

No. 1. — *Descriptions of New and Little-known Medusæ from the Western Atlantic.* BY ALFRED GOLDSBOROUGH MAYER.

LIST OF SPECIES.

SCYPHOMEDUSÆ.

Bathyluca solaris, nov. gen. et sp.

HYDROMEDUSÆ.

Bougainvillia Gibbsi, nov. sp.

Lymnorea borealis, nov. sp.

Oceania carolinæ, nov. sp.

Oceania singularis, nov. sp.

Octonema gelatinosa, nov. sp.

Orchistoma tentaculata, nov. sp.

Stomotoca apicata, L. AGASSIZ.

Stomotoca rugosa, nov. sp. = *Stomotoca apicata*, FEWKES.

Syndictyon angulatum, nov. sp.

CTENOPHORÆ.

Mnemiopsis McCradyi, nov. sp.

THE Medusæ described in the following paper were obtained by the author as assistant to Mr. Alexander Agassiz in collecting new material for a work upon the Medusa-fauna of the Atlantic Coast of North America. The descriptions of Western-Atlantic Medusæ herein given will eventually be published also in the new edition of *The North American Acalephæ* now in preparation by A. Agassiz and A. G. Mayer.

Eight species are new; of these one is a Scyphomedusa, one a Ctenophore, and six are Hydromedusæ. In addition to these there is one Hydromedusa (*Stomotoca rugosa*) that we have redescribed under a new name.

The Scyphomedusa (*Bathyluca solaris*) is, judging from its structural affinities, a deep-sea type, although the single specimen from which our figures were obtained was found upon the surface of Narragansett Bay, Rhode Island.

The Medusæ described in this paper were collected at different times at Eastport, Maine; Newport, Rhode Island; Charleston, South Carolina; and in the Bahama Islands during visits made to the above localities at the suggestion of Mr. Agassiz.

SCYPHOMEDUSÆ.

BATHYLUCA, nov. gen.

Bathyluca solaris, nov. gen. et sp.

Figs. 1, 2, Plate 1.

A single specimen of a new genus of Discomedusa belonging to the family Ephyridæ was found in Narragansett Bay, Rhode Island, on July 27, 1896, by R. W. Hall, Esq. The medusa was found floating upon the surface, but as it was very much torn and battered, and as it differs widely from any of the hitherto known pelagic medusæ of our coasts, we are inclined to suspect that it may prove to be a deep-sea form, a specimen of which has wandered to the surface.

Generic Characters.—*Bathyluca*, nov. gen. Discomedusæ with a simple cruciform, central mouth opening, without mouth-arms or palps. There are 16 wide, radial, gastro-vascular pouches (8 ocular and 8 tentacular). There is no ring canal. There are 8 marginal sense-organs and 16 marginal tentacles. There are 4 gonads in the oral floor of the disk, and there are 4 sub-genital pits.

Specific Characters.—The umbrella is flat, and the gelatinous substance is quite thick. It is 45 mm. in diameter, and about 10 mm. in height. The aboral surface of the umbrella is sprinkled over with small clusters of nematocysts. There are 8 marginal sense-organs that are deeply sunken within small niches between the lappets. The entoderm of these sense-organs contains no pigment, but instead there are small white granules (Figure 2). There are 24 marginal lappets and 16 long hollow tentacles. The mouth opening is cruciform in shape, and there appear to be no mouth-arms or palps. We may, however, be mistaken in regard to this, for our specimen was much torn and battered, and it is possible that the palps may have disappeared. There are 4 wide sub-genital pits. The gonads are found in the entoderm of the lower floor of the gastro-vascular cavity, and their position is marked by 4 horseshoe-shaped ridges upon the lower floor of the sub-umbrella. There are a number of long gastric cirri that arise from the regions of the gonads

and project slightly beyond the mouth opening. The stomach is large, its diameter being about $\frac{1}{2}$ that of the umbrella itself. Sixteen wide, simple radial pouches extend outward from the stomach cavity into the peripheral regions of the umbrella. Eight of these pouches go to the marginal sense-organs, and 8 to the tentacles which are hollow throughout almost their entire length. There are 8 radial bands of muscle fibres in the ex-umbrella. These go to the marginal sense-organs. The gelatinous substance of the disk is translucent but slightly bluish in color. The clusters of nematocysts over the aboral surface are dull yellowish brown, and the tentacles are slightly green in color.

Single specimen, Narragansett Bay, Rhode Island.

HYDROMEDUSÆ.

STOMOTOCA, L. AGASSIZ, 1862.

Stomatoca apicata, L. AGASSIZ.

Fig. 3 ♂, Fig. 4 ♀, Plate 2.

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| | Male | { | Saphenia apicata, McCrady, J., 1857, Gymn. Charleston Harbor, p. 27, Pl. VIII. Figs. 2, 3. |
| | | | Stomatoca apicata, Agassiz, L., 1862, Cont. Nat. Hist. U. S., Vol. IV. p. 347. |
| | Female | { | Stomatoca apicata, Agassiz, A., 1865, North Amer. Acal., p. 168. |
| | | | Dinematella cavosa, Fewkes, J. W., 1881, Bull. Mus. Comp. Zool. Harvard Coll., Vol. VIII. p. 151, Pl. II. Figs. 2, 3; Pl. IV. Fig. 3. |
| | | | Dinematella cavosa, Fewkes, J. W., 1884, Amer. Nat., Vol. XIX. p. 195, Fig. |

Stomatoca apicata, L. Agassiz, is distinguished by the fact that the entoderm of the proboscis in the male is emerald green, or straw-colored; and in the female dull ochre. Also the tentacle bulbs in the male are purple, and in the female dull ochre. This species has been confounded by Brooks, 1883, and Fewkes, 1881, with another form in which the entoderm of the proboscis and tentacle bulbs is brick-red in both sexes. For this brick-red form we propose the name *Stomatoca rugosa*.

Specific Characters.—*Stomatoca apicata*. In the adult medusa the bell is about 4 mm. high and 2 mm. broad. It is provided with a prominent apical projection that is solid in the males, but usually hollow in the females, the gastro-vascular space leading upward into it. There are two long tentacles with large, hollow basal bulbs. In addition to the two long tentacles there are usually 6 small rudimentary tentacle bulbs upon the bell margin. The proboscis is flask-shaped, there is no peduncle, and the 4 lips are curved slightly upward. The ectoderm of the upper portion of the proboscis, under the 4 radial tubes, is thrown into folds or convolutions, and it is in this region that

one finds the gonads. There are 4 broad radial tubes and a broad circular vessel with somewhat jagged outlines. The velum is well developed. The color of the proboscis in the male varies from intense green to dull ochre-yellow, or cream-color; and the basal bulbs of the tentacles vary from faint to deep purple. In the females, the proboscis and tentacle bulbs are usually dull ochre-yellow, or cream-color, but in some few individuals the proboscis is faintly straw-colored, and the tentacle bulbs faint purple. In the female the apical projection of the bell is hollow, while in the male it is usually solid.

Common at Newport, Rhode Island, from July 15–September. Rare at Charleston, South Carolina.

The young medusa resembles the adult excepting that the apical projection to the bell is wanting, or is but little developed. There are 2 tentacles and 2 rudimentary tentacle bulbs. The sexual color difference is seen in the youngest medusæ we have observed. The hydroid stock is unknown.

Stomotoca rugosa, nov. sp.

Fig. 5, Plate 2.

Stomotoca apicata, Fewkes, J. W., 1881, Bull. Mus. Comp. Zool., Vol. VIII. p. 152, Pl. II. Figs. 1, 4, 9.

Amphinema apicatum, Brooks, W. K., 1883, Studies Biol. Lab. Johns Hopkins Univ., Vol. II. p. 473.

The bell is 5 mm. high and 3 mm. broad; it bears an apical projection which in some specimens is long and slender, and in others is short and blunt. The substance of this projection is solid throughout. There are 2 long, well-developed tentacles and 14 small rudimentary ones. The basal bulbs of the long tentacles are large and hollow. When fully stretched, the long tentacles attain a length of 4–6 times the bell height. The velum is well developed. There are four broad radial tubes, and a broad circular vessel with jagged outlines. The proboscis is flask-shaped, the lips being flanged and quite prominent. The sexual products are found in the ectoderm of the upper portion of the proboscis where the outer surface is folded into a complex series of ridges. The bell is transparent, and the entoderm of the tentacle bulbs and of the proboscis is brick-red. In some individuals the 4 radial tubes and the circular vessel are faint red.

There is a well-marked southern variety of this species, found at the Tortugas, Florida, in which the proboscis and the tentacle bulbs are brick-red streaked with black. In some individuals, indeed, the proboscis and tentacle bulbs are coal-black.

Brooks, 1883, has described the hydroid and young medusa of this species from Beaufort, North Carolina. According to him, the hydroid stock is a *Perigonimus* very much like *P. minutus*, Allman, 1871, p. 324, Plate XI. Figures 4–6.

This medusa is common at Newport, Rhode Island, and is also found at Charleston, South Carolina. It is rare at the Tortugas, Florida.

SYNDICTYON, A. AGASSIZ, 1862.

Syndictyon angulatum, nov. sp.

Figs. 6–8, Plate 3.

Specific Characters.—The bell is almost square in cross-section and is not quite as broad as it is high. The bell height in the specimens found by us was about 2.5 mm. There are 4 stiff tentacles that are about three-fourths as long as the bell height. The distal halves of these tentacles are conical in shape, and are covered thickly with clusters of nettle cells. The basal bulbs of the tentacles are large and swollen, and contain each a single well-developed ectodermal ocellus. This ocellus is formed by a cup-shaped invagination of ectodermal cells that are deeply stained with dark-brown pigment granules. It is probable that this structure constitutes a very primitive udoscopic eye. The velum is small. There are 4 narrow, straight, radial tubes and a slender circular vessel. The proboscis is spindle-shaped, and the mouth is a simple circular orifice. The gonads are situated within the ectoderm of the proboscis. The entoderm of the proboscis and of the tentacle bulbs varies from turquoise to blue-green in different specimens.

Several specimens of this medusa were found off Turks Islands, Bahamas, January 20, 1893.

BOUGAINVILLIA, LESSON, 1836.

Bougainvillia Gibbsi,¹ nov. sp.

Figs. 14, 15, Plate 4.

Specific Characters.—Adult medusa; Figure 14. The bell is about 4 mm. in height and 3.8 mm. in diameter. The gelatinous substance is very thick, so that the bell cavity is only about one half as deep as the height of the animal. There are 4 clusters of marginal tentacles which arise from 4 large bulbous swellings, situated at the bases of the 4 radial canals. Each bulbous swelling gives rise to 4 or 5 long slender tentacles. There is a single dark-brown ocellus at the base of each tentacle upon the centripetal (lower) side. The velum is small. There are 4 straight, narrow, radial canals. The proboscis is wide and cruciform in cross-section, and the radial canals arise from the 4 corners of the cross. The proboscis is short and does not extend quite one half the distance from the inner apex of the bell cavity to the velar opening. The mouth is situated at the extremity of a short tubular neck, and there are no prominent lips. Four radially situated oral tentacles arise from the sides of the neck of the proboscis. Each one of these branches dichotomously about twice. The gonads are developed upon the sides of the stomach, and

¹ Named for Mrs. Theodore K. Gibbs.



in the female the ova are large and prominent. The proboscis is pearl-colored, or of a delicate green. The entodermal cores of the tentacle bulbs are red surrounded by a delicate yellow-green. The supporting lamella of the bell often displays a faint greenish tinge.

Young Medusa. — In the young medusa there are but 8 tentacles, 2 from each tentacle bulb. The bell is a little higher than a hemisphere and the gelatinous substance is not very thick, being of about uniform thickness everywhere instead of being very thick at the aboral pole, as in the adult. The proboscis is short and quadratic, and there are 4 short, unbranched, knob-shaped oral tentacles. When the medusa is about 3 mm. in height, the bell is still hemispherical. The proboscis is wide, shallow, and quadratic, and the oral tentacles branch once dichotomously. About 4-5 marginal tentacles arise from each tentacle bulb.

This medusa is found in Newport Harbor, Rhode Island, from July until October.

This species is distinguished from *Margelic carolinensis*, L. Agassiz, by the greater height and less width of its bell. Also in *M. carolinensis* the proboscis is long and slender, while in *B. Gibbsi* it is short, wide, and cruciform in cross-section. The proboscis of *M. carolinensis* is widest at about the middle point of its length, while that of *B. Gibbsi* is widest at its proximal base.

LYMNOREA, PÉRON and LESUEUR, 1809.

Lymnorea borealis, nov. sp.

Figs. 16-18, Plate 5.

Specific characters. — The bell is 3 mm. in height. The bell walls are thin, and there is a slight apical projection. There are 32 well-developed marginal tentacles with large basal bulbs. These tentacles are about $\frac{1}{2}$ as long as the bell height, and are curled slightly upward. They are not very flexible. The velum is well developed. There are 4 straight, narrow radial tubes. The proboscis is pyriform and the mouth is surrounded by 4 short, dichotomously branching, oral tentacles. Each of these oral tentacles branches 2 times, thus giving rise to 4 tentacle tips (see Figure 18). These tips are short and knob-like and are covered with long slender nematocyst capsules borne upon thread-like filaments (see Figure 17). The gonads occupy 4 radially situated, longitudinal swellings upon the proboscis. The entoderm of the proboscis, and of the bulbs of the marginal tentacles, is red.

Three specimens, all of them being males, were found in Eastport Harbor, Maine, on September 19, 1898.

OCEANIA, PÉRON and LESUEUR, 1809.

Oceania carolinæ, nov. sp.

Figs. 9-11, Plates 3, 4.

Specific Characters. — The bell is not quite a hemisphere, and is 14 mm. in diameter. The cavity of the bell is shallow, so that the gelatinous substance is quite thick. There are 16 well-developed marginal tentacles with large, hollow basal bulbs. These are only about half as long as the bell diameter, but as they are usually carried coiled in a close helix they appear much shorter. In addition to these well-developed tentacles there are 48 small rudimentary tentacle bulbs that probably never develop into tentacles. There are 64 otocysts, 4 between each adjacent pair of large tentacles (see Figure 11). Each otocyst contains 2 spherical otoliths. The velum is well developed. There are 4 narrow, straight, radial canals. The mature proboscis (Figure 10) is flask-shaped, and there are 4 simple curved lips. The gonads are developed upon the radial tubes at about one quarter the distance from the circular vessel to the proboscis. In the female the ova are very conspicuous. The entoderm of the tentacle bulbs and proboscis and of the radial tubes in the region of the gonads is bright yellow-green.

This species was extremely abundant in Charleston Harbor in the early part of September, 1897, and in June, 1898.

Oceania singularis, nov. sp.

Figs. 12, 13, Plate 4.

Specific Characters. — The bell is 2 mm. in diameter and the sides are quite straight and sloping. Near the apex of the bell there is a sharp constriction, above which there is a lens-shaped apical projection. There are 16 well-developed marginal tentacles with large, hollow, conical-shaped basal bulbs. The lashes of the tentacles are short and are covered with nematocyst cells. In addition to the 16 functional tentacles there are 16 intermediate rudimentary ones. There are 32 otocysts, each containing a single highly refractive spherical otolith. There are 4 straight radial tubes. The proboscis is quadrangular in cross-section, and there are 4 simple lips. The 4 gonads are developed upon the 4 radial canals near the base of the proboscis. 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.

A single specimen of this medusa was found in Newport Harbor, Rhode Island, on August 22, 1896.

OCTONEMA, HAECKEL, 1879.

Octonema gelatinosa, nov. sp.

Figs. 20, 21, Plate 6.

Specific Characters.—Young medusa? The bell is 3.5 mm. in diameter and somewhat flatter than a hemisphere. The gelatinous substance is quite thick. In the single specimen examined there were 4 tentacles with long hollow basal bulbs. These tentacles were about 2 times as long as the bell diameter. Within the entoderm of the inner side of each tentacle bulb there was a single dark-colored pigment spot. In addition to these long tentacles there were 12 rudimentary tentacle bulbs upon the bell margin. It is possible that these might have in time developed tentacles; in the specimen observed by us, however, they were very small and apparently rudimentary. A dark-colored pigment spot was found in the entoderm of each of these tentacle bulbs. There were 8 marginal clubs, 2 in each quadrant. A dark-brown entodermal pigment spot was situated at the base of each (see Figure 21). The velum was well developed. There were 4 straight radial canals upon the upper regions of which the gonads were situated. The proboscis was a simple tube with 4 simple lips. The color of the entoderm of the 4 large tentacle bulbs, and of the radial tubes in the region of the gonads was green.

A single specimen was found in Charleston Harbor, South Carolina, September 14, 1897.

ORCHISTOMA, HAECKEL, 1879.

Orchistoma tentaculata, nov. sp.

Fig. 19, Plate 5.

Specific Characters.—Young medusa: The bell was 6 mm. in height. The sides near the margin were slightly flanged outward. The gelatinous substance of the upper portion of the bell was very thick, so that the concavity was shallow. There were thirty-two marginal tentacles in various stages of development, the longest being about 1.5 times as long as the bell height. The tentacles possessed long, hollow basal bulbs. There were no marginal sense-organs. There were sixteen functional radial tubes, and sixteen others in process of development. The radial tubes were straight, and there were no traces of gonads upon them. The velum was well developed. The proboscis was flat and shallow, and there were 8 lips. The entoderm of the basal bulbs of the tentacles was of a delicate green. Only one immature specimen of this medusa has ever been seen; it was found at Newport, Rhode Island, August 18, 1896. The genus is closely related to *Melicertum*.

CTENOPHORÆ.

MNEMIOPSIS, L. AGASSIZ, 1860.

Mnemiopsis McCradyi,¹ nov. sp.

Figs. 22, 23, Plate 6.

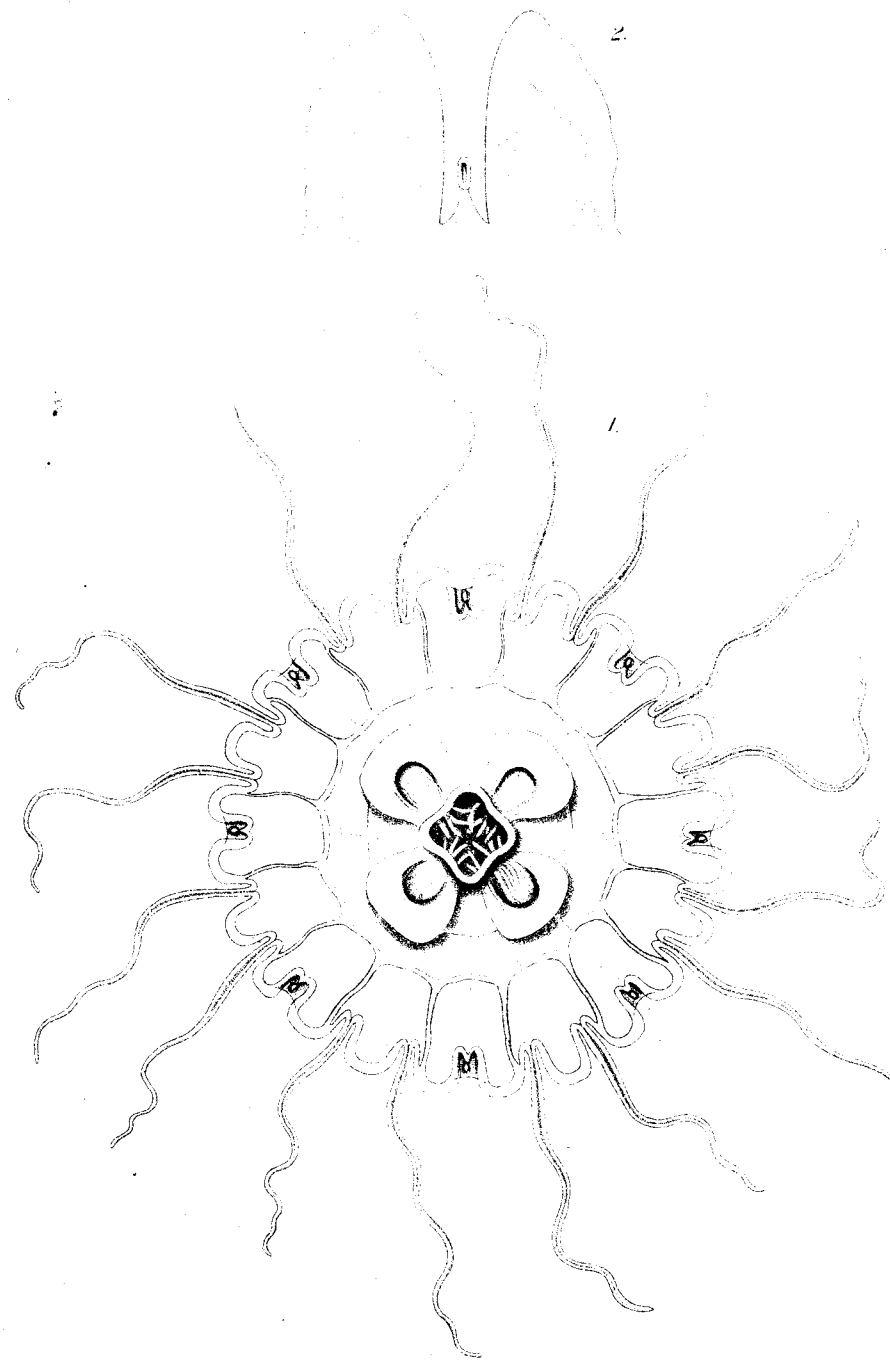
Specific Characters.—*Mnemiopsis McCradyi*: This species is closely allied to *Mnemiopsis Leidy*, A. Agassiz, but differs from it chiefly in the much greater complexity of the ramifications of the chymiferous tubes within the lappets; and also in the very decided amber color of the gelatinous substance of the animal. It is also remarkable that in this species the gelatinous substance of the body is of so tough a nature that the creature may be removed from the water by hand without suffering injury. Indeed, we know of no Ctenophore that is as resistant as this species. The animal is 100 mm. in length, our figures being natural size. There are eight longitudinal rows of ciliated plates. Four of these rows, that extend down the lateral lappets, are about twice as long as are the four others that lead from the apex to the auricles. The body is markedly compressed, the broad lateral axis, extending through the lappets, being about twice as great as the auricular axis. (Compare Figures 22 and 23.) The lateral lappets are about as long as the remaining portion of the body, and are similar in shape and size to those of *M. Leidy*, and much longer than in *M. Gardeni*. (See A. Agassiz, 1865; North American *Acalephæ*, Figures 20, 21 and 22, 23.) The apical sense-organ is found at the bottom of a deep cleft at the aboral pole of the body, and is similar in structure to that of *M. Leidy*. The chymiferous tubes that wind through the lateral lappets are of a decided purple color and their ramifications are very complex. The mature ova are similar in appearance to those of *M. Leidy*.

A single perfect specimen of this species was found in Charleston Harbor, South Carolina, September 15, 1897.

¹ This species is named in honor of Professor John McCrady in recognition of his important researches upon the medusæ of Charleston Harbor.

PLATE 1.

- Fig. 1. *Bathyluca solaris*, nov. gen. et sp. Oral view of the medusa.
Fig. 2. *Bathyluca solaris*. Oral view of one of the marginal sense-organs.



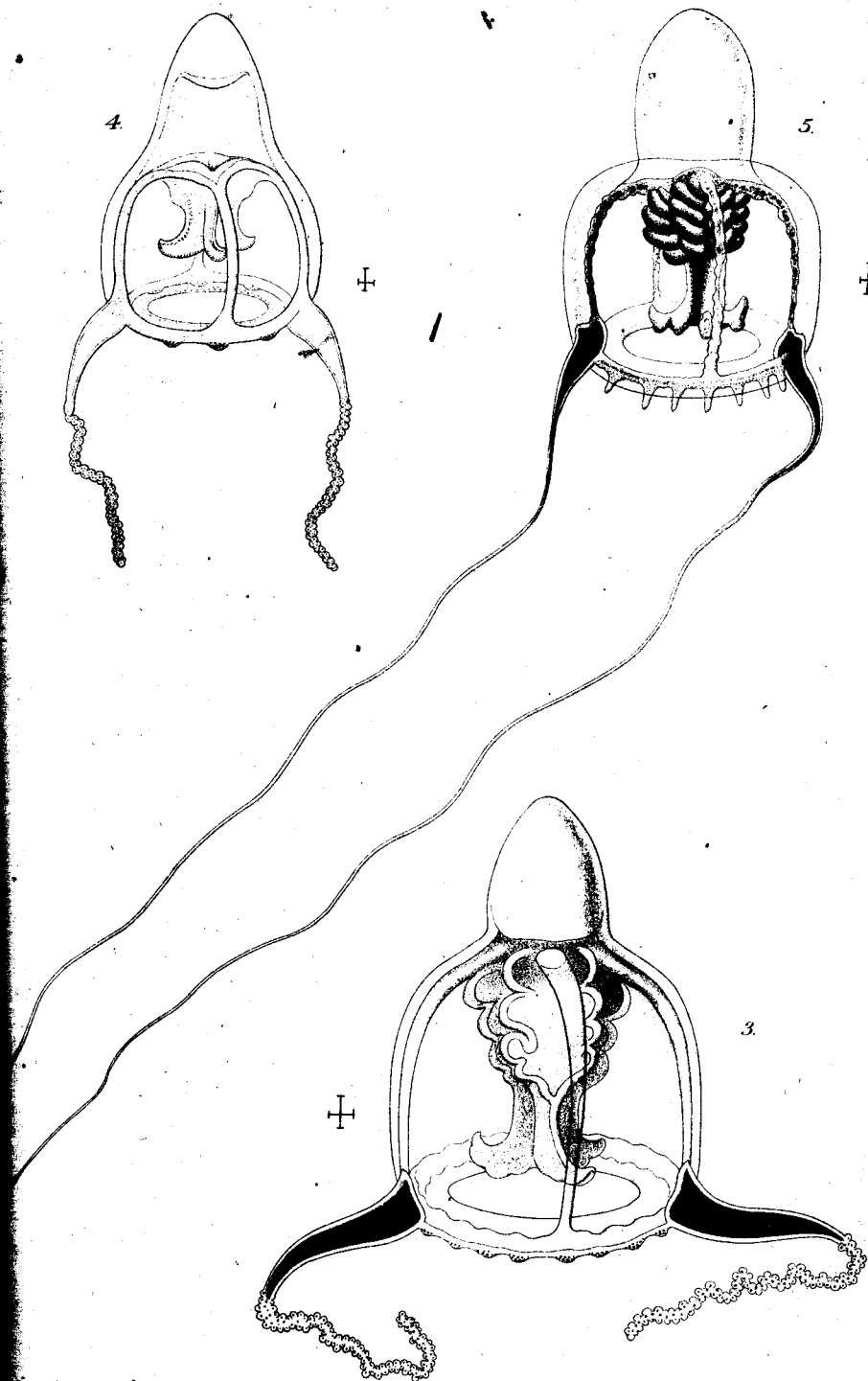


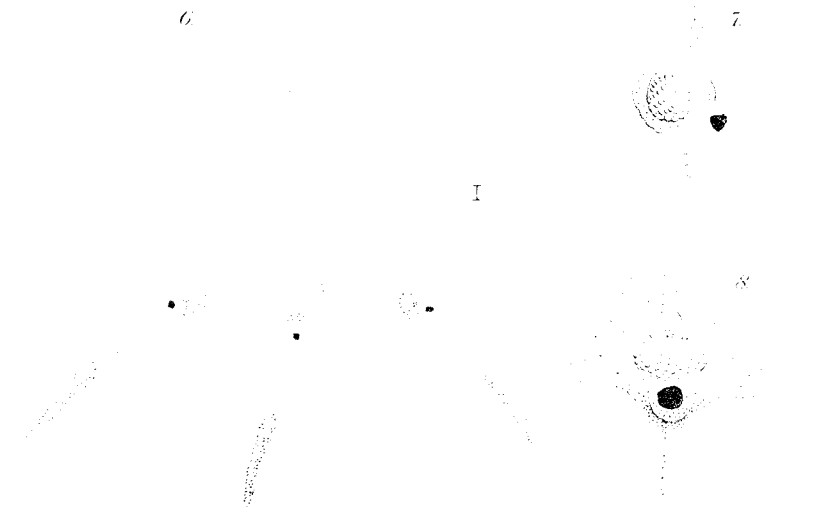
PLATE 2.

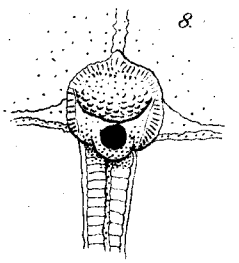
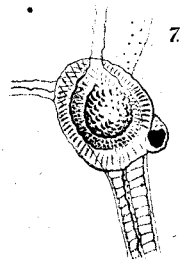
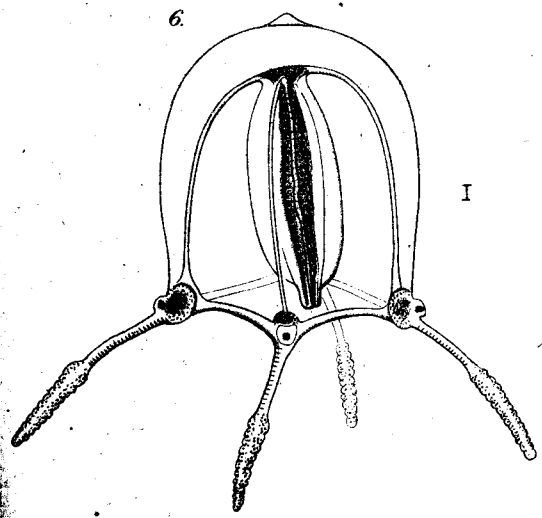
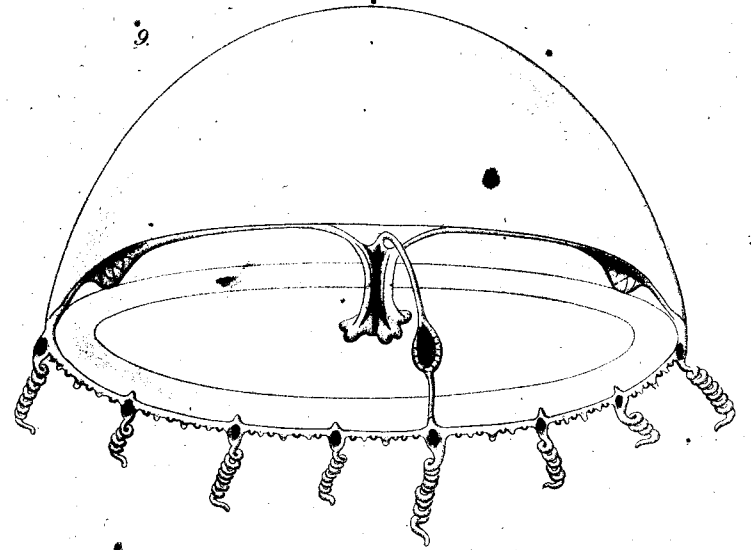
- Fig. 3. *Stomotoca apicata*, L. Agassiz. Male medusa.
Fig. 4. *Stomotoca apicata*. Female medusa.
Fig. 5. *Stomotoca rugosa*, Mayer = *Stomotoca apicata*, Fewkes, 1881.

MAYER. — Western Atlantic Medusæ.

PLATE 3.

- Fig. 6. *Syndictyon angulatum*, nov. sp. Side view of medusa.
 Fig. 7. *Syndictyon angulatum*. Side view of one of the tentacle bulbs, showing the ocellus.
 Fig. 8. *Syndictyon angulatum*. Surface view of tentacle bulb.
 Fig. 9. *Oceania carolinæ*, nov. sp.





MAYER. — Western Atlantic Medusæ.

PLATE 4.

- Fig. 10. *Oceania carolinæ*, nov. sp. Side view of proboscis and radial canal.
 Fig. 11. *Oceania-carolinæ*, nov. sp. View of bell margin.
 Fig. 12. *Oceania singularis*, nov. sp.
 Fig. 13. *Oceania singularis*. View of bell margin.
 Fig. 14. *Bougainvillia Gibbsi*, nov. sp. Mature medusa.
 Fig. 15. *Bougainvillia Gibbsi*, nov. sp. Young medusa.

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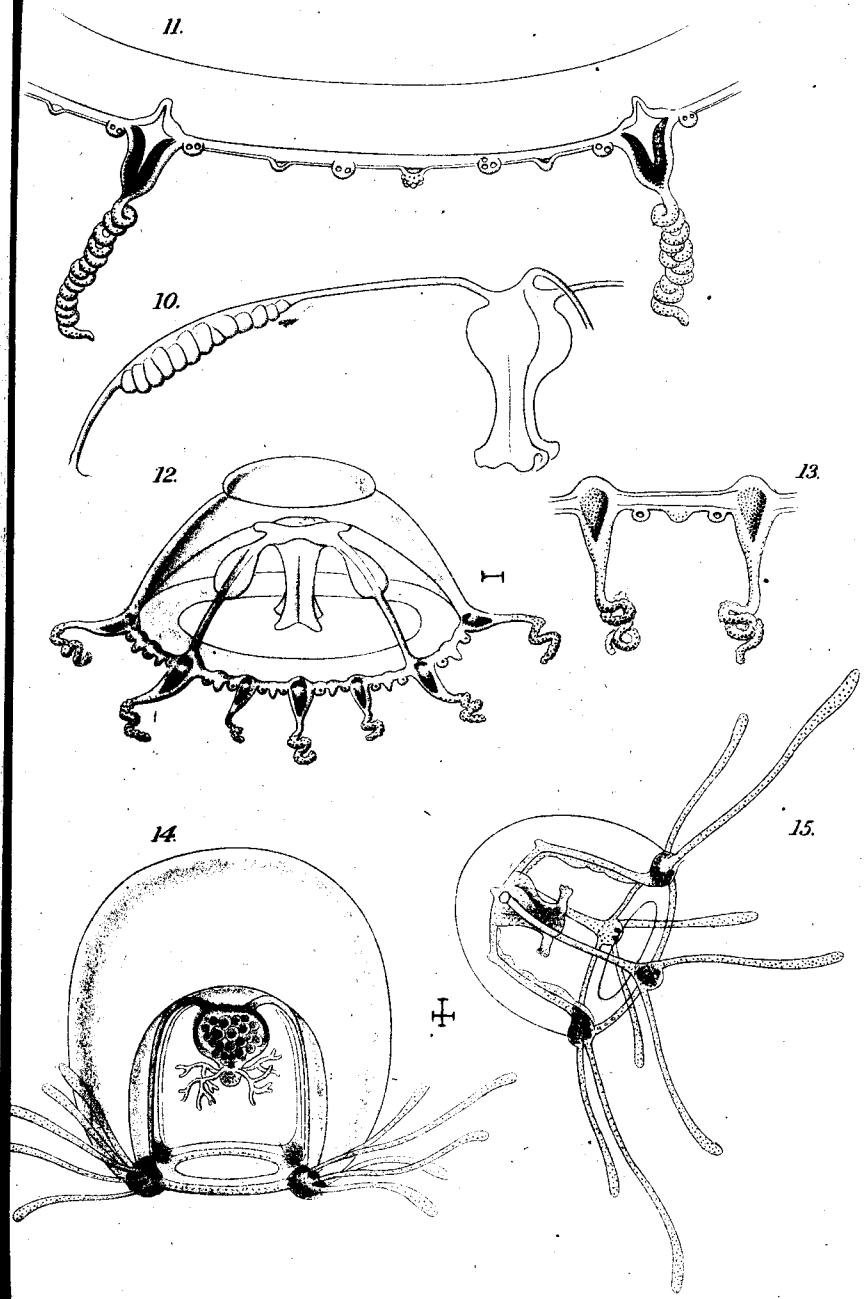


PLATE 5.

- Fig. 16. *Lymnorea borealis*, nov. sp.
Fig. 17. *Lymnorea borealis*, nov. sp. View of nematocyst capsules upon the oral tentacles.
Fig. 18. *Lymnorea borealis*. Side view of proboscis, showing the oral tentacles.
Fig. 19. *Orchistoma tentaculata*, nov. sp.

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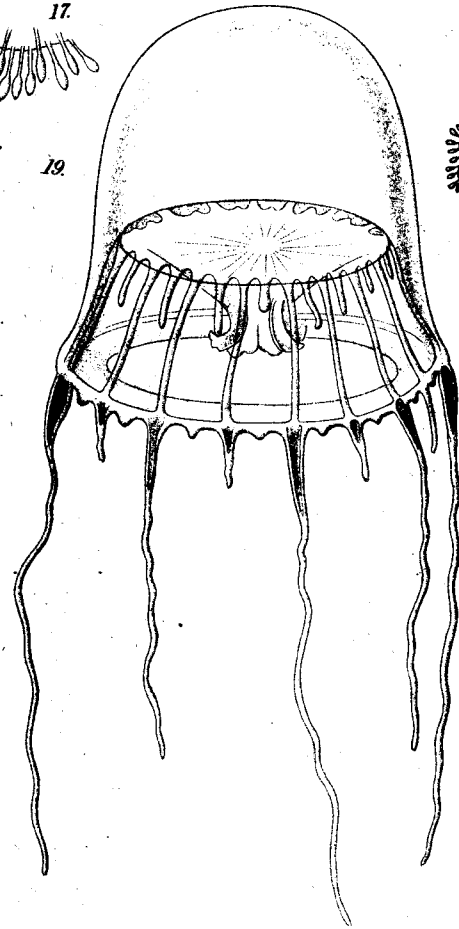
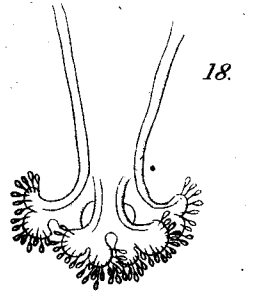
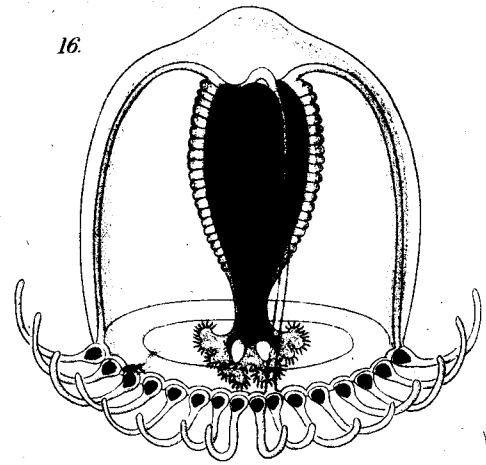


PLATE 6.

- Fig. 20. *Octonema gelatinosa*, nov. sp.
Fig. 21. *Octonema gelatinosa*, nov. sp. Marginal sense club.
Fig. 22. *Mnemiopsis McCradyi*, nov. sp. View of broad side. Natural size.
Fig. 23. *Mnemiopsis McCradyi*, nov. sp. View of narrow side. Uncolored figure, natural size.

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