THE HYDROIDS OF THE WOODS HOLE REGION.

By C. C. NUTTING,
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INTRODUCTORY NOTE.

The limits of the "Woods Hole region," in the sense here used, may be roughly defined as follows: Starting with the point of Cape Cod as the northern and eastern limits, following the New England coast to New London, Conn.; thence southward to the end of Long Island; thence southeast to the edge of the Gulf Stream, which is followed until off Cape Cod. These limits embrace, roughly, the area that can be covered by one-day excursions by steamer from the U. S. Fish Commission station at Woods Hole, Massachusetts.

It is the purpose of this pamphlet to furnish collectors and workers in this region with a practical and concise means of identifying the species of hydroids known to occur within the area above described. There are a number of other species that almost certainly occur within the Woods Hole region, but, with one or two exceptions involving species of unusual interest, these will be omitted.

Most of the material studied in connection with this work was secured by the author during three summers spent at the U. S. Fish Commission laboratory at Woods Hole and a month at the laboratory of Dr. Alexander Agassiz, at Newport.

The number of species listed indicates a fairly rich hydroid fauna in the region, the general relation being with the Arctic or rather Holarctic fauna, which explains the large percentage of British forms represented on our Atlantic coasts.

The illustrations are from sketches originally made by the author to illustrate a monograph of the North American hydroids, in course of publication by the United States National Museum. Permission was given by the authorities of that institution to have ink tracings made from these sketches, which have been reduced in size and used in the present work.

In order to secure the brevity necessary for the treatment of the subject in the form of a practical guide to identification, it has been necessary to omit all discussion regarding synonymy. In naming genera and species a conservative course has been followed, although the names in some cases have been changed in what will doubtless appear to be an arbitrary manner. The reasons for these changes are in most cases briefly indicated, but the explanations are not so full as would be deemed requisite in a work of more strictly technical nature.

Under the head of "distribution" localities are given where the species have been found in the Woods Hole region.
Much remains to be done before we can discuss with profit the economic bearings
of the subject of this work. It is well known, however, that many fishes feed more
or less extensively on hydroids. Dr. Edwin Linton has several times called my
attention to the fact that he often finds hydroids in the stomachs of fishes while
examining them for parasites. I am inclined to think, however, that hydroids do
not constitute a very important item in the dietary of our food-fishes, and am rather
of the opinion that the economic importance of hydroids lies in the fact that the
presence of these forms in quantities in a given region is of value as an indication
of abundance of food for fishes in the shape of small crustaceans. It is known that
many kinds of hydroids live very largely on minute crustacea, and it follows that
where the hydroids thrive the fishes will also find an abundant food supply, especially
in the earlier stages of their development.

The author is indebted to many naturalists for material that he failed to secure
himself, and has endeavored to briefly acknowledge these favors in their proper
connection in the body of the text.

State University of Iowa, August 10, 1900.

Key to the families of Hydroids found in the Woods Hole region.

A. Hydromedus and gonophores not provided with special chitinous receptacles.
   a. Hydromedus with scattered filiform tentacles .............................................. Clavide.
   a'. Hydromedus with a single whorl of filiform tentacles, or two or more closely approximated whorls
       around base of probosces which might easily be mistaken for a single whorl.
       b. Probosces conical.
       c. Colony regularly branched ................................................................. Bougainvilleide.
       c'. Colony not branched.
       d. Hydrothecal composed of incrusted, adherent tubules overlaid with a film of iicular... Hydractinide.
   d'. Hydrotheca not mutually adherent and not overlaid with a layer of encrustation................ Podoconide.
   b. Probosces trumpet-shaped or hemispherical, the distal portion being the bell of the trumpet or
      equator of the hemisphere .............................................................................. Hidronoride.
   a''. Hydromedus with more than one whorl of filiform tentacles.
       a. A distinct tube of horny perisarc around the stem. ........................................ Tubulide.
       c. Distal tentacles in two distinct whorls ...................................................... Hydroconide.
       b'. No distinct perisarcal tube; stem conspicuously canaliculated; probosces large ........ Corymorphide.
   a'''. Hydromedus with capitate tentacles only .................................................. Synoconide.
   a''''. Hydromedus with a basal row of filiform tentacles, and with capitate tentacles on the probosces .... Pennaride.
A'. Hydromedus and gonophores provided with special chitinous receptacles. (Hydrotheca and gonangia.)
   a. Hydrotheca with distinct pedicel, and with a septum partly dividing the hydrothecal cavity from
      the cavity of the pedicel ...................................................................................... Campanularide.
   a'. Hydrotheca with an operculum composed of converging segments ................... Campanuline.
   a'''. Hydrotheca deep, with pedicel or sessile, and without the septum ....................... Lapide.
   a''''. Hydrotheca reduced to sleeve-shaped hydrothecae ornamented with a necklace of bright dots,
      and much too shallow to accommodate the hydromedus ..................................... Haliclide.
   a'''''. Hydrotheca sessile, and adnate by their sides to the branches on which they are placed.
       a. Hydrotheca arranged on both sides of the branches ...................................... Sertularide.
       b. Hydrotheca arranged on one side only of the branches ............................... Plumularide.
HYROIDS OF THE WOODS HOLE REGION.

Suborder GYMNObLASTEA.

No hydrothecae nor gonangia.

**CLAVIDÆ.**

*Trophosome.*—Hydrocaulus branched, simple, or not evident. Hydranths with elongated tetete bodies, upon which the smooth filiform tentacles are scattered, or arranged in an ill-defined spiral.

**Gonosome.**—Gonophores growing from the hydrorhiza, branches, or body of the hydranths, and not producing free medusae.

*Key to genera of Cladia found in Woods Hole region.*

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Clava</td>
<td>Cordylophora</td>
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**CLAVA.**

*Trophosome.*—Hydranths single, with slender basal portions and tetete bodies. Filiform tentacles, about 20 to 30 in number, scattered over the body and proboscis.

**Gonosome.**—Gonophores borne in clusters immediately below the basal tentacles.

**Clava leptostyla** Agassiz.  Fig. 1.

(Contributions to the Natural History of the United States, 1862, iv, p. 218.)

*Trophosome.*—Hydranths with a slender proximal portion and a long distal proboscis; tentacles more than 20 in full-grown specimens, hydrorhiza forming a closely aggregated meshwork of contiguous tubes.

**Gonosome.**—Gonophores borne below the proximal tentacles in compact clusters, which may encircle the hydranths or be unsymmetrically collected on one side.

**Color.**—Brick-red.

**Distribution.**—Has been found on the rocks near the Hole, where it occurs in patches under the seaweed. I have also found it attached to the piles of the old guano wharf.

**CORDYLOPHORA.**

*Trophosome.*—Colony regularly branched. Hydranths with scattered filiform tentacles.

**Gonosome.**—Gonophores borne on the branches, ovate, inclosed in a chitinous investment which resembles a gonangium, 20 to 30 in number, scattered over the body and proboscis.

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**Clava leptostyla** Agassiz.  Fig. 1.

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**Cordylophora lacustris** Allman.  Fig. 2.

(Brit. Assoc. Rep., 1843.)
SYNCORYNIDÆ.

_Trochozoa._—Hydranths with capitate tentacles only, scattered over the elongated body or growing in more or less distinct verticils.

_Gonozoan._—Gonophores usually borne above the bases of the proximal tentacles, and producing attached or free medusæ with 4 radial canals and 4 tentacles with bulbous bases, and a deep bell.

Key to genera of Syncorynidae found in the Woods Hole region.

A chitinous perisarc investing the stem. Hydranth body shorter than stem when expanded.................. _Syncoryne_.
No chitinous perisarc. Hydranths sessile, with long cylindrical bodies................................. _Orytinia_.

2. _Corythara lacustris_ Allman.

3. _Syncoryne mirabilis_ (Ag.). _A._ Sessile medusa (♀).
   _B._ Sessile medusa (♂).

_SYNCORYNE._

2. _Corythara lacustris_ Allman.

3. _Syncoryne mirabilis_ (Ag.). _A._ Sessile medusa (♀).
   _B._ Sessile medusa (♂).
Color.—Hydranths rose-red owing to color of lining of body cavity.

Distribution.—Found attached to rocks, seaweed, and floating timbers (A. Agassiz). Specimens were found in both the U. S. Fish Commission and Marine Biological Laboratories, but the labels did not indicate the localities. Waquoit. (Vinal Edwards.)

CORYNITIS.

Trophosome.—No evident perisarc. Colony consisting of single cylindrical hydranths with spirally arranged capitae tentacles.

Gonosome.—Gonophores on hydranth body producing medusa with two tentacles which bear stalked batteries of nematocysts.

Corynitis agassizii McCrady. Figs. 4 and 79.

(Treeds Elliott Society, vol. 1, No. 1, p. 132.)

Trophosome.—Colony not branched. Hydranth with a long, cylindrical body and spirally arranged capitae tentacles.

Gonosome.—Gonophores growing low down on the body of the hydranth. Medusa almost spherical, the surface dotted with clusters of nematocysts. Marginal tentacles 2 or 4, with swollen bases and thickened ends. Ovaries on basal portion of the proboscis. Mouth lobed.

Color.—Medusa with manubrium, eye-spots and ends of tentacles red, ovaries orange red.

Distribution.—Found at Woods Hole. (Dr. Murbach.)

I have not seen this species, but Dr. Murbach has kindly allowed tracings to be made from his drawings, to be used in this work.

BOUGAINVILLIDÆ.

Trophosome.—Colony branching (in our species) and with a distinct hydrocaulus. Hydranths with a dome-shaped or conical proboscis, and a single whorl of rigid filiform tentacles.

Gonosome.—Gonophores borne on hydrocaulus below the hydranth body. (Never from the hydrorhiza in our species.) Medusa with 4 radial canals. Marginal tentacles either single or in clusters, with sense bodies at their bases.

Key to genera of Bougainvillidae found in the Woods Hole region.

Hydrocaulus with a strongly marked chitinous perisarc. Medusa with clustered marginal tentacles and ramified mouth tentacles................................................................. Bougainvillia.

Hydrocaulus with a gelatinous perisarc. Medusa with a single marginal tentacle and no mouth tentacles ............................................. Perigoniurus.

body and spraity arranged capitae tentacles.

Gonosome.—Gonophores growing low down on the body of the hydranth. Medusa almost spherical, the surface dotted with clusters of nematocysts. Marginal tentacles 2 or 4, with swollen bases and thickened ends. Ovaries on basal portion of the proboscis. Mouth lobed.

Color.—Medusa with manubrium, eye-spots and ends of tentacles red, ovaries orange red.

Distribution.—Found at Woods Hole. (Dr. Murbach.)

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BOUGAINVILLIDÆ.
Bougainvillia superciliaris Ag. Fig. 90.


*Trophosome.*—Colony attaining a height of about 2 inches. Stem not fascicled, irregularly branched, branches and branchlets often annulated proximally. Hydranths with very inconspicuous proboscis and 15 to 20 rigidly disposed tentacles.

*Gonosome.*—Gonophores borne mostly on the ultimate branches. Mature medusae with a very broad and heavy proboscis and much ramified mouth tentacles. Each cluster of marginal tentacles with a large sense-bulb at its base.

*Color.*—Colony light brown with a greenish tinge. Hydranth body with a suggestion of rose color. Medusae with a pale-yellow proboscis tinged with red at the end. Sense bodies orange red surrounded with yellow.

*Distribution.*—Newport, R. I., attached to focus and shells. Woods Hole. I have not seen the trophosome of this species and have culled the description from that of Dr. Alexander Agassiz. The medusa was taken by me at Woods Hole on August 11, 1899.
HYDROIDS OF THE WOODS HOLE REGION.

PERICONIMUS.

Trophosome.—Colony attaining a height of about 1 inch, either branched or simple; perisarc of a jelly-like consistency and reaching to the bases of the tentacles. Hydranth body terete, the proboscis being large and conical.

Gonosome.—Gonophores borne on the branches or hydranth bodies, in our species. Medusa bell-shaped, with a simple or lobed proboscis. Marginal tentacles 2 or 4, not in clusters, and with bulbous bases and no eye-spots.

Perigonimus jonesii Osborn & Hargitt. Fig. 6.

(American Naturalist, vol. xxvii, p. 27.)

Trophosome.—Colony attaining a height of about one-fourth inch, freely branching, the branches erect and continuing insensibly into the hydranth body; gelatinous perisarc very thick and often wrinkled, reaching to the bases of the tentacles and sometimes appearing to include the proximal part of the latter. Hydranths with about 16 tentacles held rigidly, but alternately depressed and elevated; proboscis dome-shaped or subconical.

Gonosome.—Gonophores borne on the hydranth body or branches. Meduse ovoid, with 2 tentacles, 4 radial canals, and 4 eye-spots; manubrium short with a 4-lobed mouth.

Color.—Colony flesh-colored.

Distribution.—Found on the abdomen and walking legs of Labinia emarginata. Collected at Coldspring Harbor, Long Island.

This species does not come strictly within the Woods Hole region, but as it is the only American Perigonimus yet described it seemed desirable to include it here.

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Characters of the family as given above.

**Key to species of Eudendrium found in the Woods Hole region.**

A. Main stem fascicled. (Larger species.)
   a'. Branches and pedicels annulated at proximal ends only.
   b. Colony large, pinnately branched. Male gonophores with 2 or 3 chambers. .......... E. ramosum.
   b'. Colony smaller, less than 3 inches. Male gonophores 4 or 5 chambered and borne on atrophied hydranths. .... E. cornuicornis.

A'. Main stem not fascicled. (Smaller species.)
   a. Hydranth body globular; pedicels long, slender. Male gonophores 4 or 5 chambered .......... E. tenue.
   a'. Hydranth body vasiform, colony bushy; pedicels strong, shorter. Female gonophores on aborted hydranths .......... E. capitata.
   a''. Hydranth body vasiform; colony minute, about one-fourth inch, sparsely branched; pedicels very long, slender and pellucid. Gonophores borne on aborted hydranths .......... E. album.

**Eudendrium ramosum** (Linn.). Fig. 7.

(*Tubularia ramosa* Linn., Syst. Nat., p. 1392.)

**Trophosome.**—Colony bushy, attaining a height of 6 inches; stem fascicled, the main branches giving off pinnately disposed branchlets; annulations confined to the bases of the internodes and ends of the pedicels. Hydranth body ovoid.

**Gonosome.**—Male gonophores borne on bodies of hydranths that are not often completely aborted, 2 or 3 chambered; female gonophores usually on hydranths below the tentacles, or on the upper part of the pedicels.

**Color.**—General color greenish. The hydranth bodies lined with vermilion pigment. Male gonophores vermilion; female gonophores orange red.

**Distribution.**—Growing abundantly on piles of U. S. F. C. wharf at Woods Hole. One of the commonest forms flourishing in shallow water.

**Eudendrium dispar** Ag. Fig. 8.

(*Tubularia dispar* Ag., Syst. Nat., p. 295.)

**Trophosome.**—Colony large, attaining a height of 5 inches. Stem slender, slightly fascicled, with extensively annulated branches and pedicels. Hydranth body vasiform.

**Gonosome.**—Gonophores borne on hydranths, which are not aborted and usually not reduced in size.

**Color.**—General color greenish. Hydranths rose-colored. Male gonophores orange; female gonophores pink.

**Distribution.**—Found in rather deep, clear water. Naushon (A. Agassiz). U. S. Fish Commission station 7000, off Block Island (Nutting).
Eudendrium carneum Clarke. Fig. 9.

(Mem. Boston Soc. Nat. Hist., iii, No. 4, p. 137.)

*Trophosome.*—Colony attaining a height of about 2 inches; main stem fascicled, pinnately branched, the branches not so widely spreading as in *E. ramosum*. Annulations usually confined to the proximal ends of branches and pedicels, except that the pedicels bearing aborted hydranths and gonophores are deeply ringed throughout. Hydranth body subvasiform.

*Gonosome.*—Male gonophores 4 or 5 chambered, borne in a verticil around the body of aborted hydranths, which are themselves joined to pedicels bearing ordinary hydranths, the two being thus borne in pairs symmetrically disposed on the branches.

*Color.*—Hydranth bodies and gonophores bright red.

*Distribution.*—The specimen described was found in the U. S. Fish Commission collection at Woods Hole. Labeled December 17, 1888.

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Eudendrium tenue A. Ag. Fig. 10.

(North American Aculeata, p. 169.)

*Trophosome.*—Colony branching irregularly, attaining a height of about one-half inch. Stem not fascicled, loosely branching, the pedicels being long and slender. Hydranth body globular.

*Gonosome.*—Male gonophores 2 to 4 chambered, borne on unbranched annulated pedicels, the hydranths of which have become aborted. Female gonophores globular, scattered over hydranth body and pedicels. (A. Agassiz.)

*Color.*—General color bright pinkish. (A. Agassiz.)

*Distribution.*—Shallow water in Buzzard's Bay. Naushon.
Eudendrium capillare Alder.

Catalogue of the Zoophytes of Northumberland and Durham, p. 105.

_Trophosome._—Colony attaining a height of about one-half inch, sparsely branching, the branches and pedicels being sparingly annulated. Hydranth body vasiform.

_Gonosome._—Male gonophores 2 or 3 chambered, borne on aborted hydranths springing either from the branches or hydrorhiza. Female gonophores also borne on aborted hydranths.

_Color._—Hydranths pale greenish. Male gonophores orange.

_Distribution._—Newport, R. I., in shallow water. (C. C. N.)

Eudendrium album Nutting. Fig. 11.

_Catalogue of the Zoophytes of Northumberland and Durham, p. 189._

_Trophosome._—Colony minute, attaining a height of about one-third inch, branching in a straggling manner, the ultimate branches or pedicels being exceedingly long and slender, pellucid, and not decidedly or regularly annulated. Hydranths with vasiform bodies.

_Gonosome._—Male gonophores 2 or 3 chambered, borne on hydranths that are generally not aborted, but may be considerably reduced in size. Female gonophores apparently not so numerous as in allied species, borne on partially aborted hydranths.

_Color._—General color white, hydranths almost entirely so. Male gonophores pale orange yellow.

_Distribution._—Found on floating seaweed secured in taking the tow at Woods Hole; also on U. S. Fish Commission wharf.

HYDRACTINIDÆ.

_Trophosome._—Colony formed of “persons” of three sorts springing from an incrusting layer beset with jagged spines. Perisarc not evident. Hydranths with a single whorl of filiform tentacles and a conical proboscis. “Spiral zooids” or defensive persons slender, cylindrical, spirally coiled, with large nematocyst batteries near their distal ends.

_Gonosome._—Gonophores fixed sporosacs borne on blastostyles, forming a third or sexual person of the colony.

HYDRACTINIA.

Characters of the family as given above.
Hydractinia polyclina Ag. Fig. 12.


Trophosome.—Colony composed of thickly crowded persons arising from an incrusting plate beset with jagged spines and overlaid with coenosarc. Hydranths slender, gradually increasing in size from proximal to distal end, tentacles numerous, filiform, arranged in several closely approximated whorls, which are so closely set as to appear as one whorl at the base of the rather low conical proboscis. Spiral zooids generally situated on the borders of the colony and with a number of nematocyst batteries around the distal end.

Gonosome.—Gonophores borne on sexual persons which are much stouter and shorter than the hydranths, and have numerous batteries of nematocysts around the conical proboscis, but no tentacles. No free medusae.

Color.—Hydranths white, tinged with red. Gonophores, which give the characteristic color to the colony, bright red.

Distribution.—Found growing on gastropod shells inhabited by hermit crabs, on the bare rock, or on the piles of wharves. The writer has found them among the colonies of Tubularia crocea on the U. S. Fish Commission wharf at Woods Hole.

I have carefully compared this species with H. echinata from England, and found that the two are quite distinct, as claimed by Agassiz. Aside from the characters as given by him, I find that the European form has very much larger hydranths than the American and much less numerous tentacles.

PODOCORYNIDÆ (modified).

Trophosome.—Hydranths with a single whorl of filiform tentacles around the base of a conical proboscis. Hydrorhiza a reticulate network of stolons invested with perisarc and usually beset with jagged spines.

Gonosome.—Gonophores growing in a circlet around the basal part of the hydranth body, and producing fixed sporosacs or free medusae with 4 radiating canals and 4 or 8 marginal tentacles with eye-spots at their bases.

STYLACTIS.

Trophosome.—Hydranths sessile, without evident perisarc, slender, growing from a hydrorhiza composed of a network of anastomosing tubes which are not covered with naked coenosarc and which usually bear chitinous spines.

Gonosome.—Sporosacs borne on the hydranth body just below the tentacles and producing medusae with 8 rudimentary tentacles and no mouth.

Stylactis hooperi Sigerfoos. Figs. 13 and 85.

(American Naturalist, xxxiii, No. 394.)

Trophosome.—Hydranths exceedingly slender and attaining a height when alive of about three-fourths inch. Tentacles in a single whorl, very variable in number, the average, according to Sigerfoos, being 18 to 25. Hydrorhiza covered with a felting of diatoms, etc., but with no covering of naked coenosarc.
**Gonosome.**—Gonophores borne on shorter hydranths just below the tentacles and producing free medusae with 4 radial canals, 8 rudimentary tentacles, and neither mouth nor eye-spots. Ova borne on the very large manubrium.

Color.—A specimen kept for some time in formalin is of a reddish flesh color. I have not seen the free medusa, and the color is not given by the original describer.

Distribution.—Found on shells of a living gastropod, *Hymanassus obsletus*. A colony was found at Woods Hole in 1886. Dr. Sigerfoos found numerous specimens at Cold Spring Harbor, Long Island.

**Pennaridae.**

**Trochosome.**—Colony regularly branched (in our species). Hydranths with a proximal circlet of filiform tentacles and a distal set of spirally arranged or whorled capitate tentacles.

**Gonosome.**—Gonophores producing medusae which are either attached permanently or become free when mature, and which have 4 radiating canals and 4 rudimentary tentacles.
HYDROIDS OF THE WOODS HOLE REGION.

PENNARIA.

**Trophosome.**—Colony pinnately branched, with a pronounced chitinous perisarc. Hydranths with a pyriform body and long mobile proboscis beset with capitate tentacles.

**Gonosome.**—Gonophores borne above the proximal row of tentacles. Medusae oblong ovate, with a very large proboscis bearing the sexual products.

**Pennaria tiarella** McCr. Figs. 14 and 83. (Proceedings Elliott Soc., vol. 1, No. 1, p. 158.)

**Trophosome.**—Colony attaining a height of about 6 inches, with main stem and branches geniculate and beautifully annulated above origin of each branch, branchlet, and pedicel. Hydranths large, the ones terminating branches being decidedly larger than the others; a basal whorl of about 12 filiform tentacles, and a number of capitate tentacles disposed in indistinct whorls on proboscis.

**Gonosome.**—Gonophores attached to hydranth body just above whorl of filiform tentacles, and producing oblong-ovate sessile medusa which sometimes give forth sexual products while still attached, and sometimes become free before giving forth the sexual products.

**Color.**—Stem horn brown with darker areas at the annulations. Hydranth body lined with vermilion, which shows through, producing a beautiful contrast with the white tentacles. Sessile medusae greenish with vermilion markings.

**Distribution.**—Abundant on the piles of Fish Commission dock at Woods Hole, and also growing profusely on eelgrass near the Hole. One of the most abundant and beautiful species on our coasts.

CORYMORPHIDÆ.

**Trophosome.**—Hydranths solitary, without complete tube of perisarc, and having proximal and distal whorls of filiform tentacles and a number of fleshy or tubular processes on the proximal end of the pedicel or stem.

**Gonosome.**—Gonophores producing medusa which have 4 radiating canals and 1 to 4 marginal tentacles, of which one is much the largest.

CORYMORPHA.

**Trophosome.**—Hydranth sharply distinguished from its pedicel and with numerous short filiform tentacles arranged in several closely set whorls around the distal end of the proboscis and a single whorl of larger tentacles around the base of the body.

**Gonosome.**—Gonophores borne on branched pedicels above the proximal whorl of tentacles and producing fixed or free medusa with either a single large tentacle or 4 tentacles, one of which is much the largest.

**Corymorpha pendula** Ag. Fig. 15. (Cont. Nat. Hist. U. S., iv, p. 276.)

**Trophosome.**—Hydranths attaining a height of 3 to 4 inches when alive and fully extended. Pedicel with canaliculated cesophage, the canals appearing superficially as longitudinal bands which anastomose, especially on the proximal part of the pedicel the distal part of which is abruptly

F. C. B. 1890—22
TUBULARIAE.

**Trophosome.**—Hydrocaulus with a distinct tubular perisarc, branched irregularly or not at all. Hydranths with a proximal and distal set of filiform tentacles. An adherent, creeping hydrorhiza often produced.

**Gonosome.**—Gonophores borne above the proximal whorl of tentacles on branched peduncles, and not producing free medusae. The females produce hydra-like actinules which develop directly into new colonies.

**Key to the genera of Tubulariae found in the Woods Hole region.**

<table>
<thead>
<tr>
<th>Hydranths permanently attached by a regular hydrorhiza</th>
<th>Tubularia.</th>
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<tr>
<td>Hydranths not permanently fixed, the stem or pedicel giving off buds from its free end, which are separated by spontaneous fission and develop into new hydranths</td>
<td>Hypotyposa.</td>
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</table>

**TUBULARIA.**

**Trophosome.**—Colony branched or unbranched, attached by permanent chitinous hydrorhiza.

**Gonosome.**—Gonophores borne in pendent clusters attached by peduncles to the hydranth body above the proximal tentacles. Female gonophores producing actinules.

**Key to the species of Tubularia found in the Woods Hole region.**

<table>
<thead>
<tr>
<th>A. Sessile medusa, with distinct radial canals</th>
<th>T. couthouyi.</th>
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<tbody>
<tr>
<td>A'. Sessile medusa without distinct radial canals and with conical apical processes</td>
<td>a. Cenosearc forming a distinct expansion in the stem just below the hydranth. Perisarc extensively annulated</td>
</tr>
<tr>
<td>a'. Perisarc not extensively annulated</td>
<td>b. Hydranths large. Habitat, shallow water</td>
</tr>
<tr>
<td>b'. Hydranths small. Habitat, deep water</td>
<td>T. lenticulata.</td>
</tr>
</tbody>
</table>

**Tubularia couthouyi** Ag. Fig. 16. (Cont. Nat. Hist. U. S., iv, p. 296.)

**Trophosome.**—Stems unbranched, often annulated, attaining a height of 5 to 7 inches. Hydranth large, probably the largest on our coasts, often expanding an inch or more; proximal whorl of tentacles 30 to 40 in number; distal set very much smaller and shorter.

**Gonosome.**—Gonophores growing in dense racemes from the hydranth body just above proximal whorl of tentacles. Sessile medusa with 4 radial canals and without tentacular processes at the oral end. Females producing actinules.

**Color.**—Stem and gonophores bright scarlet.

**Distribution.**—Found in brackish water usually. A number of beautiful specimens were sent me by Dr. Mead, of Brown University, who had them growing in a submerged flatboat at Providence, R. I. A few specimens were taken from a depth of 30 fathoms by the *Fish Hawk* in latitude 40° 49' 49", longitude 70° 42'. Mr. George Gray reports them from Quiek Hole and off Nobska Point.

**Tubularia larynx** Ellis & Solander. Fig. 17. (Nat. Hist. Corallines, p. 30.)

**Trophosome.**—Colony bushy; stems branched and extensively annulated, attaining a height of 1 to 1 1/2 inches. Cenosearc of the stem forming a curious collar-like expansion below the hydranth. Hydranth with 16 to 20 proximal tentacles and about the same number in the distal set.
HYDROIDS OF THE WOODS HOLE REGION.

Gonosome.—Gonophores borne in dense clusters, the female without evident radial canals, and with conical tentacular processes at their oral ends.

Color.—Perisarc, in adult specimens, yellow. Body of hydranths and gonophores pinkish scarlet.

Distribution.—Found on rocky and shelly bottoms. A number of specimens secured growing on Eudendrium diapar and on seaweed at U. S. Fish Commission station 7060, Muskeget Life-Saving station bearing N. by E. 4½ miles. Depth, 5 fathoms.

Tubularia spectabilis (Ag.). Fig. 18.

Trophosome.—Colony irregularly branched and sparsely annulated, attaining a height of about 4 inches. Hydranths with about 20 tentacles in the proximal row and nearly the same number in the distal row.

Gonosome.—As in the last species, except that the clusters of gonophores are larger and longer.

Color.—The stems are very pale; almost white. Hydranth body and gonophores rose red.

Distribution.—Found on rocks at end of Newport Island. At Woods Hole, locality not given.

Tubularia tenella (Ag.).

Trophosome.—Colony very small for this genus, hardly exceeding 1 inch in height. Stems loosely branching, not distinctly annulated. Hydranths with a proximal row of about 18 tentacles and about the same number in the distal row.

Gonosome.—As in the last species.

Color.—Stem pale, almost white. Hydranth bodies and gonophores pink.

Distribution.—The open ocean in rocky pools (A. Agassiz). Vineyard Sound, 6 to 10 fathoms. (A. E. Verrill.)

The best distinguishing mark of this species seems to be its small size, only about half that of T. spectabilis.
Tubularia crocea (Ag.). Fig. 19.


Trophosome.—Colony growing in dense tufts of stems entangled below and separated into long pedicels above, attaining a height of 3 to 4 inches. Stems unbranched or sparsely branched, annulated slightly at intervals and swollen just below the hydranth. Hydranth with a body whorl of about 20 to 24 tentacles and about the same number in the distal set.

Gonosome.—Gonophores growing in racemes or clusters. Sessile medusae with a group of about four tentacular processes at its oral end, those of the female being laterally compressed. There are no evident radiating canals.

Color.—Body of hydranths and gonophores rose red. Stems pale, almost white.

Distribution.—Found growing very profusely on the piles of the Fish Commission dock at Woods Hole; also on the piles of the docks at New Haven and other similar places.

This species is exceedingly difficult to distinguish from T. spectabilis. Indeed, little confidence can be placed in identification of specimens without mature female gonophores.

HYPOLYTUS.

Trophosome.—Colony consisting of single hydranths with a long proboscis and a distal and proximal whorl of filiform tentacles. The proximal end of the stem is free.

Gonosome.—Gonophores borne on the proboscis immediately above the proximal whorl of tentacles. They occur singly and not in clusters in the type specimen. The sessile medusae are long and terete in form and show no tentacular processes.

Hypolytus peregrinus Murbach. Fig. 20.


The generic description above is sufficient to identify the one known species of the genus. Description condensed from original. The figure has been copied from that of Dr. Murbach, with his permission.

Distribution.—Woods Hole, Mass.
HYDROIDS OF THE WOODS HOLE REGION.

HYBOCONIDÆ.

Trophosome.—Colony unbranched. Stem with a distinct chitinous perisarc, and rooted to a true hydrorhiza. Hydranths large, with a proximal and distal set of filiform tentacles.

Gonosome.—Gonophores producing free medusae.

HYBOCODON.

Trophosome.—Stem with distinct, deeply annulated, expansion just below hydranth. Hydranth with a proximal whorl and two distinct but closely approximated distal whorls of filiform tentacles.

Gonosome.—Gonophores attached directly to the hydranth body without the intervention of poduncles and developing into free medusae, each of which has a single large tentacle bearing succeeding generations of medusae. The medusae are deeply campanulate, with 4 radial canals and a short proboscis.

Hybocodon prolifer Ag, Fig. 76.


Trophosome.—Hydrocaulus unbranched, longitudinally striped owing to the cenosarcal canals showing through; perisarc suddenly enlarging near the hydranth, where a number of collar-like swollen rings appear, the uppermost being the largest. Hydranth much like that of Tubularia, but with two distinctly separated whorls of tentacles around the proboscis, each whorl being composed of about 16 tentacles, the lower being twice as long as the upper.

Gonosome.—Gonophores adnate to the hydranth body just above the basal whorl of tentacles, producing free medusae with four radial canals and five superficial meridional orange-colored bands when fully mature. The single tentacle is greatly enlarged and near its base a number of medusae in various stages of development are attached, and these again may in the same manner bear still other groups of medusae.

Color.—The pigmentation of both hydranth and medusa is orange red.

Distribution.—Deep pools of sea water (Agassiz). The medusa only has been taken at Woods Hole, being collected in the tow net by Mr. Vinal Edwards on March 2. At that time the orange bands were not conspicuous.

Suborder CALYPTEROBLASTEA.

Hydrotheca and gonangia present.

CAMPANULARIDÆ.

Trophosome.—Hydrotheca well developed, nonoperculate, either with distinct pedicels or nearly sessile, but not adnate to or partly immersed in stem or branches. Hydrothecal cavity distinctly differentiated from cavity of stem by a septum perforated to allow a cenosarcal connection between hydranth and pedicel. Hydranth with a trumpet-shaped or subgobular proboscis.

Gonosome.—Gonophores either developing the generative products directly or producing medusae which usually have otocysts and in which the ovaries are situated along the course of the radial canals and sometimes on the proboscis also, but never on the proboscis alone.

Key to genera of Campanularideae found in the Woods Hole region.

A. Stem not regularly branched.
   a. Hydrotheca on long pedicels.
   b'. No medusae, but free medusae developed within the gonangium .......... Campamularia.

A'. Stem regularly branched.
   a. Free medusae with 4 or more marginal tentacles. Lithocysts on the bases of tentacles .......... Obelia.
   a'. No free medusae, the mature gonangium bearing medusa-like bodies on their summits .......... Gonothyraea.
   a''. No free medusae, the planulae being developed within the gonangium .......... Campamularia.

The Campanularideae offer great difficulties in identification, owing to the necessity of basing generic characters on the gonosome and the practical identity of the trophosomes of different genera. The following entirely artificial key, although inadequate in some cases, is presented to aid the collector and student in the identification of specimens without the gonosome.
Key for identification of Campanularidae found in Woods Hole region (based on trophosome alone).

A. Stem neither regularly branched nor fascicled. This includes cases where a pedicel supports other pedicels springing from it in an irregular manner.
   a. Pedicels strongly annulated throughout.
   b. Hydrothecal margin not toothed, but entire. ........................................... Campanularia peregrina.
   c. Hydrothecal margin evidently toothed.
   d. Hydrothecal teeth sharply pointed, the extreme tips sometimes rounded.
      c. Pedicels usually more than three times the length of hydrothecoe. Hydrotheces deeply campanulate ........................................... Clytia bicornis.
      c. Pedicels seldom more than three times the length of hydrothecae. Clytia intermedius.
   e. Hydrothecal teeth evenly rounded. Hydrothecae very large, with parallel sides and exceed-ingly thin walls ........................................... Clytia grayi.
   b. Hydrothecal teeth squared or bifid. Hydrothecae ornamented with vertical lines. Campanularia bisectedi.
   a'. Pedicels not strongly annulated except at ends.
   b. Hydrothecal teeth square. Hydrothecae ornamented with vertical lines. Campanularia bisectedi.

A'. Stem regularly branched.
   a. Stem fascicled.
      b. Hydrothecae with pointed or regularly rounded teeth. Pedicels arranged in verticiles around stem ........................................... Campanularia verticillata.
      b. Hydrothecae with square, or bincrururate teeth.
         d. Hydrothecae very deep. Pedicels with usually 5 to 6 annulations. Obelia bicriptata.
   b'. Hydrothecal margin even, not toothed.
      c. Colony with a very slender central stem from which much-branched, short, lateral branches arise in a verticillate manner.
         d. Hydrothecae triangular in outline. Pedicels usually with 4 to 6 annulations. Obelia floridana.
      c'. Colony not branched in a regularly verticillate manner.
         d. Stem strongly flexuose, or geniculate, usually not profusely branched, and giving off alternate pedicels.
            e. Stem decidely flexuose, each pedicel forming a graceful curve continuous with the internode from which it springs. Hydrothecae campanulate. Pedicels with 6 to 12 annulations. Campanularia flaccida.
            e. Stem geniculate or abruptly bent at the nodes.
               f. Pedicels long, with many annulations. Campanularia angustata.
      d'. Stem not regularly fascicled.1
         c. Colony with a very slender central stem from which much-branched, short, lateral branches arise in a verticillate manner.
            d. Hydrothecae triangular in outline. Pedicels with usually 4 to 6 annulations. Obelia floridana.
      c'. Colony not branched in a regularly verticillate manner.
         d. Stem strongly flexuose, or geniculate, usually not profusely branched, and giving off alternate pedicels.
            e. Stem decidely flexuose, each pedicel forming a graceful curve continuous with the internode from which it springs. Hydrothecae campanulate. Pedicels with 6 to 12 annulations. Campanularia flaccida.
            e. Stem geniculate or abruptly bent at the nodes.
               f. Pedicels long, with many annulations. Campanularia angustata.

A''. Colony parasitic, usually growing in a straggling or irregular manner over other hydroids. Hydrothecae tubular, with even margins. Pedicels very short, sometimes hardly apparent. (Genus Hebelia.)
   a. Hydrothecae large, curved. Colony almost always found growing symmetrically over Sertularia cornucisa. Hebelia cornucisa.
   a. Hydrothecae much smaller. Colony growing in a straggling manner over various hydroids and other organisms. Hebelia pygmaea.

1 An appearance of fasciculation is often produced when a simple stem is overgrown with parasitic hydroids, or even when young colonies are growing over older ones of the same species.
HYDROIDS OF THE WOODS HOLE REGION.

CLYTIA.

_Trophosome._—Colony not regularly branched. Hydrothecae with toothed margins and long pedicels.

_Gonosome._—Gonangia containing gonophores which produce medusae with 4 radial canals, 4 marginal tentacles at birth, and 8 lithocysts between the tentacle bases.

**Key to the species of Clytia found in the Woods Hole region.**

| Hydrothecae small, bell-shaped, with deeply cut teeth | C. bicophora |
| Hydrothecae small, cylindrical, with sharp teeth and short pedicels | C. cylindrica |
| Hydrothecae larger, stout, broadly campanulate, or subtriangular in outline, with large, evenly rounded teeth | C. noliformis |
| Hydrothecae very large, with parallel sides and evenly rounded teeth | C. grota |

**Clytia bicophora** Ag. Fig. 21.


_Trophosome._—Stem seldom branching, never regularly so. Hydrothecae deeply campanulate, with about 14 pointed teeth. Pedicels large, long, annulated at the ends, usually smooth through the middle portion.

_Gonosome._—Gonangia deeply and evenly ringed, resembling a Chinese lantern, usually borne on the rootstock, sometimes on the stem. Medusa when liberated hemispherical, with 4 tentacles and 8 lithocysts situated between the bases of the tentacles, and a short manubrium.

_Distribution._—Shallow water, attached to shells, other hydroids, seaweed, etc. Found on the stems of _Tubularia crocea_ growing on the piles of the U. S. Fish Commission dock at Woods Hole.

Both Hincks and Verrill regard this species as identical with _Clytia johnstonii_ Alder, of British waters. I have carefully compared American specimens of _C. bicophora_ with specimens of _C. johnstonii_ from England, and find that the former is a much more delicate and smaller species, the hydrothecae of _C. johnstonii_ being on the average twice as long and wide as those of _C. bicophora._

**Clytia cylindrica** Ag.


_Trophosome._—Stems unbranched, with pedicels shorter than in _C. bicophora_, annulated at the proximal and distal ends. Hydrothecae cylindrical, small, deep, with about 10 deeply cut, sharply pointed teeth.

_Gonosome._—Gonangia slender, obovoid, flattened, not annulated, containing developing medusae which escape singly. Medusa not described.

_Distribution._—Much as in the last species. Found in Buzzards Bay and at Nauset. (A. Agassiz.)

I have not seen this species, and have compiled the above descriptions from the writings of Louis and Alexander Agassiz.

**Clytia noliformis** (McCr.). Fig. 22.

(Campanularia noliformis McCr., Proc. Elliott Soc., vol. 1, No. 1, p. 194.)

_Trophosome._—Pedicels short, usually not more than twice as long as the hydrotheca, strongly annulated, rising from a creeping rootstock. Hydrothecae broadly campanulate, with 10 to 12 very prominent, deeply cut teeth with rounded points. Texture of hydrothecae stouter than in other species of the genus.

_Gonosome._—My specimens are without gonangia, and I have been unable to find any description of them.

It is not certain that this species occurs in the Woods Hole region. Dr. Agassiz reports it from Buzzards Bay, but as he considers it identical with the _Clytia cylindrica_ of his father's work, a species that appears to me to be distinct, I am not sure whether he had McCrady's species or not. My own specimens came from Beaufort, N. C.
Clytia grayi, new species. Fig. 23.

Trophosome.—Stems unbranched or irregularly branched, strongly annulated, except on the middle portion. Hydrothecae very large (twice as large as in C. bicophora), cylindrical, the sides being parallel and bottom hemispherical; marginal teeth about 16 in number, evenly rounded and not very deeply cut. There is often a tendency to a longitudinal plaiting, which shows as short, straight lines running downward from between the teeth. Hydranth with about 20 tentacles.

Gonosome.—Gonangia oblong, conspicuously and regularly annulated, attached to creeping rootstock. Medusa not known.

Distribution.—Found growing on living worm tubes composed of sand. Dredged by the U. S. Fish Commission steamer Fish Hawk at station 7051, latitude, 40° 46' 30" N.; longitude, 70° 40' W. Depth 31 fathoms.

The largest Clytia which has up to this time been found in American waters. Named in honor of Mr. George Gray, of the Marine Biological Laboratory at Woods Hole, a man who has done much for American marine biology.

CAMPANULARIA.

Trophosome.—Colonies unbranched, regularly branched, or fascicled. Hydrothecae without operculum and with or without marginal teeth.

Gonosome.—Gonangia producing sexual products which develop into planulae within the gonangium. No medusa.

Key to species of Campanularia found in the Woods Hole region.

A. Colony not regularly branched.
   a. Hydrothecae with margin entire. ........................................... C. poteriun.
   b. Hydrothecae margin toothed.
      V. Teeth square or truncated at top ....................................... C. blackii.
      V'. Teeth very shallow, forming sinuities or undulations around aperture. Hydrothecae deep, tubular. C. rufiblitta.
      V''. Teeth very sharp and deeply cut, pedicels long, stem irregularly branched. ............... C. minuta.

A'. Colony regularly branched.
   a. Hydrothecae margin toothed.
      b. Teeth castellated or bimucronate ........................................ C. neglecta.
      V. Teeth acute, stem not fascicled .......................................... C. edwardsi.
      V'. Teeth sharp or rounded, stem fascicled ................................... C. verticillata.
   b. Hydrothecae margin entire.
      b'. Branches arranged in subverticillate manner around a slender axial stem. Pedicels often longer than hydrothecae .................................. C. amphara.
      V'. Branches not arranged in a subverticillate manner. Main stem giving off alternate pedicels.
      c. Stem angulated, or strongly geniculata. Pedicels long. ........................................ C. angulata.
      e'. Stem slightly flexuosa. Pedicels long, not always annulated throughout. Gonangia with a subterminal aperture. C. calcolifera.

Campanularia poteriun (Ag.). Fig. 24,


Trophosome.—Stem unbranched, the pedicels arising directly from annulated rootstock; pedicels annulate throughout, the annulations often oblique, giving a twisted appearance. Hydrothecae deeply campanulate; aperture not toothed; basal portion thickened greatly, so as to include what appears to be the uppermost annulation. Hydranths with 24 tentacles.

1 It appears to be impossible to construct generic characters for the Campanulariidae on the basis of the trophosomes. The classification of the group is unnatural and unsatisfactory in the extreme, but this is not the place to attempt its rectification.
HYDROIDS OF THE WOODS HOLE REGION.

**Gonosome.**—Gonangia rather slender, not decidedly annulated, growing from the rootstock. The sexual products pass through part of their development in an acrocyst resting on top of gonangium.

**Distribution.**—Found growing on stones, shells, seaweed, etc. A specimen in the U. S. Fish Commission collection is labeled: "Off Nantucket Island. Depth, 23 fathoms."

**Campanularia hincksii** Alder. Fig. 25.
(North. and Durh. Cat. in Trans. Tynside Field Club, iii, p. 127.)

**Trophosome.**—Pedicels springing directly from a creeping rootstock, not extensively annulated. Hydrothecae large, deep, cylindrical, with about 12 prominent square-topped teeth, from between which vertical lines pass down over the surface of the hydrotheca.

**Gonosome.**—Gonangia long, annulated, resembling those of *Clytia johnstonii*, but often not so deeply annulated.

**Distribution.**—Growing on stones, shells, etc., in rather deep water. A specimen was secured from a depth of 15 fathoms near Newport, R. I. Contrary to the rule among campanularians, the hydranth of this specimen was brilliantly colored, the general color being yellow and the basal part scarlet.

**Campanularia volubilis** (Linn.). Fig. 26.
(Syst. Nat., p. 1311, under name of *Sertularia volubilis*.)

**Trophosome.**—Pedicels long, extensively annulated, springing from a creeping rootstock. Hydrothecae small, tubular, with about 10 shallow rounded marginal teeth.

**Gonosome.**—Gonangia borne on the rootstock, flask-shaped, with a long tubular neck and small terminal aperture.

**Distribution.**—Found growing on *Sertularella tricuspidata* on specimens in the U. S. Fish Commission collection; supposed to be from rather deep water.

The combination of tubular hydrothecae with very shallow teeth and extensively annulated pedicels will differentiate this form from others on the North Atlantic coast.

**Campanularia minuta**, new species. Fig. 27.

**Trophosome.**—Stem branching in an irregular straggling manner, attaining a height of about one-fourth inch. Pedicels long, extensively annulated, rising almost parallel with the main stem, which is itself extensively annulated, although there are smooth portions of considerable extent. Hydrothecae very small, deeply campanulate, with 8 to 10 very acute and prominent teeth.

**Gonosome.**—Not known.

**Distribution.**—Parasitic on *Oleom commissuratus* from the piles of the wharf at New Bedford. Collected by Mr. Vinal Edwards.

This species appears to be quite distinct. It seems to be nearest to *C. varidens* Alder, from which it differs in being branched, in the extent of annulations of the pedicels, and in the hydrothecae being considerably broader in proportion to their length.
Campanularia edwardsi, new species. Fig. 28.

*Trophosome.*—Colony attaining a height of over an inch, branching somewhat irregularly, but with a distinct tendency to send off pedicels from the main stem in subopposite pairs. Stems, branches, and pedicels exceedingly long and slender, with the annulations confined to the proximal portions, except a few just below the hydrothecae. Hydrotheca very large, deeply campanulate, with 12 to 14 exceedingly sharp, slender teeth, more acuminate than in any other species in the region. Hydranth with about 28 tentacles.

*Gonosome.*—Unknown.

*Distribution.*—The type specimen was found on the piles of the U. S. F. C. dock at Woods Hole. This is one of the most distinct and beautiful of the American campanularians. Named for Mr. Vinal Edwards, the veteran collector at the U. S. F. C. station at Woods Hole.

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Campanularia neglecta (Alder.) Fig. 29.

(*Laomedea neglecta* Alder, North, and Durham Cat. in Trans. Tyneside Field Club, p. 123.)

*Trophosome.*—Colony branching, main stem flexuose, giving off alternate pedicels which are long, slender, and annulated at the ends. Hydrotheca deeply campanulate, almost tubular, with their margins armed with 8 to 10 teeth which are bimucronate; that is, the summit of each tooth is crowned with two minute denticles.

*Gonosome.*—Gonangia borne in the axils of the pedicels, oblong ovate, smooth, somewhat truncated above. The mature gonangium often has a globular acroyst on its summit.

*Distribution.*—In shallow water, on stones, shells, and other hydroids. Reported by Professor Verrill from Casco Bay, Maine. I find it in my notes as occurring at Woods Hole, but fail to find specimens. The figure is from a British specimen.
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Campanularia verticillata (Linn.). Fig. 30.
(Serulinae verticillata Linn., Syst. Nat., p. 1310.)

Trophosome.—Colony branched, attaining a height of about 5 inches. Stem and branches fascicled, composed of many parallel tubes from which the pedicels arise in a verticillate manner. Hydrothecae large, rather broadly campanulate, with about 12 deeply cut acuminate teeth.

Gamoseome.—Gonangia borne on the main stem and branches, oblong flask-shaped, with necks often produced into tubular extensions with terminal openings.

Distribution.—Found in rather deep water attached to stones, shells, etc. Block Island Sound, 17 to 45 fathoms. Fisher Island Sound, 4 to 11 fathoms. (Verrill.)

Campanularia angulata Hincks. Fig. 32.
(Annals and Magazine of Nat. Hist., 3d series, viii, p. 261.)

Trophosome.—Colony slightly branched, attaining a height of about three-fourths inch. Stem geniculate, with long internodes, annulated above the origin of each pedicel. Pedicels long, usually
annulated throughout. Hydrothecae rather deeply campanulate, aperture entire. Hydranth with about 24 very slender tentacles.

**Gonosome.**—Gonangia borne on the rootstock, irregularly ovate, obscurely wrinkled, neck short and broad.

**Distribution.**—I have several fragmentary specimens from Woods Hole region that agree very closely with Hindek's figures. Comparing these, however, with some of the terminal branches of *C. amphora*, I find them to agree closely with these also. Verrill reports the species from Casco Bay. I do not know whether his material embraced the gonosome or not.

**Campanularia calceolifera** Hincks. Fig. 33.


*Campanularia calceolifera* Hincks. Fig. 33.

**Trophosome.**—Colony usually consisting of a single slightly flexuosus stem, but sometimes it gives off long branches similar in every way to the main stem, which sends off alternate pedicels of varying length, but usually fully annulated and considerably shorter than the hydrothecae. Hydrothecae without teeth, deeply campanulate, and with gracefully everted margins.

**Gonosome.**—Gonangia of peculiar shape, tapering basally, with latero-terminal aperture from which a short, curved tube projects into the gonangial cavity.

**Distribution.**—In shallow water on stones, seaweed, submerged timbers, etc. Noank, Conn., on bottom of boat (Clarke). Woods Hole, on piles of U.S. Fish Commission's dock.

This beautiful species can be immediately identified when sexually mature. Otherwise the best character is the elegant shape of the hydrothecae.

**Campanularia flexuosa** (Hincks). Fig. 34.


**Trophosome.**—Colony usually in the form of a single flexuosus stem giving off a series of regularly alternating pedicels. Stem with three or four well-marked annulations above the origin of each pedicel; pedicels apparently continuous with the internodes from which they spring, and with which they curve continuously, rather large, completely annulated and diminishing gradually in size toward the distal end. Hydrothecae campanulate, not very deep, with even rims. Hydranth with a web between the bases of the tentacles.
Gonosome.—Female gonangia very large and abruptly truncated above; male gonangia much smaller and more oval, but with no neck; sexual products forming planulae before leaving gonangia.

Distribution.—Very abundant on floating seaweed and on rocks and timbers in shallow water. One of the most abundant species at Woods Hole.

OBELIA.

Trophosome.—Colony branched, stem simple or fascicled. Hydrothecie campanulate, margin even, or toothed.

Gonosome.—Gonangia borne in axils of pedicels, usually oblong ovate, with terminal aperture usually surrounded with a collar or short neck. Medusa with disk-shaped umbrella, 4 radial canals, more than 8 marginal tentacles, 8 lithocysts borne on bases of tentacles, and a short manubrium without mouth tentacles.

It is apparently impossible to define this genus so that it can be distinguished from Campanularia by the trophosome alone.

35. Obelia flabellata Hincks.

36. Obelia commissuralis McCr.

Key to the species of Obelia found in the Woods Hole region.

(A very careful manipulation of the microscope is often necessary before the characters of the hydrothecal margin can be definitely determined.)

A. Hydrothecal margin entire. Stem not fascicled.
   a. Colony a long central stem, giving off subverticillate branches which are themselves palmately branched.  
   b. Hydrotheciae triangular. Pedicels usually with more than 6 annulations.  
   b’. Hydrotheciae deeper, subtriangular. Pedicels often with more than 6 annulations.  
   a”. Colony irregularly branched; branches erect, often themselves branched. Hydrotheciae large, very deeply campanulate.  
   a”’. Colony usually consisting of a single geniculate stem, giving off alternate pedicels which are supported on broad shoulders of the internodes from which they spring.

A’. Hydrothecal margin toothed. Stem fascicled.
   a. Teeth bifurcate, or castellated.
   b. Hydrotheciae triangular, without vertical lines.  
   b’. Hydrotheciae deep, ornamented with vertical lines.  
   c. Hydrotheciae deeply tubular. Pedicels with 6 to 15 annulations.  
   c’. Hydrotheciae shorter. Pedicels with 3 to 6 annulations.
   a”. Teeth forming a series of exceedingly shallow undulations around the hydrothecal margin.
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**Obelia flabellata (Hincks).** Fig. 35.


*Trophosome.*—Colony 8 to 10 inches high, consisting of a central geniculate stem, giving forth branches which themselves branch in a flabellate manner; stem not fascicled, annulated above the origins of the branches. Pedicels borne on rather short processes or shoulders of the branches, distinctly annulated, short. Hydrothecae triangular in outline, margin entire.

*Gonosome.*—Gonangia borne in axils of pedicels, oblong ovate, with a terminal collar and large round aperture. Medusae not described, so far as I can ascertain.

*Distribution.*—Found in rocky tide pools (Hincks). Off Thimble Island, 4 to 5 fathoms. Woods Hole, in the passage (Verrill).

**Obelia commissuralis McCr.** Fig. 36.


*Trophosome.*—Colony attaining a height of 6 to 8 inches, consisting of a central geniculate stem giving off branches as in *O. flabellata*. Pedicels not borne on distinct shoulders of the branches, distinctly annulated. Hydrothecae campanulate, often subtriangular, but considerably deeper than in *O. flabellata*.

**Obelia dichotoma (Linnaeus).** Fig. 37.

*(Sertularia dichotoma Linnaeus, Syst. Nat., p. 132.)*

*Trophosome.*—Colony branching irregularly, the branches tending to assume an erect posture, not subverticillate. Pedicels short, usually with 4 to 6 annulations, but sometimes with many. Hydrothecae large, deeply campanulate, with straight sides and no teeth.

*Gonosome.*—Gonangia long, slender, widening toward distal end, and terminating in a beveled collar. Medusae at liberation with 16 marginal tentacles.

*Distribution.*—Rather shallow water. Off Gay Head, 8 to 10 fathoms. (Verrill.)

I suspect that this is the same species as *Eucnephe pyriformis* A. Ag., but, not having seen his types, I cannot be certain.
HYDROIDS OF THE WOODS HOLE REGION.

Obelia geniculata (Linn.) = Eucope diaphana L. Ag. (in part) = Eucope alternata A. Ag. Fig. 38.
(Sertularella geniculata Linn., Syst. Nat., p. 1312.)

_Trophosome._—Colony usually consisting of a single geniculate stem bearing alternate pedicels on broad shoulder-like processes. Pedicels short, usually with 4 to 6 annulations. Hydrothecae short, campanulate or subtriangular.

_Gonosome._—Gonangia long, tapering gradually to basal end and terminating in a collar which is beveled and convex on its surface. Meduse at liberation disk-shaped, with 24 marginal tentacles.

_Distribution._—Growing profusely on docks, floating seaweed, etc. One of the commonest species in the Woods Hole region.

Obelia gelatinosa (Pallas) = Laomedea gigantea A. Ag. (teste Verrill). Fig. 39.
(Sertularella gelatinosa Pallas, Elenchnus Zoophytorum, p. 116.)

_Trophosome._—Colony sometimes attaining a height of 15 to 20 inches, profusely branched in a dendritic manner. Stem fascicled, with geniculate branches. Pedicels usually quite short, with 3 to 5 annulations. Hydrothecae small, campanulate or subtriangular; margins armed with castellated or bimucronate teeth.

_Gonosome._—Gonangia rather small, ovate, with collared aperture. Meduse with 16 tentacles at time of liberation (Hincks).

_Distribution._—Shallow water, often between tides, attached to timbers, etc. New Haven. Rhode Island coast. Vineyard Sound.

Obelia bicuspidata Clark. Fig. 40.
(Trans. Conn. Acad. of Sci., III, p. 58.)

_Trophosome._—Colony attaining a height of about 33 inches. Stem fascicled, straight, irregularly branched. Pedicels longer than in the next species, and with 10 to 15 annulations. Hydrothecae very deep, tubular, their margins armed with bimucronate teeth, between which lines originate which pass down the surface of the hydrothecae.

_Gonosome._—Unknown.

_Distribution._—Found at a depth of 3 to 5 fathoms, from reefs near Thimble Island. Near Woods Hole, 10 fathoms.

Obelia longissima (Pallas). Fig. 41.
(Sertularella longissima Pallas, Elenchnus Zoophytorum, p. 119.)

_Trophosome._—Colony attaining a height of 12 to 14 inches. Main stem fascicled, flexuose, giving off branches, which themselves branch in a palmate manner, the whole thus being subverticillate in effect. Pedicels of varying length, usually extensively annulated. Hydrothecae rather deep, campanulate, the margins appearing at first sight to be without teeth, but upon careful examination proving to be armed with very shallow, regularly undulating teeth.

_Gonosome._—Gonangia ovate, with collared apertures. Meduse at the time of liberation with 20 to 24 tentacles (Hincks).

_Distribution._—Woods Hole. Off Gay Head. Dredged by the Fish Hawk at station 7051, about 40 miles southeast of No Mans Land; depth, 3 fathoms.

As described by Hincks, this species has not a fascicled stem. Authentic specimens from England, however, have distinctly fascicled stems and agree well with American specimens.

Obelia bidentata Clark.
(Trans, Conn. Acad. of Sci., III, p. 58.)

_Trophosome._—Like that of _O. bicuspidata_, except that it attains a larger size, has shorter pedicels, with 4 to 6 annulations, and proportionately wider hydrothecae.
Gonosome.—Unknown.

Distribution.—On piles, Greenport, Rhode Island.

I have a specimen that to a certain extent intergrades between this species and the preceding, and therefore suspect that the two species may be identical.

GONOTHYRÆA.

Trophosome.—Stem not fascicled, branched. Hydrothecæ campanulate, with toothed margins.

Gonosome.—The gonangia producing fixed, medusiform sporosacs with apical filiform tentacles. The gonophores, when nearly mature, pass out of the gonangium and remain attached to its top until the spermatozoa or planula are discharged.

Gonothyrea loveni Allman. Fig. 42.


Trophosome.—Stem irregularly branched, attaining a height of one-half to three-fourths inch, slightly flexuose, annulated above origins of pedicels. Pedicels short, with 2 to 5 annulations. Hydrothecæ deeply campanulate, gracefully tapering toward base, very thin and transparent around margin, which is quite variable in its dentition, the typical teeth being turreted and squared at the ends.

Gonosome.—Gonangia large, long, obconic, borne in the axils of the pedicels, each bearing, when mature, 3 to 5 modified medusæ on its summit. The sporosacs are attached to the top of the gonangium by short pedicels, and have at their upper end a circle of short tentacles. They discharge their contents before becoming free.

Distribution.—Found on shells, stones, etc., in shallow water. Dr. H. C. Bumpus kindly sent to the writer some beautiful specimens from the coast of Rhode Island.

Gonothyrea tenuis Clark, fig. 43, is reported from New Haven. There is no point either in the original description or in the figure published by Dr. Clark that enables me to separate this species from typical specimens of G. loveni from England. Professor Verrill says of this species: “Closely allied to G. loveni, but has narrow, elongated, obconic gonothecæ.” As these terms are precisely applicable to the gonangia of G. loveni, I can not perceive any basis for considering G. tenuis a good species.

Gonothyrea hyalina Hincks is also reported by Professor Verrill as occurring off Watch Hill, Rhode Island. The writer, while at Plymouth, England, found completely intergrading specimens between this species and G. loveni.

HEBELLA (modified).

Trophosome.—Pedicels arising from a creeping rootstock. Hydrothecæ tubular, with entire margins and without opercula. Hydrothecal cavity separated from that of the pedicel by a partial septum. Hydranth with a conical proboscis.

Gonosome.—Gonangia producing free medusæ.

The genus as here defined would include several species which most authors place in the genus Lafaea.

Key to species of Hæbella found in the Woods Hole region.

HYDROIDS OF THE WOODS HOLE REGION.

Hebella calcarata (A. Ag.). Fig. 56.

(Tetra a calcarata A. Ag., North American Aculeophy, p. 122.)

Trophosome.—Colony parasitic, almost always on Sertularia cornicina, where it assumes a symmetrical mode of growth, the main stem growing straight up the front of the host and giving forth a pair of hydrothecae immediately above each pair of the sertularian hydrothecae. Pedicels very short and slender. Hydrothecae large, curved outward, backward and upward; margin circular, entire. Hydranth with a conical hypostome and about 16 tentacles.

Gonosome.—Gonangia very large, borne on pedicels between the pairs of hydrothecae. Medusa at birth deeply campanulate, with two long marginal tentacles, and others in course of development; 4 radial canals and yellow-spotted proboscis.

Distribution.—Found attached to Zostera at Woods Hole by Mr. Walmsley. Vineyard Sound, 1 to 8 fathoms (Verrill).

This species was originally described by McCrady as a part of the sertularian on which it grows.

Hebella pygmaea (Alder) MS. Fig. 44.

(See British Hydroid Zoophytes, Hincks, p. 205.)

Trophosome.—Pedicels springing direct from a simple creeping rootstock, very short, annulated. Hydrothecae minute, cylindrical, deep; aperture smooth, sometimes somewhat oblique, as in figure.

Gonosome.—Unknown.

Distribution.—Found on a polyzoon off Nantucket; Sankaty Light east by south; depth, 24 fathoms. (Vinal Edwards.)

This minute species is identified with considerable doubt.

CAMPANULINIDÆ (modified).

Trophosome.—Colonies branched or unbranched. Hydrothecae borne on pedicels, tubular, ending in an operculum composed of converging segments. Hydranths with a conical proboscis.

Gonosome.—Gonangia producing planulate, or free medusae.

This family is here modified to include the genera Loveneilla and Calycella, the former having heretofore been placed in the Campanularidæ and the latter in the Lafaideæ. Both agree with the genus Campanulina in having hydrothecae with a segmented operculum and hydranths with a conical proboscis.

Key to genera of Campanulinidæ of Woods Hole region.

A. Colony usually branched.
   a. Hydrothecae large, subcylindrical, with a well-defined sinusous margin at base of segmented operculum …… Loveneilla.
   a'. Hydrothecae much smaller, ovate in outline, the margin passing insensibly into the segments of operculum ........................... Calycella.

A'. Colony not regularly branched. Hydrothecae not sessile, tubular, often with replicated margins …… Opercularella.

A''. Colony not branched. Hydrothecae sessile, tubular .............................. Ospidella.

LOVENELLA.

Trophosome.—Colony branched. Hydrothecae deep, with a distinct sinusous margin crowned with operculum composed of several triangular segments which form a pointed covering to hydrotheca.

Gonosome.—Gonangia borne on the stems and producing free, bell-shaped medusæ with 8 tentacles in two sets, and 4 lithocysts.

F. C. B. 1899—23
Lovenella grandis, new species. Fig. 45.

_Trophosome._—Stem simple, giving off regularly alternating, short, annulated pedicels, one from each internode. Hydrothecae very large, cylindrical; margin with 10 regular sinuations from which arise the 10 sharply pointed segments of the operculum. Hydranths large with a conical proboscis which becomes dome-shaped on retraction, and about 16 rather rigid tentacles.

_Gonosome._—Not known.

_Distribution._—Dredged from Newport Harbor, off Castle Hill.

This beautiful species was given me for description by Mrs. Virginia Barrett Gibbs, of Newport.

OPERCULAELLA.

_Trophosome._—Stem annulated throughout. Hydrothecae ovate in outline, the margin not distinct, the segments of the operculum appearing to be very thin and greatly elongated marginal teeth which converge to form the operculum.

_Gonosome._—The mature gonangia bear acrocysts.

Key to species of Opercularella found in the Woods Hole region.

| Hydrothecae larger, with more deeply cleft segments of the operculum | O. lacerata |
| Hydrothecae smaller, with less deeply cleft segments of the operculum | O. pumila |

Opercularella lacerata Hincks. Fig. 46.

(British Hydrozoa, p. 194.)

_Trophosome._—Stem annulated throughout, sparsely branched, or unbranched. Hydrothecae with short pedicels, oblong ovate in outline; opercular segments 8 to 10, very long and slender, somewhat curved. Hydranth with conical proboscis and about 16 tentacles.

_Gonosome._—Gonangia large, ovate, born on ringed pedicels, and, when mature, bearing globular acrocysts on their summits.

_Distribution._—New Haven, Conn., on piles of Long Wharf. (Clark.)

Opercularella pumila Clark.

(Trans. Conn. Acad., vol. 11, p. 61.)

Like _O. lacerata_, but with smaller hydrothecae and less deeply cleft segments of the operculum.

In comparing Dr. Clark's description and figure with sketches of _O. lacerata_ made by myself in England I have serious doubts as to the validity of the former species, but consider it best to let it stand here, as I have not seen the type specimens.
HYDROIDS OF THE WOODS HOLE REGION.

CALYCELLA.

Trophosome.—Stem a creeping rootstock parasitic on other species of hydroids, polyzoons, etc., sending forth short annulated pedicels bearing tubular hydrothecae with distinct, segmented opercula.

Gonosome.—Gonangia oval, borne on the rootstock and, when mature, bearing globular acrocysts.

Calycella syringa (Linn.). Fig. 47.
(Sertularia syringa Linn., Syst. Nat., p. 1311.)

Trophosome.—Pedicels shorter than hydrothecae, very deeply annulated. Hydrotheca tubular, with thick horn-colored walls and slightly sinuated margins; opercular segments rather short, triangular, and capable of being drawn into the hydrotheca when the hydranth is retracted. There is often a sort of an addition or tubular extension beyond the end of the hydrotheca, with a distinct margin bearing the opercular segments.

Gonosome.—Gonangia oval, borne on short annulated pedicels and, when mature, with globular acrocysts.

Distribution.—Found abundantly in the Woods Hole region, growing over all sorts of plant-like marine organisms, especially other hydroids.

CUSPIDELLA.

Trophosome.—Hydrotheca sessile with a conical operculum. Hydranths with a conical hypostome.

Gonosome.—Not known.

Cuspidella costata Hincks.
(British Hydroid Zoophytes, p. 210.)

Trophosome.—Hydrotheca perfectly cylindrical and sessile, encircled with usually three sharply defined annulations dividing the hydrotheca externally into four zones; operculum composed of numerous segments, the distal ends of which can be retracted within the hydrotheca.

Gonosome.—Unknown.

Distribution.—Reported by Professor Verrill from Fisher Island Sound, 9 to 11 fathoms. This species is identified with doubt by Verrill.

LAFCEIDÆ (modified).

The modification consists of the removal of the small monosiphonic species, such as Lafa pocillum, which I have placed in Allman's genus Hebella, and the genus Calycella, which I have placed in the family Campylenulidae.

Trophosome.—Stem fascicled. Hydrotheca tubular, without a partial septum dividing the hydrothecal cavity from that of the pedicel; margin without teeth or opercula. Hydranths with a conical proboscis.

Gonosome.—Gonangia found in compact masses incrusting the fascicled stem, oblong, each female gonangium containing a single ovum. The gonosome of Lafa was long regarded as a distinct hydroid organism under the name Coppinia area.1

Lafa.

This being the only genus of Lafa found on the New England coast, it can be identified by the family characters as given above.

Key to the species of Lafa found in the Woods Hole region.

Hydrothecas short, almost sessile ...................................................... L. dumosa.
Hydrothecas slender, with distinct pedicels which are waved or twisted ...................................................... L. gracillima.

Lafa dumosa Fleming. Fig. 48.
(Phil. Journ., u, p. 83.)

Trophosome.—Stem simple, in the form of a creeping rootstock, or compound and erect. Hydrotheca strong, large, tubular, with short, sometimes hardly evident, pedicels.

Gonosome.—Gonangia in masses, incrusting the fascicled stem, so closely crowded as to be pressed together, tubular or oblong oval with short bottle-shaped necks. Both sexes found in the same colony.

Distribution.—Found growing on other hydroids on Nantucket Shoals. (Verrill.)

**Lafoea gracillima** (Alder). Fig. 49.
(Campanularia gracillima, Cat. Zooph. Northumb. and Durham, p. 39.)

*Lafoea* gracillima (Alder).

_Trophosome._—Stem erect, fascicled, often irregularly branched. Pedicels slender, sinuous or apparently twisted. Hydrothecae very slender, delicate in texture, often slightly curved.

_Gonosome._—Much like that of _L. dumosa_, and heretofore known as _Coppinia arcta_.

Distribution.—Reported from the New England coast by Professor Verrill. Although not specifically reported from the Woods Hole region, it doubtless occurs there, as its distribution is much like that of _L. dumosa._

**HALECIDÆ.**

*Trophosome._—Hydrothecae alternate, reduced to the form of saucer-shaped hydrophores, usually borne on tubular pedicels; margins even, often reduplicated several times, and surrounded by a circle of bright, bead-like dots. Hydranth large, with conical proboscis, not capable of retracting within the hydrophores.

_Gonosome._—Gonangia producing planulae, and usually different in the two sexes, that of the female often being surmounted by a pair of hydranths.

**HALECIIUM.**

The single genus can be identified by the characters given above.

*Key to species of Haleciun found in the Woods Hole region.*

A. Hydrophores borne on distinct pedicels.
   a. Stem fascicled.
   b. Colony flabellate in form; aperture of female gonangium terminal, but not central. Pedicels short. ......................................................... _H. halecinum._
   b'. Colony dendritic in form. Female gonangia with round lateral apertures. Pedicels short. .................. _H. beaui._
   b". Colony with slender branches. Female gonangia as in _H. halecinum_, but with end emarginate . . . . . _H. gracile._
   a'. Stem not fascicled, irregularly branched, annulated ........................................... _H. texellium._
   A'. Hydrophores sessile, borne directly on broadened shoulder of internodes of stem. ........................................ _H. articulatum._
**Halecium halecinum** (Linn.). Fig. 50.


Trophosome.—Colony attaining a height of 6 to 10 inches, erect, rigid; stem fascicled, pinnately branched, internodes short. Hydrophores on long trumpet-shaped pedicels, margins frequently reduplicated.

Gonosome.—Female gonangia in rows on upper side of branches, obconic in outline, with the aperture on one side of the truncated top, surrounded by a collar-like rim surmounted by a pair of hydranths. Male gonophores slender, oblong-ovate.

Distribution.—Abundant throughout the Woods Hole region, growing on shells, stones, etc., in shallow water.

**Halecium articulosum** Clark. Fig. 51.

*(Trans. Conn. Acad. of Sci., vol. III, p. 543.)*

Trophosome.—Colony sometimes attaining a height of almost 2 feet; stem fascicled, branches very long and slender, the ultimate branchlets being pinnately arranged like those of the family Plumulariidae. Hydrophores sessile, alternate, borne on the broadened distal ends of the almost triangular internodes. Hydranths very large, with about 20 tentacles.

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**Halecium tenellum** Hincks. Fig. 52.


Trophosome.—Colony very small, not over half an inch in height; stem not fascicled, delicate, irregularly geniculate; branches straggling, irregular; internodes very long and irregularly annulated. Hydrophores borne on very long, tubular pedicels, irregularly arranged.
Gonosome.—Gonangia borne at origin of pedicels, very large, oblong-ovate in outline.

Distribution.—I find this species mentioned in my notes as occurring at Woods Hole, but the specimen seems to have been lost. The figure is from an English specimen.

**Halecium beani** (Johnston). Fig. 53.

(Thoa beani Johnston, British Zoophytes, p. 120.)

Trophosome.—Colony 2 to 5 inches high, branching in a dendritic manner, more delicate than *H. halecinum*; stem fascicled, the branches slender, the internodes divided by slightly oblique nodes. Hydrophores much as in *H. halecinum*.

Gonosome.—Female gonangia mitten-shaped, with the aperture lateral, representing the cut-off thumb of the mitten. Male gonangia oblong-ovate.

Distribution.—Found growing on bivalve shells at Woods Hole.

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**Halecium gracile** Verrill. Fig. 54.

(Invertebrate Animals of Vineyard Sound, p. 729.)

Trophosome.—Colony profusely branched; stem fascicled; branches ascending, slender, pinnately arranged, with slender internodes separated by oblique nodes. Hydrophores much as in *H. halecinum*.

Gonosome.—Female gonangia much as in *H. halecinum*, but with the end emarginate. Male gonangia oblong-ovate.

Distribution.—Buzzard's Bay; Vineyard Sound; near New Haven, on floating timber (Verrill).

Professor Verrill has kindly sent me a type specimen from which the figures were drawn. Although hard to differentiate succinctly from *H. halecinum*, it has a very distinct facies and mode of growth.
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SERTULARIDÆ.

Trophosorne.—Hydrothecæ sessile, more or less adnate to the stem, and arranged on both sides of the stem and branches. Hydranths with conical proboscis and a single whorl of filiform tentacles.

Gonosome.—Gonangia producing planulae. No medusa.

Key to the genera of Sertularidæ found in the Woods Hole region.¹

A. Hydrothecæ in strictly opposite pairs, a pair to each internode of the stem or branch.
   a. Operculum, when present, in two pieces .................................................. Sertularia.
   a⁰. Hydrothecæ strictly alternate.
   a'. Hydrothecæ placed on opposite sides of stem and branches ................................ Sertulariella.
   a⁰'. Hydrothecæ placed on the front of branches and curved alternately to the right and left .......... Hydrolithium.

SERTULARIA.

Trophosorne.—Colony usually branched; stems and branches divided into regular internodes, each of which bears a pair of strictly opposite hydrothecæ. Hydrothecæ either without an operculum or with a very delicate one composed of two pieces.

Gonosome.—Gonangia without an internal marsupium.

Key to species of Sertularia found in the Woods Hole region.

A. The two hydrothecæ composing a pair scarcely touching each other in front .................................. S. pumila.
   A'. The two hydrothecæ in contact for at least half their length.
   a. The width of a pair of hydrothecæ at their bases considerably less than distance from bottom of hydrothecæ to the node below .................................................. S. cornicina.
   a'. The width of a pair of hydrothecæ at their bases not much less than distance from bottom of hydrothecæ to the node below .................................................. S. complexa.

Sertularia pumila Linn. Fig. 55.
(Syst. Nat., p. 1306.)

Trophosorne.—Colony small, branched or unbranched; stem divided into regular internodes, each bearing a pair of hydrothecæ. Hydrothecæ stout, regularly curved, the approximated sides of a pair not in contact; aperture bilabiate, often showing a very delicate operculum composed of two valves.

Gonosome.—Gonangia ovate, with a short pedicel and a terminal collar containing the aperture.

Distribution.—Rather common in the Woods Hole region in shallow water. Often found growing over seaweed.

Sertularia cornicina (McCr.). Fig. 56.
(Dynanema cornicen McCr., Gymnophthalmata of Charleston Harbor, p. 102.)

Trophosorne.—Colony usually of a single upright stem not over half an inch high. Hydrothecæ more slender than in S. pumila and the pairs are in contact for a considerable part of their contiguous sides. Colony almost invariably overgrown by a campanularian (Hebella calicata) which the original describer took to be a part of the sertularian, the campanularian disposing its curved tubular hydrothecæ symmetrically in pairs above the pairs of hydrothecæ of the sertularian.

Gonosome.—Unknown.

Distribution.—Vineyard Sound, 8 fathoms, on Halicarm gracile and on Zostera (Verrill). My specimens were sent by Mr. Walmsley to Professor Osborn, of Hamline University, labeled "S. pumila."

¹A satisfactory classification of this group is still to be devised. The one adopted here will do fairly well for the genus and species in the territory under consideration, but would be unsatisfactory if applied to the Sertularidæ in general.
Sertularia complexa Clarke.  Fig. 57.


Trophosome.—Colony an unbranched erect stem attaining a height of about three-fourths inch. Hydrothecae tubular, abruptly curved outward distally, aperture bilabiate; the two hydrothecae of a pair adnate for more than their proximal half. Stem internodes below hydrothecae slender, showing immediately below the hydrothecae short internal, chitinous processes pointing downward from the hydrothecal floors. Hydranths with conical proboscides and about 20 tentacles.

Gonosome.—Gonangia produced usually in pairs at foot of stem, ovoid in form, beautifully and regularly annulated, resembling Chinese lanterns, collar terminal, with circular aperture and operculum.

Distribution.—Found by Mr. Walmsley near Woods Hole, and afterwards by myself, growing in great quantities over seaweed dredged from the bottom near Nobska Point.

This interesting species was originally found by the Blakely off the coast of Yucatan, then reported from Australia by Professor Bale, and finally proved to be common near Woods Hole, where it has doubtless often been mistaken for S. pumila.

DIPHASIA.

Trophosome.—Colony regularly branching; stems and branches regularly divided into internodes, each of which bears a pair of opposite hydrothecae. Hydrothecal margins even or sinuous, with an internal operculum consisting of a single piece.

Gonosome.—Gonangia cleft above into leaf-like segments, and containing a spherical, internal marsupial chamber.

Key to species of Diphasia found in the Woods Hole region.

Width of a pair of hydrothecae at base nearly equal to their height. ........................................... D. fullex
Width of a pair of hydrothecae at base not much more than half their height. ............................. D. rosea.
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Diphasia fallax (Johnston).  Fig. 58.

(Sertularella fallax Johnston, British Zoophytes, 8th edition, p. 127.)

_Trophosome._—Colony branched, the terminal branches often abruptly curved so as to form a hook or short coil. Hydrothecae stout, with a wide, sinuous margin closed by an operculum hinged to its inner side.

_Gonosome._—Female gonangium with four leaf-like expansions above; male gonangium with four terminal spines.

_Distribution._—Shallow water, often growing on other hydroids. A specimen found in the U. S. Fish Commission collection at Woods Hole is labeled “E. by S., Sankety, Nantucket, 23 fathoms, V. N. E.” Off Watch Hill, 17 to 21 fathoms. (Verrill.)

Diphasia rosacea (Linn.).  Fig. 59.

(Sertularella rosacea Linn., Syst. Nat., 1806.)

_Trophosome._—Colony branched; branches more slender than in _D. fallax_, and more widely separated. Hydrothecae delicate, transparent, slender, tubular, abruptly bent outward near the middle; aperture facing nearly upward, sinuous, closed with an internal operculum consisting of a single piece.

_Gonosome._—Female gonangium pyriform, longitudinally ridged, with two prominent pointed processes on top, and a round internal marsupium; male gonangium “pyriform, curved toward the base, traversed by longitudinal lamellated ridges, which rise above into spiny processes around a slender tubular orifice.” (Hincks.)

_Distribution._—Fisher Island Sound, 9 to 11 fathoms. (Verrill.)

SERTULARELLA.

_Trophosome._—Colony usually branching; stem and branches divided into regular internodes, each bearing one or two hydrothecae. Hydrothecae strictly alternate, borne on opposite sides of the branch, usually with toothed margins provided with an operculum consisting of more than one piece.

_Gonosome._— Gonangium as in _Sertularella_, but usually more or less annulated.

Key to species of _Sertularella_ found in the Woods Hole region.

A. Hydrothecal margin without teeth or operculum ........................................ _S. abietina._
A'. Hydrothecal margin with three teeth .................................................................. _S. triunipulata._
A". Hydrothecal margin with 4 teeth.
  a. Teeth obscure. Hydrotheca fusiform, deeply annulated or wrinkled transversely. _S. rugosa._
  a'. Hydrothecae very large, sometimes corrugated above. Branches approximate. _S. puji._
  a". Hydrothecae medium-sized, smooth. Branches irregular and distant. _S. polyzonias._

Sertularella abietina (Linn.).  Fig. 60.

(Sertularella abietina Linn., Syst. Nat., p. 1307.)

_Trophosome._—Colony pinnately branched; branches thick and coarse, approximate, divided into internodes, each of which bears one or two hydrothecae; nodes oblique. Hydrothecae large, alternate, bulging below and narrowing above to a tubular neck with a round, even aperture without an operculum.
Gonosome.—Gonangia "subsessile, ovate, smooth, with an even, shortly tubulous mouth." (Hincks.)

Distribution.—A specimen in the U. S. Fish Commission collection at Woods Hole bears the label: "E. by S., Sankety light, 20 fath."

This species has always hitherto been placed in the genus Sertularia. Its strictly alternate hydrothecae, however, make it necessary to consider it a Sertularella in accordance with the definition given above.

Sertularella tricuspidata (Alder). Fig. 61.

(Trochosome.—Colony slender, branches alternate, divided into regular internodes, each of which bears an hydrotheca. Hydrotheca cylindrical, slightly curved, distant, with a 3-toothed margin and 3-parted operculum.

Gonosome.—Gonangia deepeningly ringed, ovate, with a constricted tubular neck and circular orifice.

Distribution.—A specimen in the U. S. F. C. collection at Woods Hole bears the label "E. by S., Sankety light, 25 fath."

Sertularella rugosa (Linnaeus). Fig. 62.

(Trochosome.—Colony minute, unbranched, or sparingly branched; internodes short, each bearing an hydrotheca. Hydrotheca fusiform, very deeply and conspicuously marked with annular corrugations; aperture quadrangular, rather obscurely toothed; teeth 4; operculum composed of 4 pieces.

Gonosome.—Gonangia like the hydrotheca, but much larger.

Distribution.—Noank, on piles of wharf. Off Watch Hill, 17 to 21 fathoms. (Verrill.)

Sertularella polyzonias (Linnaeus). Fig. 63.

(Trochosome.—Colony branched in an irregular manner, the branches alternate, but not equally distant, divided into regular internodes, each of which bears an hydrotheca; nodes oblique. Hydrotheca swollen below, narrowing above to a margin with 4 shallow teeth and an operculum of 4 pieces.

Gonosome.—Gonangia ovate, corrugated, with a short pedicel and quadrate aperture.

Distribution.—"Off New London, 6 fath.; Gardener Bay, 6 to 8 fathoms; Block Island Sound, 17 to 24 fathoms." (Verrill.)
Sertularella gayi (Lamx.). Fig. 64.
(Sertularella gayi Lamx., Exposition Methodique, p. 12.)

Trophosome.—Like the last, but much more robust. Branches regularly pinnate and approximate. Hydrothecae much larger, often corrugated on the upper side.

Gonosome.—Gonangia with a 2-toothed aperture.

Distribution.—A specimen in the U. S. Fish Commission collection at Woods Hole bears the label "E. by S., Sankety Light, Nantucket, 25 fath." This specimen has much larger and coarser hydrothecae than specimens from England, and may represent a distinct species.

62. Sertularella rugosa (Linn.)
63. Sertularella polygonia (Linn.)
64. Sertularella gayi (Linn.)

THUIARIA.

Trophosome.—Colony branched; stem and branches divided into internodes each of which bears more than two opposite or subopposite hydrothecae which are usually deeply immersed in the stem. Hydrothecae tubular, or flask-shaped, with bilabiate apertures.

Gonosome.—Gonangia much like those of Sertularia.

Key to species of Thuiaria found in the Woods Hole region.

A. Stem long and slender, bearing slender branches which subdivide dichotomously.

Gonangia bimucronatæ

a. Hydrotheca free for about their distal one-third.................T. argentea.

b'. Hydrotheca immersed almost to the orifice.................T. argentea submucronata.

A'”. Stem and branches rigid, the latter stiff and subverticillately arranged.

Gonangia without mucronate processes on end .................T. thur'a.

Thuiaria argentea (Ellis & Solander). Fig. 65.
(Sertularella argentea Ell. & Sol., Zooph., p. 38.)

Trophosome.—Colony breaking up basally into long, slender main branches which give off spirally set, closely approximated, secondary branches which branch dichotomously, each forming a graceful flabellate structure; internodes rather slender, each bearing a group of several hydrothecae. Hydrothecae subalternate, tubular, their distal ends curving gently outward, so that about the terminal one-third is free; aperture armed with two opposite teeth, one much longer than the other.

Gonosome.—Gonangia with two lateral projections and a central terminal orifice.

Distribution.—Vineyard Sound, Long Island Sound, and other parts of the coast. Very common in depths from 1 to 20 fathoms.
Thuiaria cupressina (Linn.). Fig. 66.
(Sertularia cupressina Linn., Syst. Nat., p. 1308.)

_Trophosome._—Colony consisting usually of a single very long and graceful central stem which gives off alternate branches which again divide dichotomously into long alternate branchlets; giving the appearance of a verticillate arrangement. Internodes much shorter than in the last species, each bearing several pairs of subopposite hydrothecae. Hydrothecae immersed nearly to their ends, tubular, rather straight, with a not very pronounced bilabiate aperture.

_Gonosome._—Gonangia borne in rows on upper sides of pinnules, shaped like those of _T. argentea._

_Distribution._—Vineyard Sound (Verrill). A specimen in the U. S. Fish Commission collection at Woods Hole is labeled, “E. by S. Sankety Light, 25 fath.”

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Thuiaria thuja (Linn.). Fig. 67.
(Sertularia thuja Linn., Syst. Nat., p. 1308.)

_Trophosome._—Stem rigid, sharply and finely geniculate, without branches on lower portion; branches forming spirals, each dichotomously branched and forming a flabellate structure. All of the branches and branchlets are stiff and hare-like, very different from the graceful structures of the preceding species; internodes very thick, each bearing several pairs of closely approximated subopposite hydrothecae, the top of one often reaching to bottom of one immediately above. Hydrothecae tubular, somewhat swollen below, apertures with two rather inconspicuous opposite teeth of about the same size.

_Gonosome._—Gonangia ovate, without lateral spines, and with a short collar and round aperture.

_Distribution._—Off Nantucket. (Vinal Edwards).

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HYDRAILLMANIA.

Thuiaria thuja (Linn.). Fig. 67.

_Hydrallmania falcata_ (Linn.). Fig. 68.
(Sertularia falcata Linn., Syst. Nat., p. 1309.)

_Trophosome._—Stem slender, without hydrothecae; branches plume-like, the branchlets divided into internodes, each of which bears a group of several hydrothecae on its front or upper side. Hydrothecae flask-shaped, swollen below, narrow above, curved distally and ending in a bidentate aperture with an operculum.

_Gonosome._—Gonangia as described above.

_Distribution._—Common in rather deep water throughout the Woods Hole region.
HYDROIDS OF THE WOODS HOLE REGION.

PLUMULARIDÆ.

_Trophosome._—Hydrothece sessile, usually adnate by one side, arranged on the upper sides of the hydrocladia or hydrothea-bearing branchlets. Nematophores always present.

_Gonosome._—Gonangia often inclosed in protective contrivances, such as modified branches or pod-shaped receptacles called “corbule.” No medusae.

Key to genera of _Plumulariidae_ found in the Woods Hole region.

A. Nematophores trumpet-shaped, not immovably fixed to the hydrothece.
   a. Branching dichotomously, the hydrocladia springing from the upper side of the branches _Monostechas_.
   a'. Branching strictly pinnate, the hydrocladia, or some of them, forked _Schizotricha_.
   a". Branching verticillate or scattered. Cenomas are calcareous in main stem _Antennularia_.
   A'. Nematophores not trumpet-shaped, immovably fixed to hydrothece or other parts of colony. Gonangia protected by special, usually forked, branches bearing nematophores without hydrothece _Cladocarpus_.

MONOSTECHAS.

_Trophosome._—Colony dichotomously branched. Hydrocladia borne on upper sides of branches.

_Gonosome._—Gonangia ovoid, borne at bases of hydrothece.

_MONOSTECHAS quadridens_ (McCr.). _Fig. 69._


_Trophosome._—Colony erect, composed of a main stem with branches which themselves branch dichotomously, bearing hydrocladia at their points of junction and also on their upper sides; hydrocladia composed of internodes, every alternate one of which bears an hydrothece. Hydrothece cup-shaped, with even margins, adnate for about half their length. Nematophores trumpet-shaped, three associated with each hydrothece, and usually two on each internode of hydrocladium that does not bear hydrothece; a row of nematophores is also found on the upper side of each branch from which hydrocladium spring.

_Gonosome._—Gonangia ovoid or pyriform, borne on short pedicels just below the hydrothece.

_Distribution._—Dredged by the _Albatross_ near Marthas Vineyard. Depth, 22 fathoms. The species is common southward to the West Indies in moderate depths.

SCHIZOTRICHIA.

_Trophosome._—Colony consisting usually of a cluster of simple, upright stems, giving forth hydrocladia in a pinnate manner. Hydrocladia in mature specimens forked.

_Gonosome._—Gonangia ovoid, tubular or cornucopia-shaped, borne on the main stem, branches, or hydrocladia.

Key to species of _Schizotrichia_ found in the Woods Hole region.

_A_ hydrothece in the axil of each hydrocladium _S. tenella_.
_No_ hydrothece in the axil of the hydrocladia _S. gracillima_.

_Schizotrichia tenella_ (Verrill). _Fig. 70._

(_Plumularia tenella_ Verrill, Invertebrated Animals of Vineyard Sound, p. 731.)

_Trophosome._—Colony in the form of very delicate white plumes, 1 to 3 inches high, each plume consisting of a central stem giving off alternate hydrocladia with hydrothea at base of each; hydrocladia often forked in mature specimens, with internodes and hydrotheae much as in the last species, but with an additional short internode often intercalated. Nematophores as in the last species, except that there is but one to each intermediate internode.

1 The nematophores are minute trumpet-shaped or tubular organs composed of chitin and usually associated with the hydrotheae, two, one on each side, being found near where the margin of the hydrothea joins the stem to which it is adnate, and one just in front of the bottom of the hydrotheae. Others are found on the branches, stem, and protective contrivances which inclose the gonangia. The nematophores contain highly remarkable structures known as sarcostyles that are capable of enormous extension. They are morphologically “persons” of the colony.
Gonosome.—Gonangia curved, cornucopia-shaped, borne on slender pedicels at the bases of the hydrothecae and having one or two nematophores on the basal portion.

Distribution.—Found abundantly on the piles of the wharves at Woods Hole and Vineyard Haven. Off Gay Head, 8 to 10 fathoms; Vineyard Sound, 8 fathoms. (Verrill.)

70. Schizotricha tenella (Verrill). A. Part of hydrocladium (enlarged).

71. Schizotricha gracilla (Sars). A. Part of hydrocladium (enlarged).

72. Antennularia antennina (Linn.). A. Part of hydrocladium (enlarged).

Schizotricha gracilla (Sars) = Plumularia verrillii Clark. Fig. 71.

(TPlumularia gracilla Sars. Bidrag til Kundskeb om Dyrelivet paa vore Havbanker.)

Trophosome.—Colony consisting of a main stem, which gives off plumose branches near its base. Branches consisting of a slender shaft, giving off alternate rather distant hydrocladia, which are forked and divided into rather distinct internodes which are long and slender and separated by straight nodes. Hydrothecae small, cup-shaped, almost entirely adnate behind. A pair of trumpet-shaped nematophores are inserted just above the aperture of the hydrotheca, another single one below its base, and others scattered rather irregularly along the hydrocladia and stem.
HYDROIDS OF THE WOODS HOLE REGION.

Gonosome.—Gonangia subcylindrical, somewhat swollen below, not curved, borne usually at the origin and forkings of the hydrocladia.

Distribution.—Eastport, Me. (Verrill). It is altogether probable that it occurs in the deeper water in the Woods Hole region. I have included it here to enable collectors to identify it if found.

ANTENNULARIA.

Trophosome.—Hydrocladia arranged in verticels or whorls around stem. Stem with canaliculated cenosarc, the canals being just under the periderm and not well seen except with transmitted light.

Gonosome.—Gonangia borne usually in the axils of the hydrocladia, not protected by gonangia or other special contrivances.

Key to species of Antennularia found in the Woods Hole region.

A. A node between the first hydrotheca on each hydrocladium and the stem from which it springs........ A. antennina.
A'. No node between the first hydrotheca and stem.

a. At least two nodes between adjacent hydrothecae ........................................ A. americana.
a'. Hydrocladal nodes distant and usually absent ........................................ A. rugosa.

Antennularia antennina (Linn.) Fig. 72.
(Sertularia antennina Linn., Syst. Nat., 1310.)

Trophosome.—Colony composed of a cluster of upright stems with whorls of hydrocladia at regular intervals; hydrocladia borne on stout processes from the stem, the first internode being without
hydrotheca, the next with one on its proximal half, and the rest of the hydrocladium being made up of alternating hydrothecate and intermediate internodes. Hydrotheca cup-shaped, margin entire. Nematophores trumpet-shaped, a pair near the top of each hydrotheca, one below its base in front, two on each intermediate internode, and others on the stem.

**Gonosome.**—Gonangia borne on bases of hydrocladia, ovoid, deep, with subterminal aperture.

**Distribution.**—Off Gay Head, 18 fathoms. Newport Harbor; Woods Hole; off Block Island.

(George Gray.)

**Antennularia americana** Nutting. Fig. 73.

(Monograph of American Hydroids, part I, The Plumularidae, p. 69.)

**Trophosome.**—Colony composed of slender, erect stems bearing hydrocladia usually in whorls of 4. Proximal hydrotheca on each hydrocladium borne on a long process from the stem, there being no node between it and the stem. Otherwise the arrangement of the internodes, hydrothecae, and nematophores are as in the preceding species.

**Gonosome.**—Gonangia oblong-ovate, with a subterminal lunate aperture.

**Distribution.**—Off Marthas Vineyard, Albatross. Waters of Rhode Island (specimen from Dr. H. C. Bumpus).

This species, although greatly resembling *A. antennina*, differs constantly in the characters given. In some cases, where a hydrocladium has been broken off and regenerated, there will be a node below the proximal hydrotheca. Otherwise the character is constant.

**Antennularia rugosa** Nutting. Fig. 74.

(Monograph of American Hydroids, part I, The Plumularidae, p. 70.)

**Trophosome.**—Colony consisting of upright stems which give off hydrocladia in whorls of 6 or 8, no node between the proximal hydrotheca on each hydrocladium and the stem. Hydrocladia supported by a remarkable thickening of the perisarc on the lower side of the proximal portion of each. Nodes very distant and irregular, but the interiors of the hydrocladia have numerous annular thickenings of the periderm that somewhat resemble nodes. Hydrothecae deeper than in the other species. A pair of nematophores inserted on a level with top of the hydrotheca, and others scattered along the fronts of the internodes and around the stem.

**Gonosome.**—Not known.

**Distribution.**—Off Marthas Vineyard, 46 fathoms. (Albatross.)

**CLADOCARPUS.**


**Gonosome.**—Gonangia borne on the stem and protected by special branchlets which spring from near the bases of the hydrocladia and bear nematophores but no hydrothecae.

**Cladocarpus flexilis** Verrill. Fig. 75.

(Report Com. Fish and Fisheries, 1883, p. 517.)

**Trophosome.**—Stem not fascicled, long and slender; hydrocladia pinnately arranged, alternate, not forked, divided into internodes, each of which bears an hydrotheca and has its cavity divided by internal ridges. Hydrothecae deep, subcylindrical, aperture horizontal, with a single strong anterior tooth and a number of shallow lateral teeth or sinuations. Nematophores tubular, a pair slightly overtopping the hydrothecal margin, and a single one below each hydrotheca, its end not rising much above the level of the bottom of the latter.

**Gonosome.**—Gonangia growing on front of stem, protected by special branches borne on the bases of hydrocladia and branched like deers’ horns, each branch bearing a row of nematophores.

**Distribution.**—Found in moderately deep water at various points along the Atlantic coast.
HYDROIDS OF THE WOODS HOLE REGION.

A monographic account of the medusae is in course of preparation by an eminent authority, and the present writer therefore does not desire to discuss the medusae in a systematic way, but hopes that the key herewith presented will be of service in identifying the medusae known to occur in the region. No attempt has been made to describe new species or to define families, genera, or other groups. The classification conforms, so far as possible, to the plan of the preceding part of this work when the hydroid form is known. Otherwise the names are the same as those found in Alexander Agassiz's work, North American Acalephre. Almost all of the illustrations are from specimens taken at Woods Hole and Newport, and sketched by the author.

Key for the identification of the Hydroid medusae found in the Woods Hole region.

A. Ovaries attached to the proboscis walls and never found along the radial canals. Otocysts never present.
   a. Radial canals 4 unbranched.
      b. A single conspicuous marginal tentacle. Others, if present, much smaller.
         c. Proboscis not more than one-half length of bell cavity........................................... Euphyra virgulata.
         d. A single greatly enlarged tentacle from which secondary medusae arise....................... Hydractinia prolifera.
   b. Two conspicuous marginal tentacles. Others, if present, much smaller.
      c. Bell with a distinct apical projection.
         d. Apical projection a lengthened cone................................................................. Stomolophus apicalis.
         d'. Apical projection dome-shaped. Tentacles bearing stalked nematocyst batteries.. Gemmularia cladophora.
      d. Tentacles bearing stalked batteries of nematocysts................................................ Cystis baccata.
      d'. Tentacles normal......................................................... Perigonimus jonesi.
   b'. Four tentacles of approximately equal length.
      c. Proboscis and tentacles very long and slender.
         d. Bell outline subspherical................................................................. Cystis mirabilis.
         d'. Bell outline subconical......................................................... Diphyrcon canica.
      c'. Proboscis short, not reaching bell opening.
         d. Tentacles tightly coiled. Bell with 8 meridional lines of lasso cells................... Ectophora ochracea.
         d'. Tentacles rudimentary. No lines of lasso cells................................................ Pusaria tiarata.
      d'. Tentacles functional. Radial canals very broad................................................ Hydrichthys miras.
   b''. Eight tentacles of approximately equal length.
      c'. Tentacles rudimentary. No secondary medusae.................................................... Stylola hooperi.
   b'''. Tentacles more than 8, of approximately equal size when full grown, and disposed at regular intervals.
      c. A large globular or subconical process on apex of bell........................................ Turris vesicaria.
      c'. Bell evenly rounded above................................................................. Turrilopsis nutricula.
   b'''' Tentacles in groups or bunches.
      c. Four clusters of tentacles.
         d. Proboscis small and slender.
            e. A pair of erect elevate tentacles in each group.......................... Nemopias bachei.
            e'. Tentacles much alike................................................................. Bongsteinilla carolinensis.
         d'. Proboscis large and broad................................................................. Bongsteinilla supercurvatura.
      c'. Eight clusters of marginal tentacles................................................................. Lissia grana.
   a. Radial canals 4, branched at their distal ends..................................................... Orchitodina tentaculata.
   a'. Radial canals many, bell cup-shaped................................................................. Orbitodina tentaculata.
   A'. Ovaries attached to the radial canals, often also to the proboscis. Otocysts usually present.
      b. Marginal tentacles 4, sometimes with lateral cirri.
         c. Proboscis very long, reaching far beyond the velum.
            d. A swelling at base of each tentacle..................................................... Entima mira.
            d'. No swelling at bases of tentacles....................................................... Entima limbida.
         c'. Proboscis short. Bell deep.
            d. Tentacles with lateral cirri.
               e. Club-shaped appendages between bases of tentacles......................... Ingebella calcarata (juv.).
               e'. No club-shaped appendages.
               f. Two otocysts between bases of adjacent tentacles......................... Euclisella ventricularis.
               f'. Three otocysts between bases of adjacent tentacles.............. Euclisella duodecima.
            d'. Tentacles without lateral cirri......................................................... Clytia bicophora (juv.).
            d''. Clytia nodiformis (juv.).
Marginal tentacles, 16 or more.

b. Proboscis very long, reaching far below velum ........................................... Tima formosa
c. Proboscis short.

d. Tentacles with lateral cirri at bases ................................................................. Habella calcarata.
de. Tentacles without lateral cirri.


f. Otoeysts on bases of tentacles.

 g. Tentacles 24 at liberation of medusa ........................................... Obelia geniculata.
 g'. Tentacles 16 at liberation of medusa ................................................... Obelia gelatinosa.
 g''. Tentacles 16 at liberation of medusa ........................................... Obelia dichotoma.
 g'''. Tentacles 16 at liberation of medusa ................................................... Obelia commissurata.

c. Bell deeper, its surface evenly rounded.

f. Otoeysts between bases of tentacles.

g. Otoeysts 8 (or more?). Mouth tentacles not fimbriated ................. Clytia bicophora.
g'. Otoeysts 8. Mouth tentacles fimbriated ............................................. Tarpyris diademata.
g''. Otoeysts numerous, with sense-bulbs at their bases ................... Euphysa foliacea.
g'''. Otoeysts numerous. Tentacles with sense-bulbs and thickened "knees-pads" ............ Gonionemus verius.

c. Bell with a distinct dome-like apical projection .......................... Oceanis singularia.

a. Radial canals 8.

b. Bell very deep, shaped like a bishop's miter ........................................... Trachynema digitalis.
b'. Bell subspherical, somewhat narrowed above. Mouth with fringed tentacles ........... Melicertum campanula.
a'. Radial canals more than 8.

b. Manubrium very short, hardly distinguishable ........................................ Rhexymantia tenuta.
b'. Manubrium well developed.

c. Mouth without fimbriated tentacles. Bell shallow ........................................ Figuera albida.
c'. Mouth with fimbriated tentacles ................................................................. Zygopneustes grani/andica.

Euphysa virgulata A. Ag.
(North American Acalephae, p. 189.)

Bell quadrangular, thick, longer than broad. Proboscis short, tubular, without mouth tentacles. Tentacles 4, of which one is much longer than the others and has a triangular base. Radial canals 4. Velum with a sinusous inner edge.

Coloration.—Tentacles with white bases and a pink stripe or band. Proboscis light yellow.

I have not seen this species, and the above description is condensed from that of Dr. Agassiz.

Hybocodon prolifer L. Ag.  Fig. 76.

Bell ovate, evenly rounded, unsymmetrical owing to great development of the single tentacle; its surface marked with 5 meridional orange-colored bands, 2 of which start from the sides of the base of the tentacle. Proboscis long, contractile, sometimes reaching nearly to the velum; no mouth tentacles. A single very large marginal tentacle armed with conspicuous nematocyst batteries and bearing medusae of a second generation at its base.

Color.—Superficial bands and base of tentacle orange red.

Distribution.—Taken in the tow at Woods Hole (Vinal Edwards.) The colored bands are not easily seen in these specimens, which were collected in April.

This species can at once be recognized by its single greatly developed tentacle with secondary medusae at its base.

Corymorpha pendula L. Ag.

Bell deep, with the apex somewhat pointed, slightly unsymmetrical owing to the excessive development of one tentacle. Proboscis long, often reaching below the velum. Tentacles 4, one being much the largest, but not bearing secondary medusae at its base.

Color.—Proboscis light yellow; bases of tentacles light pink. (A. Agassiz.)

Distribution.—I find no record of this medusa having been found in the Woods Hole region, although the hydroid form from which it grows has been found there. Alexander Agassiz reports it from off Cape Cod.
Stomotoca apicata (McCrady). Fig. 77.

(Saphenia apicata McCr. Proc. Elliott Soc., vol. 1, No. 1, p. 130.)

Male.—Bell broad and shallow, with a long conical projection at its summit. Marginal tentacles 2, very long, but capable of retracting into short, finger-like bodies as in the figure; rudiments of other tentacles around the margin. Proboscis very large and bulky, composed of lobes that extend to the 4 mouth tentacles, which are pointed and reach below the velum. Radial canals 4.

Colors.—Tentacles rich purple, tipped with olive green. Spermaries and basal part of proboscis clear light emerald green. These colors differ greatly from those given by McCrady. They are taken by myself from a living specimen.

Female (=Dinamatella caucosa Fewkes).—Bell subglobular with a cone-shaped apical projection, the cone being shorter than in the male, and divided into two portions, a basal dome-shaped portion being surmounted by the short subconical apical part. Tentacles 2, hollow, very long; besides these there are 6 rudimentary tentacles on the bell margin which bear pigment spots at their bases. Proboscis very broad and heavy, reaching about to the velum, and bearing four heavy lips which are not fimbriated. Ovaries forming masses around the proximal part of the proboscis. Radial canals 4, band-like, with irregular jagged edges.

Colors.—General color light green. Ovaries yellowish white. Tentacles greenish. Pigment spots orange, with a bright red dot in the center.

Distribution.—Newport Harbor, August, 1896.

Gemmaria cladophora A. Ag. Fig. 78.

(North American Acalephae, p. 184.)

Bell rather deep, the apical portion being elevated into a shallow rounded dome not sharply, but still evidently differentiated from the rest of the bell. Tentacles 4, two of which are much the longest and bear curious clusters of nematocysts borne on short stalks or pedicels. Proboscis scarcely reach-
ing the bell opening, constricted just above the 4 small lips or mouth-arms, and bearing the ovaries on the proximal portion. Radial canals broad.

Colors.—The large tentacles light brown with a slight orange tinge at bases. There are bright yellow pigment spots at the bases of the two rudimentary tentacles.

Distribution.—Collected at Woods Hole, August, 1899.

78. Gemmaria cladophora A. Ag.

79. Corynitis agassizii (McCrady). (After Murbach.)

Bell deep, orbicular, without apical prominence. Tentacles 2, very long, bearing stalked batteries of nematocysts. There are also two rudimentary tentacles. Proboscis short and simple, without expanded lips. Radial canals 4, not broad and bandlike, and with curious bulging groups of nematocysts on the outside of the bell over the distal portions of the canals.

Colors.—Not given either in the original description or that of Dr. L. Murbach, who first established the connection between Corynitis agassizii and Gemmaria gemmusa of McCrady, the latter being the medusa of the former. His figures are here copied by permission.

Distribution.—Woods Hole. (L. Murbach.)

80. Perigonimus jonesii Osborn & Hargitt. (After Osborn & Hargitt.)

Bell orbicular, marginal tentacles 2, long and hollow, alternating with two eye-spots, which may indicate two rudimentary tentacles. Proboscis short, not reaching much more than half way to the broad and strong velum. Radial canals 4, those leading to the large tentacles broader than the others.

Colors.—Not given by the describers. The medusa buds, while still attached, are a light salmon color in specimens kindly furnished me by Dr. Hargitt.

Distribution.—Cold Spring Harbor, Long Island.


Bell orbicular. Marginal tentacles 4, very long, each with a swollen pigmented body at its base. Proboscis very long, reaching far below the bell opening when fully extended, but capable of being retracted well within the bell, suspended from the bell by a narrow, contracted portion. Mouth a simple opening without mouth tentacles. The attached medusa is longer, the tentacles closely coiled, and the proboscis retracted within the bell and often having its walls distended with sexual products.

Colors.—Specimens in formalin have the proboscis and tentacle bulbs light yellowish. Eye-spots black.

Distribution.—Collected at Woods Hole by Mr. George Gray.
Dipurena conica A. Ag.

(North American Acalephae, p. 181.)

Bell a rounded cone. Marginal tentacles 4, rather short, each with a rounded knob on the distal end and a pigmented spot and eye-speck at the base. Proboscis long, when fully extended reaching far below the rather broad velum, but capable of great retraction; attenuated proximally and swollen distally; mouth plain, without mouth tentacles. Radial canals 4, slender. Young specimens are almost globular in form.

Color.—Distal and proximal ends of tentacles reddish. Eye-specks black.

Distribution.—Naushon (A. Agassiz).

I have not seen this species; the above description is condensed from that of Dr. A. Agassiz.

Ectopleura ochracea A. Ag.  Fig. 82.


Bell longer than broad, subpyriform in shape, the upper end being the smaller; surface ornamented by eight meridional bands of nematoeysts, a band originating on each side of each tentacle base and passing directly over the surface of the bell to its apex. Tentacles 4, short, usually carried so closely coiled as to appear like mere knobs. Proboscis terete, not reaching to the bell opening, and ending in a simple mouth. Radial canals 4.

Color.—Manubrium bright yellow proximally and distally, the middle part being rose pink. Tentacular bulbs ochraceous, with a red eye-spot on each.

Distribution.—Abundant at Newport in August. Woods Hole. Probably common throughout the region discussed in this work.
**Pennaria tiarella** McCr.  Fig. 83.  
(Proc. Elliott Soc., vol. i, No. 1, p. 185.)

Bell very deep, regularly elliptical in outline. Marginal tentacles 4, rudimentary. Proboscis oblong ovoid, with both ends constricted, not reaching velum; mouth opening not apparent. Radial canals 4, accompanied with lines of dark pigment.

**Colors.**—Manubrium and lines over radial canals deep pink, the latter being darker and more brilliant.

**Distribution.**—Common in shallow water throughout the Woods Hole region, especially in the latter part of the summer. Growing profusely on the piles of the wharf at Woods Hole and on the eelgrass near by.

**Hydrichthys mirus** Fewkes.  

Bell oval, nearly spherical, its surface dotted with nematocysts. Marginal tentacles 2, when first liberated, afterwards 4. Radial canals 4, very broad, bandlike. Proboscis cylindrical, not reaching the broad velum. The tentacular bulbs are without eye-spots.

**Colors.**—Proboscis orange and yellow. Tentacular bulbs reddish.

**Distribution.**—The type specimens were liberated from a colony growing on a fish, *Seriola zonata*, which was brought into Dr. Alexander Agassiz's laboratory at Newport.

I have not seen this species, and the above description is condensed from that of the original describer.

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**Dysmorphosa fulgurans** A. Ag.  Fig. 84.  
(North American Arachnoidea, p. 163.)

Bell ovoid, its surface having a granulated appearance. Marginal tentacles 8, rather stout, and held somewhat stiffly, each with a bulbous expansion with a distinct eye-spot at its base. Proboscis short, not reaching much more than half way to the bell opening and ending with four mouth tentacles furnished with terminal rounded batteries of nematocysts. Specimens secured in August had young medusae growing on the upper part of the proboscis, and these themselves often show budding medusae of still another generation. Radial canals 4.

**Colors.**—The pigment spots at the bases of the tentacles are bright orange red.

**Distribution.**—During the summer, throughout the Woods Hole region. Agassiz says in reference to this species that it is "sometimes so abundant that the whole sea, when disturbed, is brilliantly lighted by the peculiar bluish phosphorescent color which they give out."

**Stylactis hooperi** Sigerfoos.  Fig. 85.  
(American Naturalist, vol. xxxiii, No. 394, p. 801.)

Bell ovoid. Marginal tentacles 8, rudimentary. Proboscis very large and broad, not reaching beyond the bell opening, greatly distended with sexual products at time of liberation, without mouth tentacles or mouth. Eye-spots absent. Radial canals 4.
HYDROIDS OE THE WOODS HOLE REGION.

Colors.—Not given by the original describer. The color of the medusa while still attached in specimens preserved in formalin is light salmon.

Found growing on a live gastropod, *Hyalessa*. Collected near Woods Hole by Mr. Waldron. Type from Cold Spring Harbor, L. I.

**Turris vesicaria** A. Ag. Fig. 86.

(North American Aculeata, p. 164.)

Bell dome-shaped, surmounted by a subglobular or subconical body, which appears to be hollow. Tentacles numerous when full grown, but one good-sized specimen, apparently almost mature, has only 8. Each tentacle is dilated at the base into a tentacular bulb that bears an eye-spot. Proboscis short, ending in four frilled mouth arms. Ovaries, forming large complicated frills, extending down on either side of the radial canals and connecting at their proximal ends. Radial canals 4, broad and with transverse striae and edges which appear jagged or frayed out.

Colors.—Ovaries and tentacular bulbs yellow.


**Turritopsis nutricula** McCrady. Fig. 87.

(Proc. Elliott Soc. vol. 1, No. 1, p. 127.)

Bell hemispherical ovoid, or sub-conical. Marginal tentacles varying in number according to age, from 4 to 24 in specimens examined, and held somewhat stiffly, each with a tentacular bulb bearing an eye-spot at its base. Proboscis not reaching to the bell opening, and ending in four small mouth tentacles bearing distal clusters of nematocysts. The genital products are contained in four large oval masses around the proximal part of the proboscis and reach to the bases of the mouth-arms. Radial canals 4. Velum broad.

Colors.—Eye-spots red. Distal part of ovaries bright lemon yellow.

Distribution.—Naushon. (A. Agassiz.) Woods Hole, Massachusetts.

**Nemopsis bachei** Ag. Fig. 88.

(Mem. Am. Acad. Sci., IV, p. 289.)

Bell deep, ovoid, sometimes almost globular; thickness of bell substance greater than in most of preceding species, making bell cavity proportionally small. Tentacles in 4 bunches, the middle pair in
each bunch being distinctly club-shaped at ends. Proboscis short and small, ending in 4 much-branched mouth-tentacles, each ramification of which ends in an oval group of nematocysts. Mouth-tentacles highly retractile and not evident when animal is disturbed. The bunches of marginal tentacles are borne on conspicuous swellings or pads at terminations of the four radial canals, and each tentacle has a black eye-spot above its base.

Colors.—Tentacular bulbs and ovaries yellow. Ends of middle tentacles of each bunch dark brown.

Distribution.—Nantucket and Nauset (A. Agassiz), Newport, Vineyard Sound, Buzzards Bay.

**Bougainvillia carolinensis** (McCr.). Fig. 89.


Bell subglobular, thick. Marginal tentacles in four bunches, arising from marginal swellings which are narrower and more pointed than in the preceding species. Tentacles all alike, with slightly enlarged ends, and eye-spots over their bases. Proboscis slender, with four branched mouth-tentacles ending in nematocyst batteries. Radial canals, 4.

Colors.—Tentacular bulbs red, edged with yellow. Proboscis red.

Distribution.—Common in the Woods Hole region.

**Bougainvillia superciliaris** Ag. Fig. 90.


Bell subglobular, very thick. Marginal tentacles in four pairs at birth, later in four bunches. Tentacular bulbs and eye-spots as in the preceding species. Proboscis thick and heavy but not reaching much more than half way to the bell opening, ending in four branched mouth-tentacles terminating in nematocyst batteries. Radial canals, 4.

Colors.—Marginal sense-bodies orange red surrounded by yellow. Proboscis pale yellow, tinged with red distally.

Distribution.—Newport, Rhode Island (Leidy). Woods Hole.

**Lizzia grata** A. Ag. Fig. 91.


Bell deep, subconical in outline, lower portion noticeably wider than upper. Marginal tentacles in 8 clusters borne on marginal swellings, but without distinct eye-spots at base of each tentacle.
HYDROIDS OF THE WOODS HOLE REGION.

Proboscis rather large, capable of being protruded nearly to the bell opening, and ending in 4 mouth-tentacles which are branched, but not so extensively as in preceding species. Radial canals, 4.

*Willia ornata* McCr.

(Br. Elliott Soc., vol. 1, No. 1, p. 149.)

Bell subconical. Tentacles of adult 16, one to each branch of the radial canals. Proboscis short, ending in 4 lobular unbranched mouth-tentacles armed with nematocysts which are not aggregated into round batteries. Ovaries forming 4 masses around proximal part of proboscis. Radial canals 4, each divided distally into 4 branches. Between each pair of tentacles a superficial structure like a "knotted chord" passes upward on outside of bell. Sense-bulbs found at bases of tentacles.

Colors.—Not described by McCrady or Agassiz.

Distribution.—Buzzards Bay, Nausson. (A. Ag.)

I have not seen this species, and the above description is condensed from that of McCrady.

---

Orchistoma tentaculata Mayer.  

Bell deep, cup-shaped, its substance very thick in upper portion much reducing depth of bell cavity. Marginal tentacles 32, with sense-bulbs at their bases. No otocysts. Proboscis short, with 4 lobulated mouth-arms, the lobes margined with nematocyst-bearing tentacles. Radial canals 16, alternating with 16 short tubes given off from near top of bell cavity. Ovaries borne on proboscis.

Colors.—Proboscis and sense-bulbs red.

Distribution.—Newport, Rhode Island.

*Eutima limpida* A. Ag.

(North American Aculephus, p. 116.)

Like *E. mira* with the following exceptions: Bases of the four tentacles not swollen, and each provided with two lateral cirri. The ovaries, tentacles, and proboscis almost colorless.

Distribution.—Buzzards Bay; Nausphon. (A. Ag.)
Eutima mira McCr. Fig. 93.
(Proc. Elliott Soc., vol. 1, No. 1, p. 190.)

Bell broad, subconical, the lateral profile sinuous, upper part dome-shaped. Tentacles 4, with swollen sense-bodies at bases, but without lateral cirri. Otocysts 8, two between each two radial canals, conspicuous, containing highly refractile granules. A number of rudimentary tentacles around the bell margin. Proboscis very long, extending below the bell two or three times the depth of the latter, and ending in a mouth surrounded by a disk-like lobed frill. Ovaries disposed along the radial canals.

*Colors.*—Swollen tentacular bases a bright light green. Ovaries whitish. Proboscis not noticeably colored.

*Distribution.*—Woods Hole, Massachusetts. August 10, 1890.

Hebella calcarata (A. Ag.) = Dumnentaria cornicina McCr. (in part). Fig. 94.

Bell of adult rather shallow, bowl-shaped, young almost spherical, with the outline of the sides rather sinuous. Marginal tentacles rather numerous, hollow, with sense-bulbs at their bases and a spur-like projection extending inward from the base of each. Other tentacles have no sense-bulbs and are much more slender, appearing like lateral cirri in young specimens; still other tentacles are short and clavate. Proboscis very short, ending in four frilled mouth-arms. Ovaries in form of convoluted bands along the four radial canals.

*Colors.*—Ovaries and larger tentacles dark yellowish. Eye-spots dark violet. (A. Ag.)

*Distribution.*—Vineyard Sound (Verrill); Newport and Woods Hole. Naushon. (A. Ag.)

Eucheilota duodecimalis A. Ag. Fig. 95.

Bell hemispherical or subglobular. Marginal tentacles 4, each with a sense-bulb and two lateral cirri at its base. Three otocysts between each two tentacles, making twelve in all. Proboscis very short, tubular, with inconspicuous lips. Ovaries along radial canals, very conspicuous when mature. Radial canals 4. Velum broad.

*Colors.*—Spots on sense-bulbs straw-yellow.

*Distribution.*—Buzzards Bay (A. Ag.); Newport; Woods Hole.
HYDROIDS OF THE WOODS HOLE REGION.

**Eucheilota ventricularis** McOr.


**Colors.**—Proboscis yellow, with a red central portion. Ovaries yellow, sense-bulbs with a red center.

**Distribution.**—Naushon; Buzzards Bay (A. Ag.);

This description is condensed from that of McOrady. Dr. Agassiz appears to doubt whether his species is the same as that of McCrady, and describes it as having lateral cirri to the tentacles. I have not seen this species.

**Clytia noliformis** (McCr.).


Bell hemispherical. Marginal tentacles 4 in young and more numerous in adults. Otocysts 8, two between each two radial canals; always between tentacle bases, and not on them. No eye-spots. Proboscis very short, ending in a four-lobed mouth. Radial canals 4.

**Colors.**—There are no conspicuous colors. Ovaries yellowish-white.

**Distribution.**—Buzzards Bay and Naushon (A. Agassiz, under name of *Platypynus cylindrica*).

**Clytia bicophora** Ag.


Bell hemispherical, considerably flattened in older specimens. Tentacles 4 to 16, according to age. Otocysts 8 or 16, according to age, placed between tentacular bases. Proboscis short, ending in a 4-lobed mouth. Ovaries, in adult, reaching along radial canals nearly to proboscis. Radial canals 4.

**Colors.**—Ovaries brown. Black spots on swollen bases of tentacles.

**Distribution.**—Naushon; Vineyard Sound (A. Ag.);

I have not seen this species, and the above description is condensed from that given by Dr. A. Agassiz, *North American Acalephae*, p. 78.

**Tima formosa** Ag.  Fig. 96.


Bell broadly campanulate, the edges perceptibly flaring, the lateral outline sinuous. Marginal tentacles 32, some of which are often rudimentary, with swollen sense-bulbs at their bases. Otocysts numerous, placed between the bases of the tentacles, each with a few granules near its margin. Proboscis very long, in the shape of a very attenuate cone with its base upward, and extending far beyond the bell opening when expanded. Mouth surrounded by four conspicuous frilled lappets. Ovaries strongly convoluted and extending the full length of radial canals and proboscis. Radial canals 4. Size very large. Among the largest of our hydroid medusae.

**Colors.**—Ovaries and sense-bulbs whitish; sometimes light-yellowish.

**Distribution.**—Woods Hole (F. M. Walmsley); Vineyard Sound (Verrill).

**Obelia longissima** (Pallas).

*(Scutulaaria longissima* Pallas, *Elementa Zoophytum*, p. 118.)*

It is exceedingly difficult, if not impossible, to differentiate the medusa of the various species of this genus. In some cases the only way to identify them is to see them given off from the hydroid.
Obelia commissuralis (McCr.) Fig. 97.


Bell disk-shaped. Marginal tentacles 16 at time of liberation, long and slender. Ovaries not developed at time of liberation.

Distribution.—Colonies abundant in Woods Hole region, growing on piling of wharves and on submerged timbers generally.

Obelia geniculata (Linn.). Figs. 39A, 98.

(Sertularia geniculata Linn., Syst. Nat., p. 1312.)

Bell disk-shaped, or shallow bowl-shaped. Marginal tentacles 24 at birth, each with an inward-projecting spur. Oto cysts 8, two between each two radial canals, placed over the bases of the tentacles and not between them. Proboscis short, with four inconspicuous lobular lips. Radial canals 4. Ovaries oval, hanging beneath the middle portion of the radial canals. No sense-bulbs. This, like other species of Obelia, has the habit of swimming with the bell reversed, so that it appears somewhat like an umbrella turned wrong side out.

Colors.—The only color is in the light-yellowish ovaries and proboscis.

Distribution.—Abundant throughout Woods Hole region.

Obelia gelatinosa (Pallas) = Laomedea gigantea A. Ag. (Verrill).


Bell disk-shaped. Tentacles 16 at time of liberation, each with an inward-projecting spur. Oto cysts 8, placed over bases of tentacles. Proboscis short, with mouth surrounded by four lobular lips or mouth-arms. Radial canals 4. Ovaries round, hanging beneath middle part of radial canals.

Colors.—Ovaries and proboscis light-yellowish.

Distribution.—Colonies have been found growing at New Haven, Conn.; along the Rhode Island coast, and in Vineyard Sound.

Obelia dichotoma (Linn.).

(Sertularia dichotoma Linn., Syst. Nat., p. 1312.)

Bell very shallow, disk-shaped. Marginal tentacles 16 at time of liberation. Not distinguishable from the preceding.

Distribution.—Colonies dredged off Gay Head, 1 fathom (Verrill).

Oceania singularis Mayer. Fig. 99.


Bell rather shallow, flaring decidedly at margin, and with a well marked dome-shaped apical projection. Marginal tentacles 16, each bearing a sense-bulb at its base. There are rudimentary tentacles between bases of larger ones. Proboscis not extending beyond velum, and ending in four broad lobes or mouth-arms that are not fimbriated. Radial canals 4, bearing the ovaries on their upper portion. There is an otocyst between each pair of tentacles, including the rudimentary ones.
HYDROIDS OF THE WOODS HOLE REGION.

Colors.—"The entoderm of the proximal part of each tentacle bulb is turquoise-green, and the distal part is brownish-red. The entoderm of the proboscis and of the radial tubes in the neighborhood of the gonads is of a delicate turquoise tinge." (Mayer.)

Distribution.—Newport, Rhode Island. Dr. Mayer kindly allowed me to sketch the type.

Tiaropsis diademata Ag. Fig. 100.
(Memoirs Amer. Acad., vol. IV, p. 289.)

Bell hemispherical in adult, ovoid in young. Marginal tentacles numerous, with swollen sense-bulbs at the bases of the larger ones. Otocysts 8, situated between the bases of the tentacles and each containing a central dark dot with an arched row of refractile granules. Proboscis short, not reaching much more than half way to the velum and ending in four conspicuous, extensively frilled or fimbriated oral arms. Radial canals 4. Ovaries long, extending nearly to the circular canal.

Colors.—Specimens in formalin have the ovaries, oral arms, and tentacle bases light green.

Distribution.—Woods Hole, Mass. (Collected by Mr. Vinal Edwards.)

Epenthesis foliata McCr. Fig. 101.


Colors.—Proboscis light green. Tentacular bulbs red.

Distribution.—Newport, Rhode Island.

Trachynema digitale A. Ag. Fig. 102.
(North American Aculephre, p. 57.)

Bell very deep, with an outline something like that of a bishop's miter, somewhat pointed above. Marginal tentacles numerous, but most of them are usually lacking in preserved specimens. Otocysts 4, according to Agassiz, but they seem to be lacking in the specimens (males) that I have examined. Proboscis long, reaching nearly to the velum, ending in a constricted portion bearing the mouth surrounded by four lobular or finger-like mouth-arms. Radial canals 8. Ovaries 8, long "sausage-like" organs, reaching sometimes half way from the upper part of the bell cavity to the velum. Velum wide, strong, extensively wrinkled.

Colors.—Bell slightly pinkish. Contracted tentacles crimson at their extremity. Ovaries milky. Otocysts garnet-colored. (A. Agassiz.)

Distribution.—Newport, Rhode Island. Woods Hole. (Vinal Edwards.)
Gonionemus vertens A. Ag.  
Fig. 103.

Bell hemispherical. Marginal tentacles numerous, each with a sense-bulb at its base and a "knee-pad" of adhesive cells near its end, which appears as a thickening of the tentacle. Otocysts numerous between the bases of the tentacles. Proboscis short, not reaching more than half way to the velum, and ending in four frilled mouth-arms. Radial canals, 4. Ovaries 4, forming convoluted bands following the radial canals to the bell margin.

Colors.—Tentacle bases emerald green and brown, with a black eye-spot. Proboscis and ovaries yellowish brown.

Distribution.—The Eel Pond, at Woods Hole.

Melicertum campanula Esch.  
Fig. 104.

Bell deep, the upper portion somewhat narrowed. Marginal tentacles numerous, hollow, without eye-spots at their bases. No otocysts. Proboscis short, ending in eight frilled mouth-arms. Radial canals 8. Ovaries 8, convoluted, extending beneath the radial canals to the margin.

Colors.—Ovaries, proboscis, and tentacle bases light yellow.

Distribution.—Woods Hole. (Vinal Edwards.)

Æquorea albida A. Ag.

Bell rather shallow, in the shape of a low dome with lateral outlines slightly sinuous. Marginal tentacles very numerous, with otocysts between their bases and without evident sense-bulbs. Proboscis small, but evident, without mouth-arms. Radial canals very numerous.

Colors.—Radial canals appearing as whitish lines.

Distribution.—Buzzards Bay; Nauset. (A. Agassiz.)

I have not seen this species, and the above description is taken from that of the original describer.¹

Zygodactyla grænlandica Ag.

Bell shallow, a low dome, hardly emarginate along the lateral outlines. Marginal tentacles exceedingly numerous, swollen at their bases. Otocysts numerous; situated between the tentacle bases. Proboscis large, thin-walled, reaching beyond the bell opening when not retracted, and sur-

¹ Since the above was written numerous specimens of this species have been secured at Woods Hole by Mr. Hal. Childs.
rounded by extensively frilled or fimbriated mouth-arms. Radial canals and ovaries exceedingly numerous, the latter extending almost to the margin. Size very large.

*Col. rs.*—Not given by the original describer.

I have not seen this species, and condense the description from that of Dr. A. Agassiz.

**Rhegmatodes tenuis** A. Ag.  
(North American Actinopoda, p. 95.)

Bell very shallow, disk-shaped, with a central elevated portion. Tentacles very numerous, slender. Otocysts numerous, situated between the tentacle bases. There is practically no proboscis, but an irregular aperture under the center of the bell surrounded by an irregularly striated membrane which forms the floor of the digestive cavity. Radial canals numerous, there being about 32 in specimen examined. Ovaries linear, numerous, reaching along the radial canals from the digestive cavity nearly to the margin of the bell.

*Colors.*—There is very little coloration about this species. The ovaries are pale yellowish or brownish.

*Distribution.*—Naushon (A. Agassiz). Woods Hole.
GLOSSARY OF TECHNICAL TERMS USED IN THE HANDBOOK.

Acrocyst, an external, sac-shaped receptacle which rests on the top of the gonangium of certain species, and within which the generative products pass through the later stages of development.

Actinule, a peculiar hydranth-like body which is found in the female gonophores of many tubularian hydroids. After being expelled from the gonophore it leads a free life for a while, and then settles down, becomes attached by its aboral end, and grows into a new colony.

Bell, the gelatinous mass which forms the greater part of a medusa and is often called the "umbrella."

Blastostyle, a stem-like structure from which gonophores grow.

Cenosphere, the living cellular tissue within the perisarc. It is composed of an outer layer called the ectoderm, an inner layer called the endoderm, separated by a structureless membrane called the mesoglea.

Corbula, the pod-shaped receptacle for the gonangia in certain genera of the Plumularidae.

Eye-speck or Eye-spot. See sense-bulb.

Fascicled stem, a stem which appears to be compound, or composed of a number of simple stems or tubes closely aggregated and often twisted together.

Gonangium, the chitinous receptacle for accommodation of the gonophores of the calypteroblastic hydroids.

Gonophore, the reproductive "person" of the colony which produces the generative products. It is usually destitute of a mouth and tentacles.

Gonosome, the assemblage of structures directly associated with sexual reproduction. It includes the gonophores, blastostyles, ovaries, gonangia, medusae, etc.

Hydranth, a nutritive "person" of a colony consisting ordinarily of a body containing a digestive cavity surmounted by a proboscis which terminates in the mouth and is surrounded by radially disposed tentacles. A hydroid "polyp."

Hydrocaulus, the supporting framework of the colony, including the stem, branches, pedicels, etc.

Hydrocladium, the branches which bear the hydranths in the Plumularidae.

Hydrophore, the collar-like expansion of the pedicel at the base of the hydranth of the Halcidse. The expanded margin is often several times reduplicated. It is supposed to be a reduced hydrotheca.

Hydrozoa, the root-like structure by which the hydroid colony is attached to stones, shells, or other bodies.

Hydrothea, the chitinous receptacle into which the hydranths of the calypteroblastic hydroids retract. It is usually transparent, and consists of an expansion and extension of the perisarc of the pedicel.

Lithocyst, a usually glassy appearing body placed on the margin of the medusa bell and containing refractive granules. It is supposed to be sensory in function and to be used as either an organ of orientation or of hearing.

Manubrium, the proboscis of the medusa.

Marsupium, or Marsupial chamber, an internal chamber found within the gonangium of the genus Dipsasia, in which the generative products pass through the later changes in their development.

Medusa, the free-swimming "jelly-fish," often given off from the hydroid colony. It usually bears, and serves to distribute, the generative products. A "sessile" medusa is one that remains attached to the parent stem after the generative products are expelled.

Nematocyst, a "netting cell," or "urticating cell," consisting of an outer sac containing a barbed thread, which can be rapidly projected with such force as to penetrate the tissues of the prey or enemy and inject an irritant poison.

Nematophore, a chitinous receptacle for the defensive "person" or sarcostyle of the Plumularidae. It is much smaller than the hydrotheca, but bears the same relation to the sarcostyle that the hydrotheca does to the hydranth.

Operculum, a movable lid or cover which closes the aperture of the hydrotheca in many calypteroblastic hydroids. It consists of one or several pieces which are raised when the hydranth is expanded and lowered when it is retracted. In many cases the gonangia are also provided with opercula.

Otocyst. See Lithocyst.

Ototh, a highly refractile granule, one or several of which are found in the otocyst.
HYDROIDS OF THE WOODS HOLE REGION. 385

**Ovaries**, the generative organs of the medusa. The term is often applied to both sexes. They are situated either on the proboscis, along (under) the radial canals, or in both places.

**Pediciol**, the stem or stalk that supports the hydranth and hydrotheca.

**Perisarc**, an external chitinous skeleton which invests and gives support to the stems, branches, etc., of most hydroids.

**Planula**, a free-swimming, usually pear-shaped ciliated body into which the ovum immediately develops in the course of the hydroid life cycle.

**Proboscis**, the portion of the hydranth body that usually surmounts the basal tentacles and contains the mouth, or the pendant mass which hangs like the clapper of a bell from the center of the bell cavity of a medusa. It is often called the manubrium.

**Radial canals**, tubes which are found on the under side of the umbrella of a medusa and lead from the digestive cavity to the circular canal around the bell margin.

**Sabreylc**, the highly extensible defensive “person” found in the *Plumulariida*. It contains nemato-cysts or adhesive cells or both, and is made up of ectoderm, mesoglea, and endoderm. In some cases a body cavity has been demonstrated, but neither mouth nor tentacles.

**Sense-bull**, a swelling, usually at the base of a marginal tentacle of a medusa, which is supposed to be sensory in function and often contains conspicuous pigment spots known as “eye-specks” or “eye-spots,” supposed to have to do with the function of sight.

**Septum**, a horizontal partition which partly divides the cavity of the hydrotheca from that of the pedicel.

**Spiral zooid**, a peculiar defensive “person,” found in *Hydractinia*, which is long and without a mouth, but capable of bending itself in a twist or spiral.

**Sporosac**, a sac-like gonophore without evident meiosoid structure.

**Tentacles**, the slender, motile organs which are arranged usually in a radiate manner around the proboscis of the hydranth. They are “filiform” when without rounded distal knobs, and “capitate” when they are knobbed at the ends. In the medusa the “marginal tentacles” surround the bell margin and the “mouth tentacles” surround the mouth.

**Trophosome**, the entire assemblage of structures in the colony, except those directly associated with the reproductive parts. It includes the hydrocaulus, hydrorhiza, hydranths, etc.

**Velum**, a delicate membrane which is stretched across the bell opening of a hydroid medusa. It is attached to the bell margin and has a large circular opening in its center.

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1 No synonyms are included in this Index.

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