATION 81, Abrohlos Bank, Brazil, 18° 24' S., 37° 58' W.

Sertularia cornicina (M'Crady).

,, *heterodonta*, n. sp.

,, *rathbuni*, Nutting.

Monostæchas quadridens (M'Crady).

Aglaophenia allmani, Nutting.

,, *dubia*, Nutting.

,, *minima*, Nutting.

Halicornaria longicauda, Nutting.

ST VINCENT, CAPE VERDE ISLANDS.

Eucopeia crenata (?), Hartlaub.*Sertularella fusiformis* (?), Hincks.

Lat. 27° 54' N., long. 33° 17' W.

Clytia johnstoni (Alder).*Sertularia mayeri*, Nutting.

STATION 537, 29° 54' N., 34° 10' W.

Campanularia clytioides (Lamx.).*Obelia hyalina*, Clarke.

STATION 538, 32° 11' N., 34° 10' W.

Plumularia setacea (Ellis).*Aglaophenia latecarinata*, Allman.*Myriothele austro-georgiæ*, Jäderholm, 1904.

Several specimens of this bizarre Hydroid have to be recorded. All came from a single neighbourhood, Scotia Bay in the South Orkneys, but the depths at which the specimens were obtained varied. Some of the examples have already been described by Professor J. ARTHUR THOMSON in a short paper in which he regards them, not without hesitation, as the separated gonostyles of some unknown giant Siphonopore (THOMSON, 1904). There can be no doubt, however, that these specimens are identical with those found by both the Swedish and the French Antarctic expeditions, and recorded by Drs JÄDERHOLM and BILLARD (1906, p. 4) as *Myriothele austro-georgiæ*. The length, the thickened basal portion on which the blastostyles (each bearing its male or female gonophores and a distal tentacle or two) are massed, and, most characteristic of all, the capitate tentacles scattered irregularly over the whole hydranth, even amongst the blastostyles—these features show that our examples belong to the same species as theirs. Nor can there be any doubt that JÄDERHOLM was correct in regarding his specimens as belonging to the genus *Myriothele*, for their resemblance to the northern forms is striking,—solitary hydranths, absence of hydrocaulus, capitate tentacles scattered over the body, blastostyles grouped at the base of the hydranth, the presence of longitudinal folds of endoderm lining the inner cavity.

Professor THOMSON remarks that some of the colonies bore solitary gonophores, while one had as many as seven on its blastostyles, and suggests the possibility of the presence of two species. Since, however, the specimens examined by JÄDERHOLM had generally from one to three, but sometimes as many as six female gonophores, while the male gonophores occasionally numbered even ten on a single blastostyle, the variation is so great that little stress can be laid on this as a specific character.

A water-colour sketch made on the capture of one of the specimens indicates that their colour was a stronger and brighter orange than is shown by JÄDERHOLM's figure. (JÄDERHOLM, 1905, pl. i.).

Locality.—Scotia Bay, South Orkneys; dredged in 10 fathoms, April 1903; dredged in 9 to 10 fathoms, May 1903; dredged among mud and pebbles, 18th December 1903.

One specimen was found "on the surface of the water, in a hole which had been cut in the ice. The depth of the water at that place was 20 to 30 fathoms; the temperature was 29° F."

M. austro-georgiæ has previously been recorded from Cumberland, South Georgia, (JÄDERHOLM), and from Flanders Bay and Booth-Wandel Island (BILLARD).

Eudendrium annulatum (?), Norman, 1864.

Two small clumps of bushy colonies appear to belong to this species, but the weathering of our specimens, and the indefiniteness of the characters which differentiate the species of *Eudendrium*, render certainty impossible. The colonies are 5 cm. high, and agree with Canon NORMAN'S species in being bushy and beset with very numerous branchlets; in possessing thick, rugged stems, on the surface of which, near the base, the fascicular tubes are more or less contorted; in having branches closely covered with strongly marked rings; and in bearing hydranths with about from 16 to 18 tentacles. On the other hand the gonophores, all of which are female, are borne on tentacle-bearing hydranths and not on atrophied individuals. So many, however, are the gonophores and so closely are they packed around the hydranth, that in not a few cases it was difficult to distinguish the presence of tentacles. Since, in some species at least, the loss of the tentacles is a degenerative change keeping pace with advancing maturity, their presence in this case may be of less significance than at first one tends to regard it.

These measurements were made:—The diameter of the unfasciated branches and branchlets is almost constant, about 0·18 mm. The hydranths are about twice as long as broad, the breadth being measured at the level of the bases of the tentacles (0·57 mm. long, 0·28 mm. broad).

Locality.—Entrance to Saldanha Bay, Cape Colony. Depth, 25 fathoms. 21st May 1904.

Eudendrium annulatum is a North Atlantic form which has been recorded from Shetland (NORMAN, 1864); Jan Mayen (MARKTANNER-TURNERETSCHER, 1890); Pas-de-Calais (BÉTENCOURT, 1899); Norwegian Coast (BONNEVIE, 1899).

Perigonimus repens (??) (Wright, 1858).

Scanty material which I have, not without doubt, referred to the above species was collected on the shore at Port Stanley. The stems, with a diameter of from 0·04 to 0·05 mm., arise from a stolon creeping upon an encrusting Polyzoon, and reach a height of 10 mm. They bear a considerable number of branches which leave the stem at a sharp angle and carry secondary, and these sometimes twigs of tertiary degree, in such a way as to give the colonies the appearance of being dichotomously branched. The offshoots can always be distinguished, however, by the presence of a slight constriction at their bases. The stems bear distinct rings at their bases and here and there through-

out their course, while the intermediate portions are more or less corrugated. A delicate chitinous envelope surrounds the coenosarc and is adorned with minute sand particles, fragments of sponge spicules, etc., this coating being continued over the lower part of the hydranth. The hydranths, which are in poor condition, appear to be rather globular in shape and have from 12 to 15 tentacles. Short-stalked gonophores occur scattered over the hydrocaulus, but they are far from mature and offer no characters of significance.

I have no hesitation in identifying my specimens with those collected by PAESSLER at Port Stanley in 1895 and described by HARTLAUB (1905, p. 530), although our examples bear more numerous branches than his "gar nicht oder nur schwach verzweigten Hydrocauli." And I follow HARTLAUB, but with considerable hesitation, in referring the colonies to the *Perigonimus repens* of WRIGHT, an almost unbranched form with a maximum height of " $\frac{1}{4}$ inch" (HINCKS, 1868, p. 90), contenting myself merely with adding a second mark of interrogation to that which expresses HARTLAUB'S doubt.

Locality.—Growing on an encrusting Polyzoon, from seaweed found on the shore at Port Stanley, Falkland Islands. January 1903.

Clytia johnstoni (Alder, 1857).

Of this common European species only a few stems occur on Saragassum weed. They resemble miniature British examples of *C. johnstoni*, structurally alike in every detail, but altogether on a much smaller scale. They are even less in some measurements than the small variety found by Dr BILLARD (1907,⁽¹⁾ p. 168) on material from the Saragassum Sea.

Measurements:—

Stem, length	1·6–2·1 mm.
„ diameter	0·63–0·71 „
Hydrotheca, length	0·66–0·7 „
„ diameter at margin	0·41–0·48 „

Locality.—Off Saragassum weed, from lat. 27° 54' N., long. 33° 17' W. 28th June 1904.

Campanularia clytioides (Lamouroux, 1824).

Several specimens of this minute species have been found creeping on Saragassum fronds. The stems are short, measuring from 0·74 mm. to 0·95 mm. in length and 0·1 mm. in diameter, and are marked by about eight compact rings at the base of the hydrocaulus and about six less compact rings beneath the hydrotheca. The intermediate portion of the stem is smooth or only slightly corrugated. The hydrothecæ are short (0·34 mm.), rather broad at the mouth (0·38 mm.), and taper rapidly to the base. Their walls are thick, but vary considerably in different individuals and even in the various parts of the same individual. At the margin of the shelf which divides the

cavity of the hydrotheca proper from the small globular cavity at its base is a ring of bright dots, indicating the points at which the base of the polyp was attached to the hydrothecal wall.

The gonosome is not present.

Locality.—On gulf weed from Station 537. Lat. 29° 54' N., long. 34° 10' W. 29th June 1904.

Obelia geniculata (Linnæus, 1758).

In addition to the Gough Island locality given in the former report, this widely distributed species occurs from another station. Gonophores are present on the colonies from habitat (b).

Locality.—(a) Entrance to Saldanha Bay, Cape Colony. Depth, 25 fathoms. 21st May 1904. (b) Growing plentifully, along with *Plumularia lagenifera*, var. *septifera*, on the segments and telson of a lobster, *Palinostus lalandii*, from the same locality.

Obelia hyalina, Clarke, 1879.

Many small, 6-mm. high colonies of this species occur creeping over the fronds of Saragassum weed in association with *Campanularia clytioides*. The characters are as described and figured by CLARKE, and the dimensions of our specimens appear to agree more closely with those of the type than do the corresponding measurements of the large-sized *Talisman* examples described by Dr A. BILLARD (1907, p. 170).

Measurements:—

Hydrotheca, depth	0.2 mm.
„ maximum diameter	0.18 „
Peduncles, length	0.36–0.45 mm.
Stem internodes, length	0.54 mm.

No gonangia were present.

Locality.—Creeping on gulf weed from Station 537. Lat. 29° 54' N., long. 34° 10' W. 29th June 1904.

Obelia longissima (Pallas, 1766).

In addition to the colonies already recorded from the South Orkney Islands, a small fragment whose characters agree with those of the above species has been found at Gough Island.

Measurements:—

Hydrotheca, depth	0.38–0.45 mm.
„ diameter at margin	0.38–0.45 „

Locality.—Off Gough Island. Depth, 25 fathoms. Bottom, rock. 23rd April 1904.

Eucopeella crenata (?), Hartlaub, 1901.

A very few examples, whose occurrence has already been mentioned (RITCHIE, 1907,⁽²⁾ p. 488, footnote), were creeping on seaweed obtained on the shore of St Vincent, Cape Verde Islands. The absolute identification of these examples with Professor HARTLAUB'S *E. crenata* is, in the absence of the gonosome, impossible, and, considering differences which occur in the shape of the hydrotheca and in the ringing of the peduncle, appears to me to be a matter of doubt. Our specimens, however, are identical with those described by Dr A. BILLARD, 1907, and I follow him in assigning them (with a query) to the above species. The hydrotheca are more conical than those of the type, and their proportions differ slightly from those of BILLARD'S specimens, where the depth exceeds the breadth, for here these dimensions are identical, or the latter may even exceed the former. The margin of the hydrotheca is cut into about thirteen rounded teeth, and above the projecting septum at the base there occurs a circle of from 28 to 31 bright dots (indicated in HARTLAUB'S fig. 27). The peduncles bear from 9 to 12 sharply defined rings at the base, and from 1 to 4 annulations at the summit, while the median portion is generally more or less corrugated.

Measurements :—

Length of peduncle	1.01–1.98 mm.
Breadth „	0.07–0.09 „
Depth of hydrotheca	0.32–0.45 „
Breadth „ at margin	0.34–0.40 „

Locality.—Growing on seaweed from the shore to the N.E. of Porto Grande, St Vincent, Cape Verde Islands. 1st December 1902.

Apparent evidences of regeneration are given by some of the specimens. To mention one example. The hydrotheca is borne on a stem 1.68 mm. in length, but this stem is composed of two distinct portions, a basal section 1.04 mm. long with walls 9μ in thickness, of a dark horn colour and deeply stained by eosin. This portion is sharply truncated at the distal end. It is succeeded by a shorter section 0.64 mm. long, with walls only 6μ in thickness, clear and transparent and faintly tinged with eosin. It is apparent that the peduncle has been truncated at a particular point, and that from this point the regenerating hydranth has built a new perisarcal protecting sheath which, as one would expect, differs in density from the older portion. It is interesting to note that the regenerated portion has, instead of continuing the smooth character of the old peduncle, assumed the character of a complete peduncle, for it bears four clean-cut rings above its point of origin, these being followed by a corrugated portion, and this by three rings below the hydrotheca. In all the cases examined the regeneration process has reproduced a complete but miniature peduncle.

Campanulina chilensis, Hartlaub, 1905.

Three minute colonies epizoic on *Halecium beanii* belong to this species. The ringing and branching of the stems and the shape of the hydrothecæ agree with the descriptions and figures of HARTLAUB and of JÄDERHOLM (1905), but although the former says of the hydrothecæ that they are "viel weniger conisch als die von *C. repens*, Wright" [! ALLMAN, 1864], I cannot distinguish between the hydrothecæ of the South American and British species. *C. chilensis* is, however, more frequently branched than *C. repens*, but I doubt whether this and the other rather indefinite characters cited by HARTLAUB are constant and of specific value. Scarcity of material of both the South American and British forms, however, prevents a comparison sufficiently extensive to warrant me in setting them down as belonging to the same species.

Measurements :—

	<i>C. chilensis.</i>	<i>C. repens.*</i>
Stem, diameter	0.06 mm.	0.08 mm.
Hydrotheca, length	0.20-0.21 mm.	0.18-0.28 mm.
„ diameter at mouth	0.09 mm.	0.10 mm.

Locality.—Growing upon *Halecium beanii* from Station 346, Burdwood Bank. Lat. 54° 25' S., long. 57° 32' W. Depth, 56 fathoms. 1st December 1903.

JÄDERHOLM has already recorded *C. chilensis* from Burdwood Bank, where it was growing on the carapace of a crab at 137-150 metres. BILLARD (1906,⁽³⁾ p. 12), found the species in collections from Flanders Bay and Booth-Wandel Island. HARTLAUB'S specimens were obtained at Calbuco on *Tubularia* and *Eudendrium*.

Thyrosocyphus tridentatus (Bale, 1893).

A few colonies have been found at a single locality. Simple, unbranched stems, 10 mm. in height, arise from a creeping hydrorhiza at intervals of some 2 or 3 mm. To the unaided eye the colonies have an erect, rigid appearance, and are seen to bear prominent hydrothecæ placed alternately on the stem. Under the microscope the stem resolves itself into a series of distinct internodes which vary considerably in size, a much shorter being occasionally wedged in between two longer individuals. That the nodes in our specimen are apparently more distinct than those in the examples recorded by Professor HARTLAUB (1901, p. 369) from French Pass, to the north of the South Island of New Zealand, is of little importance, as the boundary mark between internodes is liable to considerable variation. The locality of the node is, moreover, rendered more evident in the *Scotia* specimens, because the proximal end of each internode is generally marked by a rude annulation. The hydrothecæ are arranged alternately, and the whole series lies in one plane.

A hydrotheca rests upon a short process at the distal end of each internode. The hydrotheca is separated by a distinct boundary line from the internodal process, and occasionally one, two, or even three short joints intervene between them. The distal

* Specimens from Plymouth in my collection.

margin of such an interpolated joint is always abrupt, and the perisarc of the existing calycle is not directly continuous with this margin, but is found to merge with that of the interpolated joint some distance *within* the joint (see fig. 16). From this it would appear that the joints are not all contemporaneous, but represent the remains of former cups which, broken off by accident, have been replaced once, twice, or oftener by the regenerative power of the coenosarc. In this case, therefore, they can be of no diagnostic value. Evident knobs of chitin are present on the inner surface of the adcauline wall at the base, and of the abcauline wall at the margin. The former do not seem to be reproduced in regenerated hydrothecæ.

The hydrothecæ are much more deep than broad, and are characterised by an almost straight abcauline and a strongly convex adcauline contour. They are in most cases considerably longer than the stem internodes. The margin is divided into three pro-

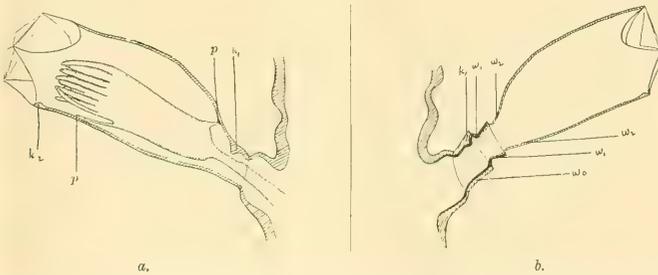


FIG. 1.—*Thyroscyphus tridentatus*. × 70. (a) Primary hydrotheca showing k_1 and k_2 , knobs of chitin; pp , points on hydrotheca to which the hydranth is moored by coenosarc strands. (b) Internode process and regenerated hydrotheca; k , knob of chitin marking base of primary hydrotheca; w_0 , wall of original hydrotheca; w_1 , wall of first regenerated hydrotheca; w_2 , wall of second regenerated hydrotheca.

nounced teeth, separated by three deep and graceful bays, and is furnished with a three-flapped operculum. No trace of a gonosome could be found.

The following measurements give some indication of the variable proportions of our specimens :—

Stem, length	Up to 13 mm.
Internode, length	0.49*–0.91 mm.
„ breadth	0.13–0.22 mm.
Hydrotheca, length	0.60–0.63 „
„ breadth (maximum)	0.22–0.28 „

Locality.—Gough Island. Depth, 25 fathoms. Bottom, rock. 23rd April 1904.

Distribution.—The species was originally described by BALE from material obtained at Port Phillip, in the south of Australia, as *Campanularia tridentata*. Subsequently it has been recorded by Professor HARTLAUB (1901) from French Pass, north of South Island, New Zealand. These, so far as I am aware, constitute the only records of the species, so that the *Scotia* specimens from Gough Island, midway between Cape of Good Hope and Cape Horn, extend its known range from the South Pacific to the South Atlantic.

* A regenerated internode which succeeded an old truncation of the stem.

Lafoëa gracillima (Alder, 1857), var. *benthophila*,* n. var.

This species has to be recorded from an additional locality, to the south of the South Orkney Islands. The two specimens from this locality are, however, of a type quite distinct from the Burdwood Bank examples. They are both small and incomplete. The larger, 18 mm. high, bears two short branches; the smaller, 9 mm. high, is branchless. Only a trace of fasciculation is exhibited by the latter, but the stem of the former is a typical rhizocaulom. The hydrothecæ, while they closely resemble those of typical examples of *L. gracillima*, differ in being placed at more regular intervals on the stem, in preserving a near approach to alternation, in lying towards the stem at a much smaller angle, and in lacking a twist on the hydranthophore.

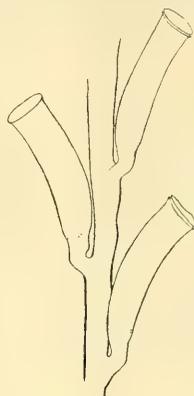


FIG. 2.—*Lafoëa gracillima*, var. *benthophila*. Portion of branch with hydrothecæ. $\times 30$.

I do not lay much stress on this last point, however, since untwisted hydranthophores are not unfrequently present in typical colonies of the species. The most striking difference lies in the robustness of the hydrothecæ, the dimensions being much greater than in any other specimen I have examined. Near the base of the hydrotheca proper is a rude row of minute, refringent prominences on the internal wall, to which the base of the polyp was presumably attached. Occasionally, but only where the margin is reduplicated, two rows of dots occur.

The following table indicates in millimetres the differences, in respect of size, between the present and typical specimens:—

	Coat's Land Specimen.	Burdwood Bank Specimen.	North Sea Specimen.
Hydrotheca, including hydranthophore	0·87-1·01	0·63-0·64	0·57-0·76
„ diameter at mouth	0·21-0·25	0·11-0·13	0·11
Diameter of a simple tube	0·16	0·11	0·10

* βένθος, the deeps; and φίλος, loving.

No gonangia were present.

Locality.—Station 313. Lat. 62° 10' S., long. 41° 20' W. Depth, 1775 fathoms. Bottom deposit, blue mud and boulders. 18th March 1903.

The distribution of the species is almost world-wide, but it has not hitherto been recorded from Antarctic Seas.

Sertularella fusiformis (?) Hincks, 1861.

A few minute simple stems, 7 mm. high, rising from a stolon creeping upon a seaweed. The slightly geniculate stems are divided into internodes which vary considerably in length, those nearer the base being longer than the more distal, the former 1·08 mm. as against an average of 0·61 mm. for the latter. The internodes are narrow, only

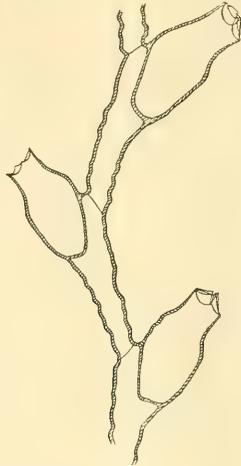


FIG. 3.—*Sertularella fusiformis* (?) Portion of stem. $\times 40$.

0·06 mm. in diameter at the base, but they widen upwards until a ledge is formed upon which the base of the hydrotheca rests. They are separated by slanting nodes, immediately above which occur one or two rings, while the remainder of the internode is more or less definitely wrinkled.

The hydrothecæ lie in the same plane, are alternate, and are placed one on the distal end of each internode. Rather more than half of each is free, the free portion leaning well away from the stem. In shape they are flask-like, bulging proximally, while towards the distal end there is formed by a sudden constriction a distinct "neck," which is surmounted by the four-toothed margin. The walls of the hydrothecæ are smooth externally, but just within the margin the inner surface bears four distinct blunt teeth which lie midway between the marginal teeth.

Dimensions of hydrotheca:—

Length	0.45–0.52 mm.
Diameter where it becomes free from internode	0.25–0.27 „
Diameter of “neck”	0.14–0.16 „

No gonangia were present.

It is with some doubt that these specimens, their gonangia lacking, have been referred to the *S. fusiformis* of HINCKS. The hydrothecæ in our specimens appear to be more robust, to have a more decided “neck,” and a more pronounced inclination away from the stem, while the presence of internal teeth is not mentioned in HINCKS’s description. The present specimens closely approach the very doubtful *S. fusiformis* (??) described by Professor CL. HARTLAUB (1900, pl. 5, fig. 9) from Rovigno on the Adriatic Sea, but the ringing which is absent in his is markedly present in our examples.

Locality.—Growing on seaweed found on the shore to the N.E. of Porto Grande, St Vincent, Cape Verde Islands. 1st December 1902.

Sertularella gayi (Lamouroux, 1821).

In addition to the colony found near Gough Island, another of almost equal dimensions, 12 cm. high, has to be recorded from St Helena. Its minute structure is very similar to that of the Gough Island example, the rugosities on the upper surface of the hydrothecæ being in some cases almost obsolete.

This species, although widely distributed in the Northern Atlantic and in the Mediterranean Seas, has hitherto been recorded south of the equator only from the Cape of Good Hope (Algoa Bay), (HARTLAUB, 1905, p. 613). In conjunction with this occurrence the two *Scotia* records, from Gough Island and St Helena, may be taken to indicate a wide distribution for the species in the South as well as in the North Atlantic.

Locality.—Intertwined with an Alcyonarian, *Amphilaphis regularis*, from St Helena. 30th May 1904.

Sertularia cornicina (McCrady, 1859).

Scanty material, a mere half-dozen colonies, represent this species. The stems arise from a stolon creeping upon the surface of the fragment of *Codium* also invested by *S. rathbuni* and *S. heterodonta*, from the former of which, indeed, they are almost indistinguishable to the unaided eye. The largest is only 6 mm. in height. The specific characters agree with those given by NUTTING (1904, p. 58), but the following variations were noted. The stem internodes are proportionally longer than in NUTTING’s specimens, for while in his examples the “height of the hydrothecæ is usually about equal to that portion of an internode which lies between the hydrothecal base and the node below,” in ours the latter distance considerably exceeds the former. Our hydrothecæ, again, have a longer distal portion free from the stem, the result being that the proportion of the anterior adnate part to the whole length of the hydrotheca is

reduced from "about two-thirds" to about one-half. As seen from the anterior aspect the hydrotheca appears to be covered in by only two opercular flaps, the free margins of which run from the tip of one lateral tooth to that of the other; but when a lateral view of the colony is obtained, so that one can look directly on the operculum, another line is seen running from the mid point of the horizontal line connecting the lateral teeth to the median superior point of the aperture. This line presumably marks the margin of two contiguous flaps of the operculum, and it would therefore seem that three, and not two, are present. The determination, however, is one of considerable difficulty owing to the delicacy of the operculum. The downward projecting processes from the base of the hydrotheca are long and evident.

Measurements:—

Internodes, length	0.63-0.78 mm.
„ breadth	0.05-0.06 „
Hydrotheca, length of contiguous portion	0.22-0.25 „
„ „ free portion *	0.21-0.22 „
„ diameter near base	0.08-0.09 „
„ at aperture	0.08-0.09 „

Locality.—Growing upon seaweed (*Codium*, sp.) from Station 81, Abrohlos Bank, Brazil. Lat. 18° 24' S., long. 37° 58' W. 36 fathoms. Bottom deposit, coral. 20th December 1902.

Sertularia heterodonta,† n. sp.

Growing upon the surface of a seaweed (*Codium*, sp.) in company with *S. rathbuni* and *S. cornicina* are numerous colonies of this more minute form. The simple unbranched stems arise from a creeping stolon and cover the weed as with a coat of delicate hairs. At first glance the colonies are hard to distinguish from those of *S. rathbuni*, but on close examination their minuteness and delicacy render them distinct even to the unaided eye. The largest are only 6 mm. in height, 3.5 to 4 mm. being much more common. The hydrorhizal tube has a diameter a little greater than that of the stem, and is strengthened in places by chitinous processes projecting downwards from its roof or upwards from its floor.

The stems are divided into fairly regular internodes separated by distinct nodes. At the base two oblique nodes occur in succession, cutting off between them a short lozenge-shaped athecate internode. The remainder of the internodes are long and slender, narrower at the proximal end and very gradually increasing in diameter upwards, until by a sudden dilation at the top they form a broad bracket upon which the hydrothecæ rest. The thecate internodes are separated by straight nodes, but occasionally an oblique node occurs in addition, a small athecate internode being in such a case intercalated between the longer thecate individuals.

* The "free portion" is measured from the line of the stem to the tip of the lateral teeth.

† *ἕτερος*, other; and *ὄντος*, a tooth, indicating the presence of other than the usual marginal teeth.

An opposite pair of hydrothecæ rests on each internode, six to seven or even ten pairs being found on one colony. The hydrothecæ are set slightly on front of the stem, are always contingent in front for rather more than one-third of their total length, but remain separate behind. The free portion diverges abruptly at a wide angle. Viewed from the anterior aspect the sides of the adherent portion of a hydrotheca are parallel to the long axis of the stem, while those of the free portion converge towards the aperture. The contour lines, especially in the younger hydrothecæ, are remarkably straight and graceful. Beneath the innermost angle of the base there is a minute chitinous thickening, and another projects from the base into the interior of the hydrotheca. The latter appears to be roughly triangular in shape, the apex pointing

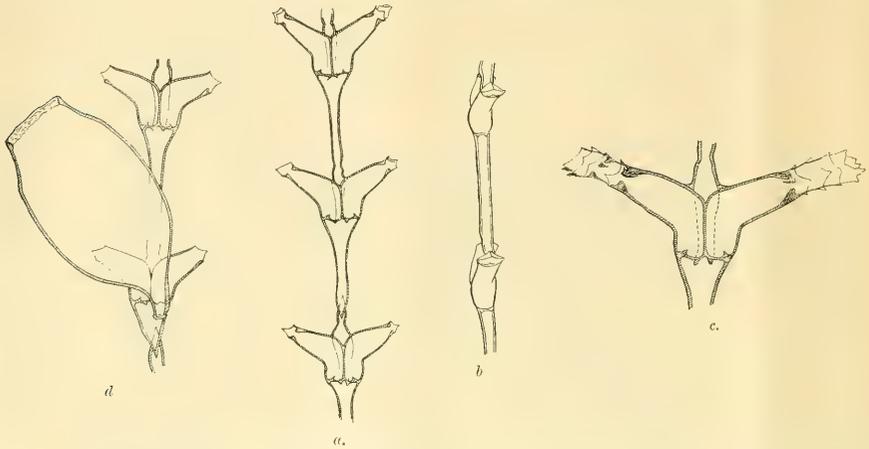


FIG. 4.—*Sertularia heterodonta*. (a) Anterior aspect of stem. $\times 60$. (b) Lateral aspect of stem showing three-flapped operculum. $\times 60$. (c) Hydrothecæ with reduplicated margins, one regenerated margin bearing internal teeth. $\times 100$. (d) Gonotheca. $\times 50$.

into the cup, the side towards the centre of the stem being thickened and concave, that remote from the centre sloping gradually till it merges with the hydrothecal floor. This process represents a small ridge bounding the posterior edge of the opening between hydrotheca and stem. The margin of the hydrotheca is divided into three distinct and sharp teeth, the lateral pair the more prominent, the median and superior individual tilted slightly upwards. There are three opercular flaps, difficult to distinguish except when one is looking directly into the aperture of the hydrotheca. Just within the margin and projecting from the inner wall are three prominent internal teeth, triangular in shape, with blunt apices tilted towards the aperture. These alternate with the marginal teeth. In hydrothecæ towards the base of the stem the superior pair appears occasionally to be undeveloped. Frequently the free portion of the tube is much elongated by the reduplication of the margin, and in some cases a new series of internal teeth is produced on the added portion (fig. 4, c).

The gonangium, of which I have been able to find only one example, is borne on the front of the stem immediately beneath a hydrotheca. It is oval in shape, tapering below to form a distinct stalk, and truncated above by a wide aperture. This is bounded by an insignificant thickened neck punctuated by small refringent chitinous swellings on the inner surface. The walls of the gonangium are smooth.

Measurements :—

Internodes, length	0.46-0.62 mm.
„ diameter near base	0.03-0.04 „
Hydrotheca, length of contiguous portion	0.10-0.14 „
„ „ free portion*	0.14-0.15 „
„ diameter at base	0.06-0.07 „
„ „ „ aperture	0.04 mm.
Gonangium, length	0.74 „
„ maximum diameter	0.41 „

One colony shows a pair of hydrothecæ at an early stage of development, ere yet the aperture, or the base, or the internal teeth had been formed. The stolon has so regulated itself to the papillated surface of the *Codium* upon which it is growing that the outline of its under surface is made up of a series of crescentic bays.

The three-toothed margin, the three-flapped operculum, the prominent internal teeth, the presence of a projection from the base into the interior of the hydrotheca, together with the straight contours of the hydrothecæ and the length of the internodes, are points which distinguish this species. It has affinities with *S. linealis*, Warren, 1908.

Locality.—Growing upon seaweed from Station 81, Abrohlos Bank, Brazil. Lat. 18° 24' S., long. 37° 58' W. Depth, 36 fathoms. Bottom deposit, coral. 20th December 1902.

Sertularia mayeri, Nutting, 1904.

Small colonies, 5 mm. high—less than half the height of the type specimens—occur creeping on Saragassum weed. Their characters agree with NUTTING'S description and figures, and are identical with those of specimens collected by Mr CROSSLAND at the Cape Verde Islands (RITCHIE, 1907,⁽²⁾ p. 505), although, owing to their smaller size and the consequent restriction of the number of hydrotheca-pairs (in the largest specimen mounted for microscopical examination there are only six pairs), the variation between the proximal and distal pairs is not so marked as in the larger Cape Verde specimens. Even here, however, the distinction between the distal long, narrow, closely forked, gradually separating pairs, and the proximal short, dumpy, wide-spreading pairs is sufficiently distinct and characteristic. It is indicated by the measurements below. In the majority of the calyces two lateral teeth and a smaller median and superior tooth, which succeeds an indentation in the wall of the hydrotheca and curves slightly upwards, are very evident.

* From the line of the stem to the tip of the lateral teeth.

Measurements (*a* and *b* are distinct colonies) :—

	Basal.		Distal.	
	<i>a.</i>	<i>b.</i>	<i>a.</i>	<i>b.</i>
Length of internode	0·42	0·49 mm.	0·56	0·66 mm.
„ hydrotheca	0·29	0·30 „	0·38	0·45 „
Breadth of hydrotheca-pair from tip to tip	0·48	0·46 „	0·56	0·52 „
„ „ „ at base	0·22	0·25 „	0·21	0·20 „

Locality.—Creeping on gulf weed, lat. 27° 54' N., long. 33° 17' W. 28th June 1904.

Sertularia operculata, Linnæus, 1758.

Several small fragments of this species occur intertwined with other Hydroids from the same locality. The specimens are typical in branching and in minute structure, but a considerable amount of variation occurs not only in the length of the two hydrothecal teeth, but also in their prominence relative to each other (*cf.* HARTLAUB, 1905, pp. 665, 666). Of the specimens figured by Professor HARTLAUB our examples most nearly approach those from West Patagonia collected by F. P. MORENO; but from those they differ in the proximity of the hydrothecæ, for the teeth of one may reach the level of the base of its successor. The present examples are also characterised by the exceedingly minute portion of the distal extremity of the hydrotheca, which is free, the proximal side of the aperture lying almost against the internode.

The points above refer specially to the younger branches. On the older portions the hydrothecæ are only sub-opposite, their length is less relatively to that of the internode, while a slightly longer distal portion is free.

A few typical gonangia occur on the branches. They exhibit a tendency to asymmetry, the aperture lying towards the outer side of the axis of symmetry.

The following measurements indicate the relations of the various parts :—

Length of branch internode	0·33–0·50 mm.
„ stem internode	0·54–0·61 „
„ hydrotheca	0·20–0·25 „
„ teeth	0·06–0·12 „
Distance from tip to tip of a hydrotheca-pair	0·43–0·58 „

Locality.—Dredged at the entrance to Saldanha Bay, Cape Colony, in 25 fathoms. 21st May 1904.

The distribution of this species is world-wide. In addition to its European localities it has been recorded from the coasts of North and South America, of Southern Asia, of Australia and New Zealand, and of Africa, although the records from the last continent are few. The African localities other than the *Scotia* record are as follows :—

South Africa (BUSK, 1850); Cape of Good Hope (*Eugenie* Expedition, JÄDERHOLM, 1903); Port Natal (Professor J. A. WAHLBERG, JÄDERHOLM, 1903); Mauritanian Coast (BILLARD, 1906⁽¹⁾); North-West of Cape Blane, Soudan (BILLARD, 1906⁽²⁾).

Sertularia rathbuni, Nutting, 1904.

The specimens occur plentifully on a seaweed (*Codium*, sp.), standing erect and rigid on its surface, so that it appears as if covered with a sparse coating of delicate hairs. They are simple, altogether without branches, herein differing, but immaterially, from the specimens described by ALLMAN (1877), VERSLUYS (1899), and NUTTING, some of which bore pinnules, and they attain a height of only 10 mm. The structures of the stem are as previously described. The hydrothecæ are in opposite pairs, the individuals of which, in the distal part of the colony, are contingent for almost half their height, but the line of contact gradually decreases until in the proximal pair the individuals

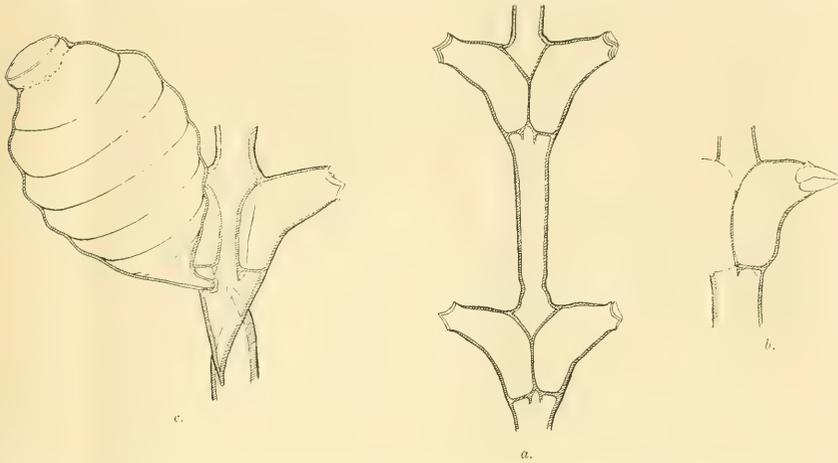


FIG. 5.—*Sertularia rathbuni*. (a) Anterior aspect of stem. $\times 50$. (b) Three-quarters view of hydrotheca showing three-flapped operculum. $\times 60$. (c) Gonangium. $\times 70$.

may be quite apart. Behind the stem the hydrothecæ are always separate. Beneath each hydrotheca, at the corner where base and inner wall meet, are two chitinous processes which project downwards and lie alongside the wall of the internode. These processes are more distinct in the older hydrothecæ. The margin of a hydrotheca is cut into three teeth, the lateral pair longer than the single superior tooth. There are three opercular flaps.

Gonosome.—The gonangia, which have not previously been described, occur on many of the colonies. They are borne on the stem, from one to three in number, and arise immediately beneath hydrothecæ towards the base of the colony. In the specimens which I have examined only one gonangium is apportioned to each hydrotheca-pair. The gonangia are broadly ovate, marked with about six rather indefinite annulations. Proximally they taper into a short stalk, while distally they contract into a short wide neck, ornamented at its base by a circle of bright spots, thickenings of the

perisarc. The contents of the gonangia were frequently missing, and in no case were they in a state fit for minute examination.

Measurements :—

Internodes, length	0.81–0.94 mm.
„ breadth	0.10–0.12 „
Hydrotheca, portion free	0.18–0.20 „
„ „ fixed	0.27–0.28 „
„ diameter at mouth	0.74 mm.
Gonangium, length	0.60–0.63 „
„ maximum breadth	0.45–0.53 „

In general build, in possessing chitinous projections from the base of the hydrotheca, and in the structure of its gonangium, this species bears close resemblance to *S. cornicina* (M^cCrady) as described by NUTTING. The latter species, however, is to be distinguished by the tubular shape of its hydrothecæ, by the number of the marginal teeth and of the opercular flaps, by the narrowly oval outline of its gonangium, and by the fact that the gonangia are borne on hydrorhizal tubes at the base of the colony, and not on the stem.

Locality.—Growing on a Plumularian, *Halicornaria longicauda*, and on seaweed (*Codium*, sp.), both from Station 81, Abrohlos Bank, Brazil. Lat. 18° 14' S, long. 37° 58' W. Depth, 40–50 fathoms. Bottom deposit, coral. 20th December 1902.

Previously recorded only from the Gulf of Mexico: ALLMAN, 1877; VERSLUYS, 1899 (Dry Tortugas); NUTTING, 1904, lat. 29° 28' N, long. 87° 56' W.

Thuiaria articulata (Pallas, 1766), (= *T. pectinata*, Allman, 1888).

In the earlier report, a colony of this species was recorded under ALLMAN'S name of *T. pectinata*. The occurrence of an additional colony with gonangia reopened the question of nomenclature, and an examination of ALLMAN'S type was made (through the kindness of Mr R. KIRKPATRICK, of the British Museum). The examination assures me of the identity of *T. pectinata*, Allman, with *T. articulata*, Pallas.

The larger of our two colonies was some 6 cm. high, the height of ALLMAN'S specimens being also "between two and three inches." The colonies are simply pinnate, with a monosiphonic stem about 1 mm. in diameter at the base. The stem is partitioned into regular and well-marked internodes, each bearing three pairs of opposite hydrothecæ, and from between the proximal and median pairs arises a pair of opposite pinnæ. Proximal to the first pinna-bearing internode a few destitute of offshoots occur, and on these the number of hydrothecæ is not constant. Apart from these only one internode has been observed in which three pairs of hydrothecæ have not occurred; and it is clearly abnormal, for it lacks pinnæ, has but one pair of hydrothecæ, and is so short that the hydrothecæ project beyond it, free for nearly half their height. The pinnæ stand out from the stem at a wide angle, and they too are divided into distinct but less regular internodes, each bearing from two to five pairs of sub-opposite hydrothecæ.

(MARKTANNER-TURNERETSCHER (1890) gives the variation as from three to ten pairs per internode.)

The hydrothecæ are almost wholly immersed, and the "free membranaceous extension of the wall," too prominently figured in ALLMAN'S account, has been destroyed (as indeed it was in the *T. pectinata* specimen examined), leaving a jagged edge level with the general outline of the pinna. There is evident on the abcauline wall of the hydrothecæ, just within the opening, a small knob of chitin, and immediately above or upon this rests the

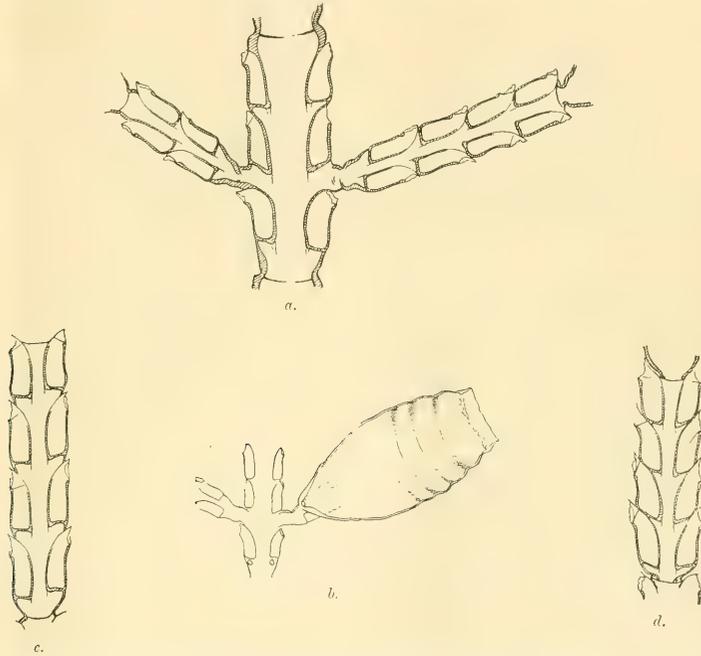


FIG. 6.—*Thuiaria articulata*. (a) Single internode of stem with proximal internodes of pinnae. $\times 20$. (b) Gonangium. $\times 12$. (c) Internode from *T. pectinata* with hydrothecæ slightly apart. $\times 20$. (d) Internode from *T. pectinata* with congested hydrothecæ. $\times 20$.

base of the one-flapped operculum. On the stem internodes and on the younger pinnae the hydrothecæ are slightly apart from each other, but in the older pinnae they are compressed and lie closely packed, the distal end of one forced against the base of its successor (*cf.* fig. 6, *c* and *d*).

The gonangia are clustered on one face of the stem and on the corresponding faces of the pinnae. They arise immediately beneath a hydrotheca, are elongate oval in shape, with a wide, circular, distal opening bordered by a distinct neck, and with a tapering proximal end. Their distal half bears more or less indefinite annular rugosities.

Measurements:—

	<i>Scotia</i> Specimens.	Allman's <i>T. pectinata</i> .
Stem internodes, length	2.25 mm.	2.75 mm.
Hydrothecæ on stem, length	0.50 "	0.52 "
" " breadth	0.17 "	0.20 "
" on pinna, length	0.45 "	0.48 "
" " breadth	0.15 "	0.18 "
Gonangia, length	3	} not present.
" greatest diameter.	1.5 "	

ALLMAN'S specimens are somewhat more robust than those collected by the *Scotia*.

Locality.—Dredged at the entrance to Saldanha Bay, Cape Colony, at a depth of 25 fathoms. 21st May 1904.

The species has been recorded from Algoa Bay and Cape of Good Hope (KIRCHENPAUER, 1884); South Africa (BUSK, 1850); Simon's Bay, Cape of Good Hope (ALLMAN, 1888).

Plumularia curvata, Jäderholm, 1904 (= *P. magellanica*, Hartlaub, 1905).

Dr JÄDERHOLM has kindly drawn my attention to the fact that the species recorded in my earlier report on the *Scotia* collections as *P. magellanica*, Hartlaub, had been previously described by him as *P. curvata*, which name I therefore substitute for HARTLAUB'S synonym. A variation which does not seem to have been present in the examples examined by JÄDERHOLM or HARTLAUB was described and figured in the earlier report (pl. iii, figs. 1, 1a); here I wish simply to add that that variation is more general in the hydroclades than I had at first supposed. My previous description reads:—"In the proximal hydroclades . . . two processes arise below and at the opposite sides of the first hydrotheca, each of which bears a thecate internode, so that after the first hydrotheca the hydroclade possesses two diverging branches each similar to the simple distal hydroclades" (1907,⁽¹⁾ p. 541). But this duplication of the hydroclade occurs not only at the first hydrotheca but sometimes at successive hydrothecæ as well. From beneath the first hydrotheca two diverging internodes spring, each capped by its hydrotheca; from the bases of each of those second pairs arise, and from these again, and so on in a system comparable to the false dichotomy of the Mistletoe, until dichotomous pairs of even the fourth degree may be reached. Some of the hydroclades thus assume a complicated and much-branched appearance, quite distinct from the simple type figured by JÄDERHOLM (1905, pl. 14, fig. 10) and HARTLAUB (1905, p. 684, fig. N⁵).

Measurements:—

Stem internode, length	0.42-0.52 mm.
" " breadth	0.11-0.13 "
Hydroclade internode, length	0.24-0.28 "
Hydrotheca, depth	0.10 "
" diameter at mouth	0.15-0.17 "

Locality.—"Growing on a sponge, Port Stanley, Falkland Islands. 3rd February 1904."

Previous records are from Port Louis and Port Albemarle, Falkland Islands (JÄDERHOLM, 1905); Southern Tierra del Fuego, and Island Picton in the neighbouring archipelago (HARTLAUB, 1905).

Plumularia echinulata, Lamarck, 1836.

In addition to a previously mentioned occurrence at Cape Town, a second locality, also in Cape Colony, has to be recorded, namely, Saldanha Bay. The specimens from this place, while rather smaller in size than the Cape Town examples, are similar in minute structure, except that in the former the hydrotheca-bearing internodes are rather shorter, and the hydrothecæ therefore more congested, than in the latter.

The gonangia are elongate oval, considerably longer in proportion to their diameter than those figured by HINCKS (1868, pl. lxxv., fig. 2*b*), and possessing shorter and more regularly arranged spines. They stand out from the median aspect of the stem in a densely packed row.

Locality.—Shore, Houtjes Bay, Saldanha Bay, Cape Colony. 19th May 1904.

Plumularia lagenifera, var. *septifera*, Torrey, 1902.

Whereas typical specimens of *P. lagenifera* are about three inches long, are sometimes branched, and grow in flexuous clumps, the specimens which I have referred to TORREY'S variety are short (only 7 mm. high), never branched, and are markedly rigid in habit. The detailed structure is that of a compressed *P. lagenifera*, where the internodes have become shorter and comparatively stouter, while the internal septa have become more distinct. In conjunction with the general shortening it has come about that in the intermediate internodes there is generally but one septum, although our specimens differ from those described by TORREY—where "no intermediate internode has more than one septal ridge"—in that, in several, there are traces of a second ridge on the distal side of the nematophore, while in at least one case the second ridge is quite pronounced. TORREY is equally emphatic that "there is never more than one internode between thecate internodes," but I have observed a case in which two successive atehcate internodes occurred, the distal being much the shorter and lacking a nematophore. There was no evidence that this duplication was due to abnormal growth, such as regeneration. These variations, however, only show more clearly the relationship between this form and *P. lagenifera* type, and confirm TORREY'S placing of it as a variety of that species.

In one point the *Scotia* specimens differ both from the type and from the variety, for they show no trace of a nematophore on any internode "on side opposite branch [*i.e.* hydroclade] and immediately distal to the proximal septum."

Between the hydroclade and the internode process on which it is set occur from one to three athecate internodes. The hydrorhizal tubes are close-set, are compressed from above downwards, and are supported by thickenings of the perisarc which project into the interior of the tube. Somewhat similar thickenings I have already seen in the hydrorhiza of a species of *Podocoryne* (RITCHIE, 1907,⁽²⁾ p. 499) which was growing on a minute shell. In both cases it is possible to imagine that the thickenings may be in some way correlated with the peculiar substratum upon which the specimens are growing, for either on a small, readily tossed shell, or on the ever-moving appendages of a Crustacean, hydrorhizal tubes would be submitted to a great amount of buffeting and rough usage. Reaction to such abnormal external factors might result in abnormal

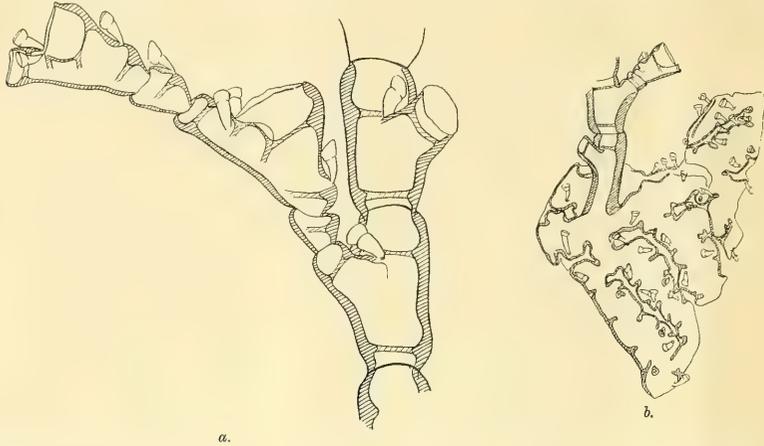


FIG. 7.—*Plumularia lagenifera*, var. *septifera*. (a) Portion of stem and hydroclade. $\times 100$. (b) Base of stem arising from complicated hydrorhizal growth with scattered nematocysts.

strengthening of the walls. Should such a supposition be well founded, the thickenings in the hydrorhizal tubes could have little systematic value. Frequent nematophores, similar in structure to those on the remainder of the colony, arise from the hydrorhizal tubes at irregular intervals, but always near their borders.

The differences between this form and *P. lagenifera* in size, in habit, in the intensity of the internal septa, in the absence of a nematophore on each stem internode, and in possessing chitinous thickenings in the hydrorhiza, I do not consider sufficient to warrant the formation of a new species.

Measurements :—

Stem internode, length	. . . . .	0.26 mm.
„ breadth	. . . . .	0.14 „
Hydroclade thecate internodes, length	. . . . .	0.24 „
„ athecate „ „	. . . . .	0.05 „
Hydrotheca, depth	. . . . .	0.066-0.090 mm.
„ diameter at margin	. . . . .	0.105-0.120 „

Locality.—A few colonies growing on the telson and under-parts of the body of *Palinostus lalandii* (Lamk.) from Saldanha Bay, Cape Colony. 21st May 1904.

Distribution.—*Plumularia lagenifera*, Allman, has been recorded from various localities off the coast of California by MARKTANNER-TURNERETSCHER (1890, p. 255), NUTTING (1900, p. 65), TORREY (1902, p. 77); from the neighbourhood of Vancouver Island by ALLMAN (1885, p. 157), NUTTING (*l.c.*); and from the coast of Alaska by TORREY (*l.c.*). The variety *septifera* has been recorded by TORREY only from Cataline Island, California. The general distribution of the species and its variety is thus along the shores of the Northern Pacific from California northwards to Alaska. That the present specimens should have occurred on the eastern margin of the South Atlantic is indeed remarkable; but, in so mobile a group as the Hydroids, wide distribution is of little significance, and the above record but adds another to the long list of species which spread beyond the bounds of any one ocean.

Plumularia setacea (Ellis, 1755).

Specimens of an exceedingly minute and delicate variety of this species occur creeping on gulf weed in company with *Aglaophenia latecarinata*. They are only 7 or 8 mm. high, and are unbranched, although in one case an appearance of bifurcation at the base (a phenomenon recorded by BILLARD in this species (1907, p. 210)) was given by a second colony being fixed to the first by its hydrorhiza. The hydroclade internodes, both thecate and athecate, are long and slender and contain two distinct septa, a distal and a proximal. While the rule is that a single athecate internode separates two thecate internodes, very rarely two intermediate internodes occur, in which case one or the other bears a single nematophore, the other lacking such an organ. Yet each of the internodes is complete as regards the internal septa, containing one at each end. They are distinct internodes and seem to be due to spontaneous variation, for no hint could be observed that, as BILLARD found in his specimens, rupture and subsequent regeneration had taken place.

Our specimens appear to be similar to the "distinct variety" recorded by Professor NUTTING from gulf weed (1900, p. 57), although NUTTING's specimens differ in being branched.

Detailed measurements indicate that the *Scotia* specimens stand intermediate to the variety found by the *Travailleur* at Cape Spartel and to the south of Madeira, and the typical form whose dimensions BILLARD records.

Measurements:—

Height of colony	7-8 mm.
Length of stem internodes	0.33-0.39 mm.
Breadth of " "	0.075-0.09 "
Length of intermediate internodes	0.14-0.21 "
" thecate internodes	0.31-0.40 "
Breadth of " "	0.42-0.48 "

Locality.—Creeping on gulf weed found in spawn net at Station 538. Lat. 32° 11' N., long. 34° 10' W. 30th June 1904.

Antennopsis scotia, Ritchie, 1907⁽¹⁾.

An additional colony of this species from the locality from which it was originally recorded enables me to amplify the diagnosis already given and to add a description of the gonosome. The new colony is of the same height as the larger of our earlier specimens, 9 cm., but it bears more branches and is altogether in better condition, although here also the hydroclades are in many places wanting. Branches are frequent, but are very irregular in position. They may bear secondary branches which are long, of uniform thickness, and are seldom branched. The stem and branches are composed of a thick bundle of tubes with transparent walls and without nodes. From short processes on the outermost of these the hydroclades spring, following one another on the same tube at a

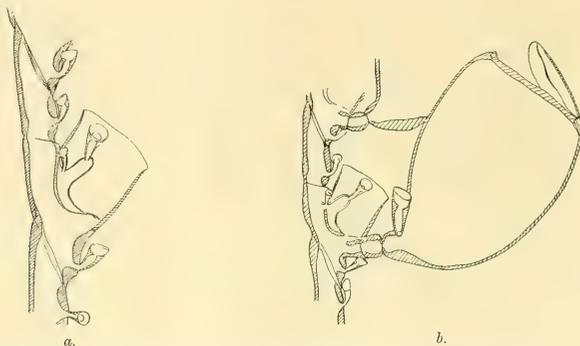


FIG. 8.—*Antennopsis scotia*. (a) Portion of hydroclade showing thecate and athecate internodes, and arrangement of nematotheca. $\times 65$. (b) Gonotheca. $\times 45$.

distance of some 0.73 mm., and thus forming a close-set coat round the branches. In consequence of the delicacy of the hydrothecal margins a perfect hydrotheca is rare, but where such occurs it shows a slight widening at the mouth.

An important addition has to be made to the previous description of the trophosome as regards the number of the nematophores accompanying the hydrotheca. Besides the median proximal nematophore and the lateral pair surmounting the processes which run alongside the hydrotheca, there is a supplementary lateral pair, the individuals of which, one on each side of the hydrotheca, rest on the upper surface of the lateral process almost in the corner formed between it and the internode (fig. 8). These nematophores, although of similar structure to, are considerably smaller than, the others, and are so delicate that they are frequently absent, their former position being marked only by a small opening in the lateral process. They correspond exactly to the supplementary nematophores described in *Antenella quadricarinata* of the present paper.

The athecate internodes show more variation than in the former specimens, their length in many cases preventing the margin of a hydrotheca from reaching the level of the proximal end of the succeeding thecate internode. Only two

deviations from the normal structure of the athecate internodes have been observed where, instead of one, two nematophores were present.

Gonosome.—The gonangia arise laterally from the hydroclades. They are situated immediately beneath the hydrothecæ on a short process from the hydroclade internode, between which and the body of the gonangium a short internode intervenes. In size a gonangium is three or four times as large as a hydrotheca; in shape it is broadly ovate, tapering proximally into a short stalk which rests upon the intervening internode mentioned above, and abruptly truncated distally, where the large terminal aperture is closed, prior to the maturity of the contents, by a one-flapped operculum attached by its abcauline edge to the wall of the gonangium. Two large nematophores are present, one on each side of the gonangium near its base.

Measurements :—

Athebate internodes, length *	. . . . .	0.28-0.32 mm.
Thecate " " *	. . . . .	0.36-0.38 "
Hydrotheca, length	. . . . .	0.20-0.24 "
" breadth at mouth	. . . . .	0.21-0.24 "
Gonangium, length	. . . . .	0.88-0.91 "
" greatest breadth	. . . . .	0.53-0.57 "

Locality.—As previously recorded—entrance to Saldanha Bay, Cape Colony. 25 fathoms. 21st May 1904.

Growing on a sponge from the same locality were several simple colonies up to 7 mm. high. Although there are no signs of fasciculation, nor even of true branching, the minute structure corresponds so exactly with that of *A. scotiæ* that I cannot but conclude that the small colonies represent an early stage of that species. They bear no gonangia.

Monostæchas quadridens (M'Crady, 1859).

Two minute colonies of this species were found growing on the leg of a masked crab. They differ from the typical form described by NUTTING (1900, p. 75) only in their minuteness—they are less than 1 cm. high—and in the length of the athecate intermediate internodes of their hydroclades. Although each bears two or three hydroclades, neither of the colonies is branched; yet circular holes at the bases of some of the hydrothecæ, indicating the point where a gonangium had been attached, show that the colonies are mature. The unusual position in which the colonies were growing is probably responsible for their smallness, for an unstable foundation is frequently accompanied by a dwarfed fauna.

Measurements :—

Stem, diameter	. . . . .	0.14 mm.
Thecate internodes, length	. . . . .	0.42-0.46 mm.
Intermediate internodes, length	. . . . .	0.56-0.73 "
Hydrotheca, depth	. . . . .	0.15-0.17 "
" diameter at opening	. . . . .	0.20-0.22 "

* Length measured from straight node to furthest point of oblique node.

Locality.—Growing amongst seaweed on the leg of a masked crab. Station 81, Abrohlos Bank, Brazil. Lat. $18^{\circ} 24'$ S., long. $37^{\circ} 58'$ W. Depth, 36 fathoms. Bottom deposit, coral. 20th December 1902.

Antenella quadriaurita,* sp. nov.

A few sparse colonies which cannot be referred to any described species of *Antenella* were trawled off Gough Island. The stems, the largest of which is 14 mm. high, are hairlike and stand out rigidly from a creeping stolon like a group of stiff bristles. To the unaided eye the stem groups much resemble the figure of *A. gracilis* given by ALLMAN (1877, pl. xxii, fig. 6), but in our specimens the stems are more delicate, and,

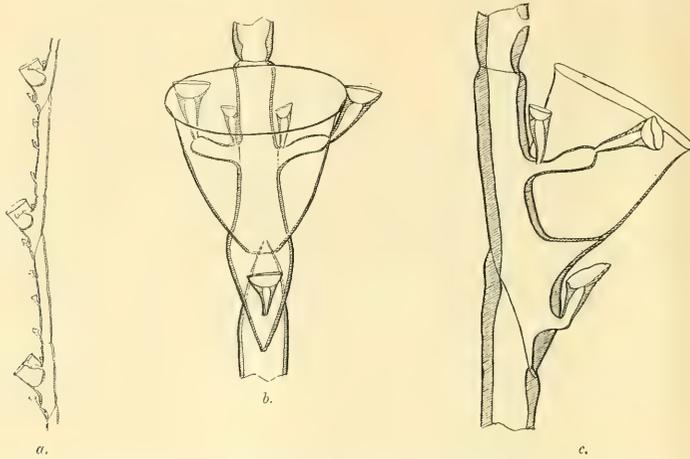


FIG. 9.—*Antenella quadriaurita*. (a) Portion of stem. $\times 25$. (b) Anterior aspect of a hydrotheca. $\times 125$. (c) Lateral aspect of a hydrotheca. $\times 125$.

owing perhaps to mere accident, they are more irregular in size and more straggling in arrangement. The stem is divided into a series of alternating thecate and athecate internodes, the boundary lines between these being oblique and very distinct on the proximal side of the thecate internode, and on the distal, transverse but faintly indicated. On the stems examined the maximum number of hydrothecæ was nine, but that a greater number may be borne is likely, as in both the "nine" colonies the stem was incomplete. The hydrothecæ are borne on every other internode. As seen in profile they are cylindrical, having almost parallel edges, but viewed from in front they seem to be conical in shape, tapering rapidly to the base. A hydrotheca is rather deeper than broad, and for more than half its height is free from the internode. Its profile is straight, and its margin is very slightly everted.

Each thecate internode bears five nematophores: one median, placed on a gently

* *Quattuor*, four; and *auritus*, eared, signifying the presence of two pairs of nematothecæ flanking the hydrotheca.

raised portion of the internode on the near side of the hydrotheca; a supracalycine pair, each individual of which reaches just to the margin of the hydrotheca and rests upon the end of an internodal projection stretching half-way across the hydrotheca; and an additional pair—supplementary nematophores—placed on the upper and exterior surface of the supracalycine process, almost in the angle between that process and the internode. The latter are extremely fragile and readily detached, so that in many cases they are unrepresented but by a small pore in the wall of the supracalycine process, indicating where they had been attached. The intermediate internodes bear a number of nematophores varying from two to four, but three is the most frequent number. Thus, in twenty intermediate internodes examined, eight bore two nematophores, eleven bore three, while only one had four. On the athecate basal internodes, three of which generally follow one another in close succession prior to the first hydrotheca, the nematophores also vary. Of nine such, four had four nematophores, two had five, while series of two, three, and seven nematophores were represented on one internode each.

Measurements:—

Thecate internode, length*	. . . . .	0.46 mm.
Intermediate internode, length*	. . . . .	0.57-0.91 mm.
„ „ breadth	. . . . .	0.07-0.087 „
Hydrotheca, depth	. . . . .	0.21-0.22 „
„ „ diameter at margin	. . . . .	0.17-0.21 „

This species is closely related to *Plumularia secundaria* (L., 1789, p. 3854), which, if the genus *Antenella* is to be preserved, and it seems a useful one from the point of view of practical convenience, must be transferred to that genus. The present species has been separated from *A. secundaria* on the strength of observations made by MARKTANNER-TURNERETSCHER (1890, p. 252), PICTET and BEDOT (1900, pp. 27, 28), and BILLARD (1907, p. 207), all of whom record the presence of a *single* nematotheca *immediately above* the hydrotheca, whereas in our specimens the hydrotheca is *flanked* by a *pair* of nematothecæ in addition to the usual supracalycine pair. The athecate internodes in the *Scotia* species are twice the length of those in *A. secundaria*, and the other parts differ in their relative proportions, but little stress can be laid on so indefinite and so variable a character. I am unable to distinguish *A. natalensis*, Warren, 1908, from *A. secundaria*.

Locality.—Gough Island. Trawled at a depth of 100 fathoms. Bottom deposit, Bryozoa and rock. 23rd April 1904.

Aglaphenia allmani, Nutting, 1900.

Two specimens are referred to this rare species. One is a comparatively small colony, 6.5 cm. high, still retaining some fragments of the hydrorhizal tubes. The other is a strongly fascicled branch, with a diameter of 1.5 mm. at its junction with

* Measured from straight node to furthest point of oblique node.

what is probably part of the main stem, and with a height of 7.5 cm. It bears rather delicate alternate ramuli which leave it almost at right angles.

While the general characters—branching, structure of hydroclades, shape and approximation of hydrothecæ, position of nematophores—agree with the descriptions of ALLMAN (1877, p. 39, pl. xxiii., as *A. ramosa*) and of NUTTING, variations worthy of note have been observed in the last-mentioned organs. These variations seem to be mainly age differences. In the hydrothecæ on the proximal parts of the hydroclades the mesial nematophore reaches to the level of the marginal teeth, and is adnate, all but the very tip. The supracalcine nematophores are generally cylindrical, with two apertures—one terminal, the other a large oval opening on that side of the upper surface which is

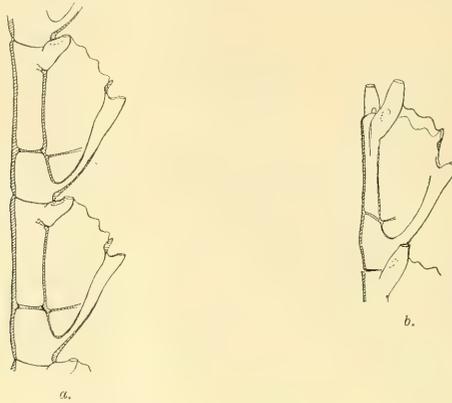


FIG. 10.—*Aglaophenia allmani*, showing variation in hydrothecæ and nematophore. (a) Hydrothecæ from the proximal end of a hydroclade. $\times 65$. (b) Hydrothecæ from the distal end of a hydroclade. $\times 65$.

towards the interior of the hydrotheca. Rarely this opening is much elongated, and extends through the band of perisarc which separates it from the terminal opening. In such a case a single continuous opening is formed and the nematophores might be described as “almost cylindrical.” The tip of a supracalcine nematophore reaches just to the margin of a hydrotheca. Its axis, viewed from the side, lies at an angle of about 45° with the stem. The nematophores, in general, agree with the type so far described.

In those hydrothecæ which occur towards the tip of the hydroclades, and which are therefore younger, the aperture is less oblique, while the adnate part of the hydrotheca is of the same length as in the older examples. As a consequence the mesial nematophore, although shown by measurement to be constant in length throughout the colony, *appears* to be shorter in the newly formed hydrothecæ, since its tip falls considerably short of the margin. The supracalcine nematophores are of markedly greater length, overtopping the margin by about 0.056 mm., are quite cylindrical, and lie with their axis (viewed from the side) more nearly parallel to that of the internode. The lateral aperture is smaller and is never continuous with the terminal one, and the

internodal septum which in the older hydrothecæ marks the base of the nematophore is indicated in the terminal individuals only by a minute indentation.

I think, with NUTTING, that the general structure of the trophosome of the colonies resembles that of *Lytocarpus* rather than that of *Aglaophenia*.

Measurements :—

Stem internodes, length	0.39-0.45 mm.
" " breadth	0.22-0.24 "
Hydroclade internodes, length	0.38-0.42 "
Hydrothecæ, length *.	0.35 mm.
" diameter at margin	0.17 "
Mesial nematophore, length	0.28 "
Supracalcine nematophores, length of longest side, 0.11 mm. at base of hydroclade to 0.14-0.17 mm. at distal end of hydroclade.	

Locality.—Station 81, Abrohlos Bank, Brazil. Lat. 18° 14' S., long. 37° 58' W. Depth, 36 fathoms. Bottom deposit, coral. 20th December 1902.

Distribution.—Only recorded from Florida Reef, in the Gulf of Mexico (by ALLMAN), and from a station in the Caribbean Sea (by NUTTING).

Aglaophenia dubia, Nutting, 1900.

Two specimens of this species, the *A. gracilis* of ALLMAN'S Gulf Stream Report (ALLMAN, 1877), were collected in the same locality—one simple, reaching a height of 6 cm., the other sparsely branched and rather longer. The anterior profile of the hydrotheca is not so markedly concave as in ALLMAN'S figure, nor is the mesial nematophore quite so long relatively to the height of the hydrotheca. The hydrothecæ have nine teeth (NUTTING says "about eight"), of which one on each side lies behind the supracalcine nematophores and is more acute than the others, while the anterior tooth is usually recurved. The number of the basal nematophores differs from that recorded by ALLMAN and NUTTING, for not only are two present on the front of each stem-internode (one close to the hydroclade and one on the proximal portion of the internode), while another small one lies at the base of the hydroclade, close to the former of those just mentioned—but, in addition, a large cup-shaped nematophore exists on the posterior aspect of internode, immediately behind the base of the hydroclade. Otherwise the specimens agree, point for point, with previous descriptions.

Measurements :—

Stem internodes, length	0.52 mm.
" " breadth	0.31 "
Hydroclade internodes, length	0.36 "
" " breadth at middle	0.05 "
Hydrothecæ, height	0.32 "
" diameter at margin	0.14 "
Mesial nematophore, length	0.17 "

* Length of hydrotheca measured along the internode from the base of the cavity to the margin.

On the branched specimen two branches, which appear to belong to the colony, since they lie in the same plane and leave the stem at the same angle as the true branches, were found, on microscopic examination, to be specimens of *Halicormaria longicauda*, arising from hydrorhizal tubes climbing upon the stem of the *Aglaophenia* colony.

Locality.—Station 81, Abrohlos Bank, Brazil. Lat. 18° 14' S., long. 37° 58' W. Depth, 36 fathoms. Bottom deposit, coral. 20th December 1902.

Aglaophenia heterodonta, Jäderholm, 1903.

Dr ELOF JÄDERHOLM has described amongst the extra-European Hydroids in the Swedish Museum specimens of *A. dichotoma* (M. Sars), as distinct from a form with similar habit which he has named *A. heterodonta*. I now regard the specimens which were described in the earlier *Scotia* report under the name of *A. dichotoma* as examples of *A. heterodonta*.

Additional material enables me to add to JÄDERHOLM'S description of the general habit of the colonies. His specimens were characterised by irregularly ramified stems bearing short, upward curling twigs. Our specimens exhibit two types. The first, previously described (RITCHIE, 1907,⁽¹⁾ pl. iii. fig. 2), is strictly dichotomous, although the branches may not develop equally in all parts of the colony. This type of branching is exactly similar to that of *A. dichotoma*. The dichotomously branched specimens were growing on a sponge, and are considerably taller (10 cm.) than JÄDERHOLM'S examples (3.5 cm.). The habit of the second type is distinctly reminiscent of that of *A. conferta*, Kirchenpauer, 1872; that is to say, simple curved stems spring in profusion from a hydrorhiza creeping upon an alga. There is no sign of branching. The largest of those colonies is only 18 mm. high, but that they are fully developed is shown by their sexual maturity, for several bear corbulæ with male gonophores. The minute characters of the two types of colonies are identical, and agree with those of *A. heterodonta*. It may be, however, that this is but a synonym of *A. conferta*, the only characters which seem to separate the latter being the absence of an unpaired anterior reflexed tooth (which, however, appears to be present in KIRCHENPAUER'S figure); the outward, instead of the inward, direction assumed by the pair of teeth nearest the stem; and the angled nature attributed to the supracalyceine nematophores. However, it is only by examination of KIRCHENPAUER'S type that such a question could be decided.

That the branched and unbranched colonies are found on two different types of substratum probably indicates that they are environmental modifications; the fixed, settled colony (that on the sponge) becoming luxuriant, while the drifting, unsettled colony (that growing on the alga) tends, as do so many alga-borne Hydroids, to remain dwarfed and of simple habit.

The development of the corbula differs slightly from that of *A. pluma* as described by ALLMAN (1871, p. 59) and NUTTING (1900, p. 40), for the leaves develop less simul-

taneously. While in NUTTING's specimens all the leaves had made their appearance before even the primary pair had reached full development, here, when only five pairs are recognisable, the two first-formed pairs are already full grown; and when six pairs are visible the earliest three have reached full development, the later ones being in a state of decreasing perfection.

While some of the corbulæ are wholly closed some remain partially open, their leaves, at least towards the tip, bearing nematophores on each side, and remaining separate from each other. In the latter case the gonophores are always male, in the former no gonophores remained; but since maleness and openness go together, as they do in so many other cases, it seems probable that in this species we have an example of sexual dimorphism of the type described by Mr H. B. TORREY and Miss MARTIN (1906).

The depth of a hydrotheca varies from 0·27 to 0·28 mm., its diameter at the mouth from 0·17 to 0·19 mm.; measurements agreeing with those of JÄDERHOLM.

Locality.—On sponges and algæ from the entrance to Saldanha Bay, Cape Colony. Depth, 25 fathoms. Bottom deposit, sand and kelp. 21st May 1904.

Aglaophenia minima, Nutting, 1900.

Two colonies (the larger 1 cm. high) are distinguished by their cylindrical, keelless hydrothecæ with short projecting mesial nematophores as belonging to this species. In addition to the septal ridge, mentioned by NUTTING, which traverses the hydrotheca-bearing internode at the level of the intrathecal ridge, another is evident opposite the base of the supracalcine nematophores. The opening of the hydrotheca is bordered by nine, instead of by eight teeth; and in the mesial nematophore of some of the hydrothecæ a slight chitinous constriction, almost in line with the profile of the hydrotheca, is apparent. The nematophores on the stem internodes are arranged as follows:—A solitary long nematophore on the front and at the proximal end of the internode; and in the angle between the hydroclade process and the stem, a double nematophore, with two diverging processes each bearing a terminal aperture. Only a single opening, however, connects the cavity of the double nematophore with that of the colony. The hydroclade process itself bears a large simple nematophore on its anterior surface, and to this appears to be due the bifurcated appearance mentioned by NUTTING.

No gonangia were present.

Measurements:—

Stem internodes, length	0·45-0·56 mm.
„ diameter	0·08-0·10 „
Hydroclade internodes, length	0·39 mm.
Hydrotheca, depth	0·34 „
„ diameter at mouth	0·14 „

Locality.—Growing amongst seaweed on the leg of a masked crab. Station 81, TRANS. ROY. SOC. EDIN., VOL. XLVII. PART I. (NO. 4).

Abrohlos Bank, Brazil. Lat. 18° 24' S., long. 37° 58' W. Depth, 36 fathoms. Bottom deposit, coral. 20th December 1902.

Previously recorded from Little Cat Island, Bahamas (NUTTING).

Aglaophenia latecarinata, Allman, 1877.

This common tropical species, identical, as shown by the researches of Professor NUTTING (1900, p. 96), with the *A. minuta* of FEWKES (1881, p. 132), occurs among the *Scotia* collections in its usual habitat, creeping upon the fronds and bladders of Saragassum weed. The specimens, the largest of which are 13 mm. high, correspond with NUTTING's description in all points but one. For while he mentions only two nematophores at the base of each hydroclade, I have observed in all cases four nematophore apertures, the two recorded by NUTTING, and, in addition, lying immediately distal to the internodal process from which the hydroclade projects, in the axil between it and the stem, a double nematophore, possessing two apertures, one directed to the right, the other to the left of the hydroclade process. The coenosarc of this nematophore connects with the general coenosarc of the colony through a single median perforation in the internode wall. A similar arrangement of nematophores occurred in the specimens examined by BILLARD (1907) and VERSLUYS (1899). As the following comparative table shows, our specimens are, in all respects, somewhat larger than those described by BILLARD:—

	<i>Scotia</i> Specimen.	BILLARD'S <i>Talisman</i> Specimen.
Length of hydrocaulus	6-13 mm.	5-6 mm.
Breadth of "	0.1-0.13 mm.	0.08-0.12 mm.
Length of stem internodes	0.34 mm.	0.25-0.30 "
" hydrotheca	0.31 "	0.27-0.30 "
Breadth of hydrotheca at mouth (excluding keel)	0.15 "	0.135 mm.
Breadth of keel	0.03 "	?

Locality.—On floating Saragassum weed, caught in spawn net. Station 538. Lat. 32° 11' N., long. 34° 10' W. 30th June 1904.

Halicornaria longicauda, Nutting, 1900.

At first glance one of the specimens which I have referred to this species appears to be a fasciated colony with alternate branches; but closer scrutiny shows that there is present a central axis with the remains of hydroclades, and that around this are grouped tubes which in their distal portions are continued as the so-called branches, and in the proximal appear to form the hydrorhizal tubes of the compound colony. The specimen really consists of a central axis upon which several distinct *Halicornaria* colonies happen

to be creeping. The clustered hydrorhizal tubes of these create the resemblance to fascicling, but the structure is analogous rather to the rhizocaulom often exhibited by *Lafoëa dumosa* than to a truly fascicled stem. The rhizoid nature of this compound stem is confirmed by another specimen (*Aglaophenia dubia*) from the same locality, where the two lower branches, at least so they appear to the eye, turn out to be distinct climbing colonies of *H. longicauda*.

The largest of the colonies found by the *Scotia* is 11 cm. in height. The specific characters agree with those given by Professor NUTTING, but in our specimens the hydrothecæ appear to have undergone a greater degree of tilting forward than his figures indicate, while the lateral teeth are more strongly developed. The aperture is vertical and slightly constricted, with a sharp tooth projecting upwards and outwards on either side. The intrathecal ridge is well marked, arising near the middle of the

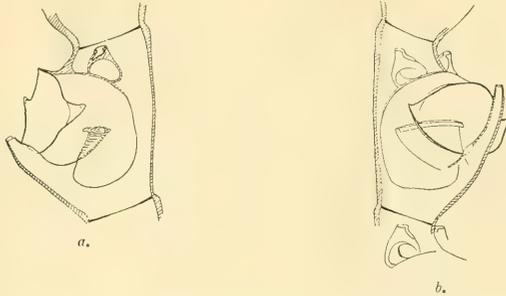


FIG. 11.—*Halicornaria longicauda*. Hydrothecæ showing variation in the length of the median nematophore. $\times 110$.

adnate portion of the mesial nematophore and extending backwards at an angle of 45° with the axis of the hydroclade. Its free edge is slightly reduplicated. The supracalcine nematophores are short and stout, and when viewed from the front appear clearly above the hydrotheca, although they do not reach the margin of the aperture. The mesial nematophore varies greatly in length; considerable differences may be seen even in two succeeding hydrothecæ. Sometimes shorter than in the examples figured by NUTTING, it may, on the other hand, extend far beyond the margin of the hydrotheca, and, curving gracefully upwards, its tip may reach the level of the upper portion of the rim. There are three cauline nematophores (not two, as NUTTING implies) clustered about the stem process on which the hydrotheca rests. Two lie on the anterior surface, one at the distal, the other at the proximal side of the stem process, while one lies on the posterior aspect of the process itself. They are triangular in shape and large, normally with two apertures, one at each of the free angles of the triangle, but occasionally showing, as a variation, a third aperture, situated medianly between the normal two.

The gonosome is unknown.

Measurements:—

Stem internodes, length	0·29–0·35 mm.
„ breadth	0·13–0·16 „
Hydroclade internodes, length	0·25–0·29 „
Hydrotheca, depth	0·14 „
„ vertical diameter at margin	0·13–0·14 „
„ horizontal „ „	0·18 „

Locality.—Station 81, Abrohlos Bank, Brazil. Lat. 18° 14' S., long. 37° 58' W. Fathoms, 36. Bottom deposit, coral. 20th December 1902.

Distribution.—The only record given by NUTTING is from the Caribbean Sea near the Isthmus of Panama (lat. 9° 32' N., long. 79° 55' W. 36 fathoms). The present locality, also a shallow water one, is off the coast of Brazil near Porto Alegre—a considerable southwards extension of the known range.

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