

ART. XI.—*Contributions towards a knowledge of the MARINE INVERTEBRATE FAUNA,  
of the coasts of Rhode Island and New Jersey.*

By JOSEPH LEIDY, M. D.

The present communication consists of notices and descriptions of invertebrate animals observed during a visit of two weeks, the last August, to Joseph P. Hazard, Esq., on Point Judith, at the entrance of Naragansette Bay, Rhode Island; and of other invertebrate animals collected by Samuel Ashmead, Esq., or myself, in short visits to Absecom Beach, in the vicinity of Atlantic City, New Jersey, and to Beesley's Point, at the mouth of Great Egg Harbor, New Jersey.

PORIFERA.

1. *GRANTIA CILITIA*, Flemming. Sponge elliptical, with a single terminal orifice surrounded with a crown of spiculæ. Color yellowish white; length from two lines to three-fourths of an inch. Point Judith; attached to corallines, mytili, &c.

2. *GRANTIA BOTRYOIDES*, Flemming. Sponge branching irregularly; branches ovate or cylindroid, tubular, with a single terminal aperture. Structural spiculæ trident. Point Judith; with the preceding species.

POLYPI.

3. *CLAVA MULTICORNIS*, Johnston. (Pl. XI. figs. 33, 34.) Polypidom a very short, thin tube of attachment. Polype clavate, with the dilated portion roseate, the remaining portions translucent whitish. Tentaculæ up to twenty. Ova attached in clusters by means of a pedicle below the tentaculæ. Length of polypes up to two lines. Point Judith; in shaded pools between tides, attached to barnacles, the rocks, &c.

Although I found numerous individuals of this polype, I saw none greater than the measurement above given; whereas, the european *Clava multicornis* is stated to exceed half an inch in length. If this is a constant difference, most probably others will be found on comparison sufficient to characterise the american *Clava* as a distinct species. In all the specimens examined I observed a polypidom in the form of a small cup enclosing the basis of attachment, as seen in figures 33, 34.

4. *HYDRACTINIA ECHINATA*, Johnston. (Pl. XI. fig. 35.) Polypidom crustaceous; brown, furnished with simple and compound spines. Polypes long clavate, translucent white; with the head obtuse and furnished with an alternating circle of from six to eighteen cylindrical tentaculæ. Ovigerous polypes smaller than the others, sur-

rounded with a many-lobed head, and having attached to the sides numerous ovigerous capsules, of various sizes, containing from one to five ova. Length of polypes up to one-fourth of an inch. Abundant at Point Judith and at Beesley's Point, investing the shells occupied by the hermit crabs.

EUCORYNE, Leidy. Polypidom, a rooted, branching, corneous tube with a soft axis. Polypes terminating the branches of the polypidom, non-retractile, clavate, furnished with a circle of long, cylindrical tentaculæ, and one or more circles of short tentaculæ with globular tips.

5. EUCORYNE ELEGANS, Leidy. (Pl. X. figs. 1-5.) Polypidom alternately branching, adhering by a coarse reticular root, and growing in profuse branches three or four inches in length; trunk and branches shining black, and annulated at their origin; branchlets yellow, and annulated at their origin and termination. Polypes up to three-fourths of a line long, clavate, translucent white, with the dilated portion encircled with two red bands. Tentaculæ colorless, in two or three circles: first or basal circle twelve in number, filiform, as long or longer than the body; second and third circles of six in each, cylindrical and ending in globular extremities. Quite abundant at Point Judith, adhering to corallines, and other fuci, mytili, &c., below low tide.

Gærtner,\* Van Beneden,† Hassal,‡ and Johnston§ represent *Coryne* as having the tentaculæ terminating in globular extremities and irregularly distributed, while *Eudendrium* is represented as possessing only a circle of filiform tentaculæ. Such being the case, the polype, above described, would characterise a genus intermediate to *Coryne* and *Eudendrium*. Gosse|| has, however, represented two polypes, which he calls *Coryne cerberus* and *Coryne stauridii*, each having a circle of simply filiform tentaculæ, and a second of those with globular tips. As an examination of *Eucoryne elegans* shows the two kinds of tentaculæ to have a different arrangement in structure, the two species just named either do not belong to the genus *Coryne*, or all the species of the latter possess filiform tentaculæ, and others with globular tips, which I suspect actually to be the case, when the genus *Eucoryne* would cease to exist.

*Eucoryne elegans* is an exceedingly beautiful object, on account of the profuseness of its development, its graceful branching, and varied coloring. I observed many bunches four inches in length, but the main branches do not measure more than three inches; the addition of length in the branches, being due to the successive origin of the latter from stems of corallines, or other elevated objects of attachment.

The root of the polypidom is a coarse, tortuous, black fibre, reticulated upon the object of attachment. Sometimes an ascidia is imprisoned by the net-work, but more frequently it embraces the stems of corallines, or entangles masses of minute mytili.

\* Pallas, Spicilegia Zoologica.

† Rech. sur l'embryol. des Tubulaires.

‡ Ann. and Mag. of Nat. Hist. vol. vii.

§ A History of the British Zoophytes.

|| A Naturalist's Rambles on the Devonshire Coast, pl. xiv. figs. 4-6; pl. xvi. figs. 1-5.

The principle trunks of the polypidom are nearly straight, and they give off alternating branches, provided with from one to half a dozen branchlets. The trunks are black, and are annulated at their commencement, for a short distance after giving off the branches, and at their termination. The branches have the same color and character of annulation as the parent trunks. The branchlets are ochre-yellow, and annulated at their commencement and termination, or occasionally throughout; and frequently they give off secondary branchlets.

The polypes have the familiar form of the nine-pin, and are translucent white, with two purplish red bands encircling the body at the base of the first two circles of tentaculæ. The stomach of the animal is pink, and is visible through the translucent parietes of the body, between the red bands. The head of the polypes is conical, but in the expansion of the mouth is frequently observed to assume a cup shape.

At the base of the polypes there is situated a radiating circle of twelve narrow, cylindrical tentaculæ, about one line in length, and capable of retraction, inflection, or complete reflection. The neck of the polypes is surrounded by two circles, each of six, comparatively short, cylindrical tentaculæ, with large globular tips.

The long tentaculæ of *Eucoryne elegans* are composed of an axis of large, nucleated cells, surrounded with a delicate muscular sheath, and enveloped in a thin, ciliated epithelium. Beneath these tentaculæ, extending their entire length, and enveloping the tips, there is a stratum of nettling cells. The short tentaculæ have the same structure as the others, except that the nettling cells are accumulated entirely at their extremities, and thus give to these their characteristic globular form.

The nettling cells of *Eucoryne* vary in size, and present the same structure as the principal ones of the fresh water Hydræ. When the cells are entire they appear as oval capsules containing at their fundus a hemispherical mass of matter, which in some instances has appeared to me to consist of a coiled thread, as represented in figure 6, plate X. Above this mass or coil is a narrow oval capsule, within which is a style, the point of which slightly projects from the summit of the nettling cell. When the latter has emitted its thread, it appears partially collapsed, and from its summit projects an irregular cone with four barb-like processes at the sides, and the thread protruded from the apex, as represented in figures 5, 7.

As in other compound polypes the soft structure of the animals is continued as an axis throughout the polypidom. This axis contains numerous nettling cells, as large and as well developed as those of the tentaculæ. What can be their office in this position?

*Eucoryne elegans* produces medusa-like buds, in numbers of one to four, situated just above the position of the first circle of tentaculæ. Very frequently a pair of these buds become fully developed at the same time, and then appear larger than the parent.

They are attached by a narrow pedicle, are oval in form, and white in color, with four longitudinal bands of purplish red. They have four short, conical tentaculæ and measure about half a line in length by one-third of a line in breadth.

In one instance, I found a small bunch of *Eucoryne elegans*, in which the polypes had only two circles of tentaculæ: the long cylindrical ones and a circle of the short ones.

Since writing the foregoing, Mr. Ashmead has given to me several dried specimens of *Eucoryne elegans*, from Great Egg Harbor. The bunches are not so profuse as those of Point Judith, but one of them has a branch six inches in length.

6. LAOMEDEA GELATINOSA, Lamouroux. Small polypidoms attached to *Mytilus edulis*, *Laminaria saccharina*, the rocks, &c. Point Judith.

7. LAOMEDEA DICHOTOMA, Lamouroux. (Pl. XI. fig. 36.) Polypidom very much branched; branches alternate, annulated at their commencement, the larger ones brown, the smaller ones light-yellow; branchlets annulated throughout, or at their commencement and termination, from one to three times the length of the polype cells; the latter campanulate, with an even margin. Ovarian cells axillary, pedicled, two or three times the length of the polype cells, urn-shaped, with the pedicles annulated. Found abundantly, growing in profuse bunches, three inches in length, attached to a submerged wreck on Absecom Beach. Specimens obtained by Mr. Ashmead.

The netting cells of the tentaculæ of *Laomedea* are numerous, and are arranged in circles. They are elliptical in form, often curved, and minute; measuring from .0067 mm. to .0089 mm. long by .0022 mm. broad; and they contain a central style extending from one pole of the cell half through its length. These cells, of which two are represented in figure 8, plate X, I saw at no time emitting threads.

8. CAMPANULARIA VOLUBILIS, Lamarck. Point Judith.

9. CAMPANULARIA DUMOSA, Flemming. Point Judith. I found small specimens of what I suspect to be this and the preceding species, but had not the opportunity of carefully examining their characters.

10. SERTULARIA. Polypidoms, with opposite, tubular cells, the mouth divergent, growing to about three-fourths of an inch in length, are very abundant at Point Judith, attached to the roots of *Fucus vesiculosus* and *F. nodosus*, to the surface of the rocks beneath these fuci, and to mytili, but I did not ascertain the species to which they belong.

11. SERTULARIA CUPRESSINA, Lin. Found abundantly, thrown up on Absecom Beach. Some of the bunches measure six inches in length.

12. *ASTRANGIA ASTRÆFORMIS*, M. Ed. et Haime, An. des Sc. Nat. 1849, 181; *Astrangia Danæ*, Agassiz, (non M. Ed. et Haime), Proc. Amer. Assoc. 1850, 69. Polypidom encrusting, flat or lobed, or pedicled and lobed. Polype cells short, approximate, fused together at their bases, cylindrical when free, subpolygonal when crowded, externally slightly costate. Calices infundibular. Columella slightly developed. Partitions up to thirty-five in number, slightly exserted, narrow, with their margin oblique and serrated and their sides denticulated. Polypes cylindrical, projecting up to half an inch in length, translucent white, brown, red, or green; tentaculæ colorless, twenty-four in number, elongated conical, with rounded tips, situated in an alternating circle; mouth oval, situated at the summit of a conical proboscis. Coral masses up to two inches in diameter. Point Judith. Found attached to rocks just below low tide.

The polypidom of *Astrangia astræformis* was first described by Milne Edwards and Haime, in the Annales des Sciences Naturelles for 1849. The living coral was first discovered by Agassiz who dredged it from a depth of nine fathoms off Gay Head in Martha's Vineyard Sound.\* At Point Judith I observed it in position attached to the rocks a little distance below the lowest tide mark. It is especially interesting from the fact that it is the only coral which has been discovered on the eastern shore of the United States. Dead specimens have long been known, and the cabinet of our Academy contains a number of them, among which is one attached to a fragment of a *Fulgur*, from the coast of South Carolina.

Finding the living *A. astræformis* afforded me an opportunity of examining its filiferous capsules. These are especially abundant in the tentaculæ, and in certain white cords of the interior of the body. The function of the cords just mentioned is yet unknown. I frequently observed them extruded from wounds of the body of *A. astræformis*. When detached they will spontaneously roll into a close coil; and are composed of filiferous capsules arranged in a radiant manner around a central cellular axis, enveloped in a delicate, actively vibrating ciliated epithelium.

The filiferous capsules of *A. astræformis* are of two principal varieties. The first variety consists of oval, or ovoidal cells, about .05 mm. long by .0155 mm. broad, containing a spirally wound thread, as represented in figures 11, 12, plate X. The second variety consists of smaller cells; those of the tentaculæ measuring about .045 mm. by .0067 mm., and those of the white cords .03 mm. by .0112 mm.; and they contain besides a spirally wound thread, a style extending from one pole to about the centre of the cells, as represented in figures 9, 10.

Both kinds of filiferous capsules, under certain circumstances not readily explained, eject their contained threads with an astonishing degree of rapidity, and in so doing the threads are absolutely turned inside out, as was first noticed by Agassiz,† and sub-

\* Proc. Am. Assoc. 1850, 69.

† Proc. Am. Assoc. 1850.

sequently by Gosse,\* and remain attached to the emptied cells as long extended tubes. From the smaller cells the style is also extruded, and then appears as a more expanded portion of the thread, with which it is continuous at one end and with the capsule at the other, as seen in figures 15, 16. An attentive examination of the extruded thread exhibits a more complicated structure than would have been suspected, and as remarked by Agassiz, who first detected the peculiar arrangement, its exact character is exceedingly difficult to ascertain and requires the utmost power of the microscope to analyze. In the case of the larger capsules a spiral arrangement is readily distinguishable, extending the entire length of the extruded thread. This arrangement in some instances appeared to me to depend upon minute ciliæ, which project at right angles from the thread, and apparently pursue a spiral course, as described by Agassiz, and as represented in figure 13; but in other instances, it appeared to me as if the thread during its eversion from the capsule, assumed a spiral course within the portion preceding it, and that the thread externally was encircled at regular intervals with non-vibrating ciliæ, as represented in figure 14.

In the case of the smaller capsules the extruded style appears as a tube much dilated beyond its original calibre, narrowed at the extremities, and longer than the cell which contained it, so that it appears to have been folded within itself. From the distal extremity of the stylous tube projects the everted thread, which at times appeared simple, but at other times appeared to possess a spiral arrangement, like the coarser thread of the larger capsules. The tube derived from the style also presents a spiral arrangement, apparently dependent upon long ciliæ pursuing a spiral course as represented in figure 16, or upon a twisting in the tube as represented in figure 15.

13. *ACTINIA MARGINATA*, Lesueur. Body when contracted, in the form of the segment of a large sphere; when expanded, cylindrical; brown in color with longitudinal bands of brighter brown. Tentacular disk deeply folded, translucent brown. Tentacles very numerous, short, elongated conical, from one-sixth to half an inch in length, brown tipped with white, sometimes with a median ring of white, and not unfrequently the white altogether absent. Mouth nearly circular, surrounded with an irregularly lobate, bright orange or reddish brown lip.

This species is abundant at Point Judith. In one position, beneath an overhanging rock, a short distance from Mr. Hazard's residence, I observed a group in the highest state of development. Some of the individuals measured four inches across the tentacular disk.

Var. *ambrea*. Attached to fuci I frequently observed small specimens of an *Actinia*, two or three lines in diameter, and of a translucent ambreous appearance, which I suspected to be the young of *A. marginata*.

\* The Devonshire Coast.

Var. *salmonea*. I found two specimens of an anemone of the same form as that of *Actinia marginata*, about an inch in diameter, and of a bright salmon color, which I suppose to be only a variety of the latter species. It was attached to large mytili, appeared to be more active than the undoubted *A. marginata*, and when irritated ejected jets of water from large pores of the body, a phenomenon I did not observe in the more ordinary variety.

The filiferous capsules of *Actinia marginata* are numerous in the tentaculae, but especially so in the white cords of the interior of the body. (Pl. X, figs. 17, 18). They are elliptical in form, and measure about the .06 mm. in length by the .004 mm. in breadth; and they contain a spirally coiled thread and a style extending from one pole about two-thirds through the centre. The ejected contents of the capsules present two different forms. In the one case the style assumes the appearance of a spindle-shaped tube, several times its original length, apparently having the extruded thread of the capsule coiled within it and having on its exterior long ciliary appendages, as represented in figure 21. In the other case the extruded style assumes the appearance of a long narrow tube, apparently with the projected thread partly coiled within it and partly everted from its distal extremity as represented in figures 19, 20.

14. *ACTINIA NEGLECTA*, Leidy. Body when closed, obpyriform, or shortly cylindrical; when expanded, cylindrical, about an inch in length by one fourth of an inch in breadth, smooth, translucent olive green. Mouth elliptical, with the lip composed of six greenish white lobes. Tentacles numerous, up to half an inch in length, brighter olive green than the body. A single specimen was found in the mud of a sound, in the vicinity of Atlantic City.

#### POLYZOA.

15. *MEMBRANIPORA PILOSA*, Johnston. The stellate variety is very abundant at Point Judith, encrusting the ruffled borders of *Laminaria saccharina*. It is also found encrusting *Chondrus crispus*, the shells of *Mytilus edulis*, etc. In all the specimens I observed, the cells possessed four lateral spines and a posterior spine, and this in no case was developed to the dimensions which would give it the name of a bristle.

16. *ESCHARINA LINEATA*, Leidy; *Flustra lineata*, Lin. (Pl. X. fig. 22.) Polypidom crustaceous, circular. Polype cells oblong oval; mouths large, with about ten inclined spines on each side. Found by Mr. Ashmead, on pieces of anthracite coal from a wreck, at Beesley's Point.

17. *ESCHARINA PEDIOSTOMA*, Leidy; *Lepralia pediosstoma*, Hassal. (Pl. X. fig. 23.) Polype cells, six-sided oval, closely punctured; mouth subterminal, quadrate with rounded angles, and slightly constricted at the sides. On shells. Beesley's Point. Obtained by Mr. Ashmead.

18. *ESCHARINA VARIABILIS*, Leidy. (Pl. XI. fig. 37.) Polypidom encrusting, spreading in circles; simple or lobate. Polype-cells exceedingly variable: square, oblong square, tubular, oval, ovoid, or flask-formed; arranged alternately, semi-alternately, in advancing series, or opposite; more or less convex, or flat, or with a large spheroidal dilatation in advance of the mouth; usually procumbent, occasionally semi-imbricated, and rarely vertical; when young glistening white, thin, and covered with perforated mamillæ; when old dull white, thick, and reticulated. Mouth terminally lateral or median, usually to the left, circular, with an elevated border, emarginated inferiorly or laterally, with or without a short tubercle below the emargination. Anal aperture triangular, oblique, elevated, protected by a triangular corneous valve, usually situated to the right of the mouth, occasionally to the left, more rarely beneath, sometimes conjoined with the mouth, and not unfrequently entirely absent. Polypes brownish orange color. Found at Point Judith encrusting rocks and shells; obtained by Mr. S. Ashmead at Great Egg Harbor, N. J., encrusting oyster shells, serpulæ, &c.

This species of *Escharina* may have been already described under half a dozen names, but I found it no easy task to determine which they are. The *Celleporidæ* are subject to great variety of form, and require much study before the true species can be ascertained.

19. *CELLULARIA FASTIGIATA*, Blumenb. Polypidom branching dichotomously. Polype cells in alternating pairs, elongated conoidal, with a short spine supero-externally; mouth large, elliptical, with an entire margin. Found in small bunches attached to fuci. Obtained by Mr. Ashmead, in Great Egg Harbor.

20. *ALCYONIDIUM? PELLUCIDUM*, Leidy. (Pl. X. fig. 24.) Polypidom translucent white, attached by narrow fasciculated bases, which are extended in a procumbent manner and then expand into wedge-shaped masses, upon the free, flat surfaces of which the polypes are clustered. Polypes with bright orange colored tentaculæ. Attached to rocks, mytili, sponges, &c., at Point Judith; abundant.

The masses of *A. pellucidum* from the white, fasciculated points of attachment to the broad free surfaces are up to an inch in thickness. Although I preserved a number of specimens in fresh sea-water for some days, I could not induce the polypes, if they were such, to protrude from their cells, and I only had the opportunity of examining them in their retracted condition as represented in figure 24, plate X.

21. *BOWERBANKIA GRACILIS*, Leidy. (Pl. XI. fig. 38.) Polypidom delicate, creeping, branching, white. Cells cylindrical, erect, about one-third of a line in length, without appendages at their orifice, the margin of which is retractile with the inhabitant of the cell. Polype provided with eight ciliated arms. Intestine with a strong gizzard. Point Judith.

This species differs from *Bowerbankia densa* in having a less number of tentaculæ and in having no spines to the cells. From *Flurella* our polype differs in possessing a strong gizzard. The animal corresponds in its form very closely with the figure given by Hassal in the seventh volume of the An. and Mag. of Nat. History for 1841, Pl. viii. fig. 4.

22. *PEDICELLINA AMERICANA*, Leidy. (Pl. X. fig. 25.) Polypidom delicate, creeping, white, with erect branches about one-third of a line in length, smooth and without abrupt dilatations. Polype campanulate, white, with a wide, crenated border marked with fine concentric lines. Tentaculæ cylindrical, twelve or more in number. Found attached to the roots of *Laminaria saccharina*, at Point Judith.

23. *VALKERIA PUSTULOSA*, Johnston. Polypidom growing in profuse, wide spreading bunches up to two or more inches from the root of attachment. Stems flexuose; alternately branching at the flexures. Cells oval, arranged in semi-spiral clusters up to a half a line in length and situated about the same distance apart. Found by Mr. Samuel Ashmead, in Great Egg Harbor, N. J.

#### DENDROCÆLA.

24. *MONOCELIS AGILIS*, Leidy. Body elongated elliptical, anteriorly and posteriorly subacute, black or fuliginous. Eye brown. Length one line, breadth one-eighth of a line. Found actively creeping on *Mytilus edulis*. Point Judith.

25. *PLANARIA FREQUENS*, Leidy. Body spatulate, posteriorly convex, anteriorly narrowed; head auriculate. Eyes two, reniform, distant. Color above black, beneath grey. Length one to two lines, by one-sixth to two-fifths of a line in breadth. A small, quite active, and remarkably abundant species, found beneath stones, near high tide mark. Point Judith.

26. *NEMERTES SOCIALIS*, Leidy. Body long, linear, flattened, anteriorly subacute, posteriorly obtuse or subacute; usually black above, and brownish ash colored beneath, occasionally brownish ash colored with the anterior extremity tipped with black. Head not constricted from the body. Eyes two to four pairs, arranged longitudinally on each side. Length up to six inches, by one-third of a line in breadth. Very abundant, often in masses, about the roots of corallines between tides. Point Judith.

27. *MECKELIA INGENS*, Leidy. Body long, tape-like, narrowed posteriorly, cream colored. Head obtusely angular, depressed; lateral fissures deep. Generative aperture a longitudinal fissure. Described from a specimen preserved in alcohol, and measuring in its present condition, fifteen inches in length, eight lines in breadth and three and a half lines in thickness. It was obtained by Mr. Chas. C. Ashmead, from an oyster bed, at Beesley's Point, New Jersey, and when alive measured more than a yard in length.

## NEMATOIDEA.

PONTONEMA, Leidy. Body capillary, narrowing towards the extremities. Head continuous with the body, obtuse, pointed, with short cirri. Eyes none, caudal extremity obtuse. Generative aperture near the middle of the body. Œsophagus long, cylindrical; intestine cylindrical. Ovaries two. Allied to *Amblyura*. Marine.

28. PONTONEMA VACILLATUM, Leidy. Body cylindroid, with minute cirri anteriorly in addition to those around the head. Tail short, obtuse, incurved. Color brownish white. Length to three-fourths of an inch, by one-fifth of a line in thickness. Found abundantly beneath stones, between tides, at Point Judith.

29. PONTONEMA MARINUM, Leidy. Body cylindroid. Tail long, narrow, blunt. Color white. Length to three lines. Obtained from an oyster bed, in about six feet water, in one of the sounds near Atlantic City, New Jersey.

## ENTOZOA.

30. GREGARINA ———. Body elliptical; head oblate spheroidal. Length .225 mm., breadth .072 mm. From the intestine of *Nereis denticulata*.

31. LEUCOPHRYS CLAVATA, Leidy, (Journ. Acad. Nat. Sc. ii. 50.) In the visceral cavity of *Lumbriculus tenuis*.

32. LEUCOPHRYS COCHLEARIFORMIS, Leidy. (Pl. XI. figs. 62, 63.) Body curved cochleariform. Length .135 to .18 mm. From the intestinal canal of *Lumbriculus tenuis*.

I found four individuals of this remarkable species in a dozen of the *Lumbriculus*. While within the intestine it appeared quiescent, but when set free it moved about actively, by means of its long vibrating cilia, with the bowl-end forward.

## ANNULATA.

NARAGANSETA, Leidy. Body cylindrical, narrowed posteriorly; no lateral pinnae; segments numerous; those anteriorly furnished with a few, simple, cylindrical, lateral tentaculæ; anterior segments with four rows of simple setæ in fascicles; succeeding few segments with two rows of simple setæ, and two rows of cochleariform podal spines; posterior segments with four rows of cochleariform spines. Upper lip distinct, conical, eyes none.

33. NARAGANSETA CORALII, Leidy. (Pl. XI. figs. 46—48.) Body black, brownish or yellowish black, ninety segments in an individual, one inch and a quarter in length. Eight comparatively short tentaculæ on each side of the anterior six segments; three to the first segment; first two the shortest, the third the most robust; orange in color, and except the most robust one, tipped with black. Anterior ten segments with four rows of simple setæ in fasciculi of five; the succeeding four segments with two rows

of simple setæ, and two rows of cochleariform podal spines; and the following segments with four rows of cochleariform podal spines in fasciculi of four to six. Point Judith.

This curious worm lives in tubes within the dead portions of *Astrangea astræformis*. It protrudes the anterior portion of its body with the orange colored antennæ. The latter are contractile, from one to four lines long, and with the exception of the third or most robust one on each side, are tipped with black, as if to be subservient to the impressions of light. Its setæ are quite simple, as represented in figure 47, and are about the fifth of a line in length. The podal spines consist of a long style ending in a bowl, like that of a spoon, as represented in figure 48.

For the new genus, of which the worm just described is the type, I have adopted the Indian name Narragansett, being that of the bay, on the shores of which the animal was first discovered.

34. *SABELLA OCULIFERA*, Leidy. (Pl. XI. figs. 55—61.) Body demicylindroidal, posteriorly narrowed, one hundred and thirty-eight setigerous segments to an individual one and a half inches in length. Tentaculæ twenty-four in number, arranged in the four-fifths of a circle, decreasing in length towards the extremities of the latter, reflected, supplied with about forty-eight secondary tentaculæ, arranged in pairs; two or three black eye spots on the back of the longer tentaculæ. Two rows of setæ in fascicles of about six, and two rows of podal hooks, in transverse series of ten. Setæ in the third to the ninth segment inclusive, in major part spade-shaped with a short subulate point; of the following segments all like the latter. Podal hooks in the first to the tenth segments inclusive, bird-like in form, associated with opposing spade-like podal spines. Podal hooks of the following segments smaller than those anteriorly. Worm living in tough tubes composed of mud, and found in a horizontal position partially concealed beneath masses of *Astrangia astræformis*. Point Judith.

The plumose tentaculæ with the dark eye specks on their back render this worm a beautiful object. The surface of the tentaculæ is everywhere covered with vibrating cilia. By transmitted light the blood appears of a bright green color.

35. *CLYMENE URCEOLATUS*, Leidy. Body cylindrical, composed of segments of various lengths, twenty-six in number including the head and caudal appendage. The anterior eight segments the shortest; the seven preceding the last ten the longest; those in advance of the third, and intervening to this and the sixth and the ninth, without setæ. Head obliquely truncated, concave, with a thin acute margin. Mouth inferior triangular. Caudal appendage large, urceolate, with the margin entire. Color reddish brown. Length five inches; breadth one and a half lines. Raked from the mud in a sound about six feet deep, near Atlantic City, N. J.

36. *CLYMENE TORQUATUS*, Leidy. Body cylindrical, with a membranaceous collar at the fifth segment. Head abruptly truncated, concave, with a thin membranous border emarginate below and on each side. Mouth inferior, at the summit of a double ringed papilla. Length? (the posterior portion of the only specimen found, is either wanting or the body terminates very abruptly.) The anterior fourteen segments measure one inch and a half in length by one line in breadth. Found with the preceding species.

37. *PECTINARIA AURICOMA*, Grube. (*P. Belgica*, Grube, Gould; *P. Grœnlandica*, Grube, Stimpson)? Body composed of nineteen segments including the head and tail. Paleæ eight to sixteen in a fasciculus, according to age. Twenty-eight denticulations to the frontal border. Length up to an inch and a half. Point Judith and Great Egg Harbor.

38. *TEREBELLA ORNATA*, Leidy. (Pl. XI. figs. 44, 45.) Body with about one hundred segments, of which forty-five are setigerous. The anterior ten ventral plates transversely oblong square, those succeeding abruptly diminished in size. Tentaculæ numerous; branchiæ in three pairs. Color brownish red. Length to four inches. Lives in tubes of mud. Found at Point Judith, Atlantic City, and Beesley's Point.

I found the young of this species at Point Judith. It had the appearance of that of *Terebella nebulosa*, Mont., represented in fig. 24, pl. 3, of M. Edward's Rech. Anat. et Phys. etc. The single specimen obtained was three lines long. There were twelve tentaculæ, twenty-five eyes around the head, and twenty-eight segments to the body, of which sixteen were setigerous.

39. *SPIROBIS SPIRILLUM*, Lamarck. On *Chondrus crispus*. Point Judith.

*TORQUEA*, Leidy. Body cylindrical, narrowed at the extremities. Tentaculæ numerous, attached laterally to the head, capable of very great extension and contraction by the passage to and fro of blood corpuscles from the cavity of the body. Eyes none. Setæ in two rows, three to twelve in a fasciculus, extremities lanceolate. Podal hooks in two rows, short, from twelve to forty in each transverse series, supported at the edge of a laminar process stiffened with fine, simple setæ.

40. *TORQUEA EXIMIA*, Leidy. (Pl. XI. figs. 51, 52.) Body soft, blood red. Tentaculæ very numerous, capable of very great extension by the propulsion into them of the bright red corpuscles, with which the cavity of the body is filled. Setæ anteriorly in fasciculi of twelve, posteriorly from three to six. Podal hooks commencing at the eighth segment, from twelve to forty in each series. Worm half an inch to an inch in length, with from forty to sixty segments. Obtained from mud and sand below low tide mark. Point Judith.

This worm is remarkable for its softness, its blood red color, its numerous extensi-

ble tentaculæ, and its numerous podal hooks. It is capable of slowly progressing, by means of its tentaculæ. In the process, these are extended by having forced into them the bright red corpuscles which fill the visceral cavity of the body, they then attach themselves by their extremities to the surface upon which the animal is lying, and by subsequent contraction the body is dragged after them.

41. *CIRRHATULUS FRAGILIS*, Leidy. (Pl. XI. figs. 39—43.) Body cylindrical, narrowed towards the extremities, reddish orange color, posteriorly greenish. Mouth inferior, circular; upper lip conical. Eyes two. Cirri numerous, orange colored; the first pair, commencing at the second setigerous segment and the most robust. Setæ in two rows, simple, in fasciculi of three to five. Podal hooks in two rows, five to eight in each fasciculus, sigmoid, bifid at the free extremity. Intestine cylindrical, constricted. Ovaries on each side of the intestine, extending four-fifths the length of the body. Worm three lines long, by one-fourth of a line broad, and composed of forty annulations. Found under stones, on the shores of Point Judith.

42. *LUMBRICONEREIS SPLENDIDA*, Blainville. Body cylindrical, copper-red and strongly iridescent. Upper lip conical; mouth round, with a short proboscis armed with an inferior pair of dental plates, as well as a complex dental apparatus above and within. Eyes four. Caudal segment furnished with a pair of minute cirri. Lateral tubercles with from six to ten setæ in two fasciculi. Setæ simple, distally curved and grooved and ending in a subulate point. Length up to eighteen inches, with as many as 420 segments. Raked from oyster beds, in Great Egg Harbor, N. J., where it is abundant. The animal corresponds closely with De Blainville's description of a specimen, the country of which, he remarks, he did not know.

43. *EUNICE SANGUINEA*, Montagu. Body compressed, cylindroid, brownish red, iridescent. Head with two oval dorsal lobes. The five antennæ nearly equal. An eye situated between the outer two antennæ. Branchiæ blood red, commencing at the sixteenth segment and continuing until within about forty segments of the posterior extremity. Setigerous tubercles of the anterior sixteen segments containing two spines, the remainder containing four. Setæ in two fasciculi to each tubercle, simple and compound, the latter consisting of a scalpel like blade received into a forked handle. Length to five inches, with two hundred, and twenty segments. Found with the preceding.

44. *GLYCERA AMERICANA*, Leidy. (Pl. XI. figs. 49, 50.) Body cylindrical, brownish red. Upper lip short, with hardly perceptible antennæ. No branchial appendages except three minute dorsal papillæ upon the pinnæ. The latter five-lobed, armed with two spines and four fasciculi of simple and compound setæ, thirty to forty in number to each pinna. Simple setæ linear, awned; compound setæ composed of a

furcate handle and a long linear lanceolate blade. Length up to five inches, with a breadth of one and a half lines, and about 240 setigerous segments, between each of which is a secondary ring. Found at Point Judith, Atlantic City, and Great Egg Harbor. It is most like the *Glycera capitata* Oersted, but nevertheless is a different species.

45. NEREIS DENTICULATA, Stimpson. Abundant at Point Judith, R. I., and on the shores of Great Egg Harbor, N. J.

46. SIPHONOSTOMUM AFFINE, Leidy. Body cylindro-fusiform, minutely papillated, with four rows of fasciculi of setæ; those of the anterior three segments directed forward; those of the first segment one-third of an inch long; those of the third segment one line long. Length to three inches, by two lines broad, with 80 segments. Obtained by Mr. Ashmead, from Beesley's Point, N. J.

47. LEPIDONOTE ARMADILLO, Leidy. (*Aphrodita armadillo*, Bosc., *Lepidonote punctata*, Oersted, Stimpson; *Polynoe squamata*, M. Ed., Gould)? (Pl. XI. fig. 54.) Body of twenty-four segments, with twelve pairs of elytræ completely covering the back. Elytræ fringed externally, spotted with variously colored papillæ. Head round, with two pair of eyes, three anterior tentaculæ and three lateral tentaculæ; the middle of the anterior and the first of the lateral tentaculæ the longest, the former with two eye-like black spots, the latter with none; all the others with a single black eye-like dilatation or spot. Dorsal and anal cirri with black eye-like dilated spots. Length an inch and a quarter, by three lines wide. Point Judith and Great Egg Harbor. The *Lepidonote squamata* is described as having five tentaculæ; in *L. armadillo* I in no case could find less than nine, as represented by figure 54.

48. SIGALION MATHILDÆ, Aud. et Edw. (Pl. XI. fig. 53.) Body composed of over 200 segments, with over 150 pairs of elytræ completely covering the back. Head with five antennæ, of which the outer ones are the longest and most robust, the middle one is next in length, and the second is the shortest. Eyes four, those anterior nearly concealed by the bases of the second antennæ. Setæ of the dorsal pinnæ simple; those of the ventral pinnæ compound. Length over five inches, by two and a half lines in breadth. Described from a specimen, with the posterior extremity lost, obtained by Mr. Ashmead, at Beesley's Point, N. J.

49. OPHELIA SIMPLEX, Leidy. Body fusiform, above convex, below flattened, anteriorly and posteriorly acute, reddish brown. Mouth inferior, round. Cirri commencing at the third and ceasing about the twentieth segment. Setæ in two lateral approximated fasciculi, simple, linear. Length two-thirds of an inch, with about 30 setigerous segments. Taken from below low tide at Point Judith.

50. LUMBRICULUS TENUIS, Leidy. (Pl. XI. fig. 64.) Body cylindrical, linear, bright

red, composed of sixty or more segments; ninth to the eleventh segment inclusive, slightly thickened; two generative apertures on each side of the ninth segment. Four rows of podal hooks, anteriorly five or six in each fasciculus, posteriorly three or four in each fasciculus. Length up to an inch and a half, by the fourth of a line in breadth. Abundant about the roots of grasses on the shores of a sound on Point Judith.

## CRUSTACEA.

51. OCYPODE ARENARIA, Say. Great Egg Harbor.
52. GELASIMUS PUGILATOR, Desmarest. Absecom and Great Egg Harbor; in immense numbers, at margins of salt meadows, or upon salt flats.
53. GELASIMUS MINAX, Le Conte. From a brackish spring at Great Egg Harbor, and at Dennis Creek, N. J. Discovered by Mr. Ashmead.
54. SESARMA CINEREA, Say. Absecom and Great Egg Harbor.
55. SESARMA RETICULATA, Say. Absecom and Great Egg Harbor.
56. PINNOTHERES OSTREUM, Say. Point Judith, Absecom, and Great Egg Harbor.
57. PINNOTHERES MACULATUM, Say. Point Judith. Frequent in *Mytilus edulis*. Say gives the muricated Pinna of our coast as the animal which protects this parasitic crustacean. His description also closely applies to the parasite of our *Mytilus edulis*, which is a curious fact as the same species of *Mytilus* of Europe contains the *P. mytilorum*, which is quite distinct from the *P. maculatum*.
58. PLATYCARCINUS IRRORATUS, M. Edw. Point Judith; Great Egg Harbor.
59. PLATYCARCINUS SAYI, Dekay. Point Judith; Great Egg Harbor.
60. PLATYONICHUS OCELLATUS, Latr. Point Judith; Newport; Great Egg Harbor.
61. LUPA DICANTHA, M. Edw. Point Judith; Absecom; Great Egg Harbor.
62. LUPA MACULATA, Say. Great Egg Harbor. Obtained by Mr. Ashmead.
63. CARCINUS MÖENAS, Leach. Point Judith; Newport.
64. PANOPEUS HERBSTII, M. Edw. Newport; Great Egg Harbor.
65. PANOPEUS WURDMANII, Gibbes. Delaware Bay. Obtained by Mr. Ashmead.
66. HYAS COARCTATA, Leach. Great Egg Harbor. Obtained by Mr. Ashmead.
67. HIPPA TALPOIDEA, Say. Point Judith; Absecom; Great Egg Harbor.
68. PAGURUS POLLICARIS, Say. Newport; Point Judith; Great Egg Harbor.
69. PAGURUS LONGICARPUS, Say. Newport; Point Judith; Great Egg Harbor.

70. CRANGON SEPTemspinosus, Say. Great Egg Harbor. Obtained by Mr. Ashmead.
71. GEBIA AFFINIS, Say. Great Egg Harbor. Mr. Ashmead.
72. SQUILLA EMPUSA, Say. Newport. Obtained by Samuel Powell, Esq.
73. PYCNOGONON ———? Point Judith.
74. CAPRELLA ———? Point Judith.
75. CALIGUS ———? Attached to the fin of a shark. Great Egg Harbor. Obtained by Mr. Ashmead. This and the preceding two crustaceans I have not had the leisure to determine.
76. POLYPHEMUS OCCIDENTALIS, Lam. Point Judith; Absecom; Great Egg Harbor. In the latter locality in immense numbers.
77. LIGIA ———? Point Judith.
78. LIMNORIA TEREBRANS, Leach. Absecom.
79. IDOTEA IRRORATA, M. Edw. Point Judith; Absecom; Great Egg Harbor. Numerous varieties, and in great abundance in the first mentioned place.
80. IDOTEA TRILOBA, Say. Great Egg Harbor. Obtained by Mr. Ashmead.
81. ORCHESTIA GRYLLUS, Gould. Point Judith. Abundant.
82. CEPON DISTORTUS, Leidy. (Pl. XI. figs. 26—32.) *Female*. Body compressed and distorted ovoid, white; abdominal scales completely concealing the pinkish white ova. Head prominent, provided with a pair of large oval disks situated posteriorly. Mouth minute, at the summit of a trilobate papilla. Antennæ very small and indistinct. Divisions of the thorax posteriorly strongly costate. Feet in seven pairs, curved forward and downward, ending in a short recurved, abortive hooklet. Abdomen deeply segmented. Branchial appendages lanceolate, fringed. *Male*. Body long and slender, divided into fourteen segments. Head subrotund. Internal antennæ short and robust, three jointed; joints spinous. External antennæ long, seven jointed; the first two joints spinous, the others bristled. First joint of the thorax transversely oblong, the remainder depressed, pyriform in outline. Feet in seven pairs, the antepenultimate joint spinous, the penultimate joint broad and with the claw recurved. Abdominal segments depressed, pyriform in outline, each provided with a pair of peculiar ventral appendages, and, except the fifth one, with a lateral irregular pigment cell. Caudal segment round, with a pair of divergent appendages. Length of female four lines, breadth three lines; length of male one and a quarter lines. Found in the branchial cavity of *Gelassimus pugilator*, at Atlantic City.

The genus *Cepon* was first described by Duvernoy, in the fifteenth volume of the *An. des Sciences Naturelles*, but the individual he indicates as being the male of *Cepon typus* is evidently the female of another species. *Cepon distortus* is not a very abundant parasite, for after having accidentally found a specimen, in searching for others, I destroyed fifty fidler crabs without obtaining a second. The parasite produces no deformity, visible externally, of the animal it infests. The male was found in the embrace of the female, as commonly observed in the isopodous crustacea.

In making out the foregoing list of crustacea, I have availed myself of the aid of Dr. Bridges' knowledge of this class of animals.

## CIRRIPEDIA.

83. ANATIFA STRIATA, Brug. 84. ANATIFA LÆVIS, Brug.

85. ANATIFA DENTATA, Brug.

86. BALANUS BALANOIDES, Stimpson. The four species of cirripeds have been observed at Point Judith, Atlantic City, and Beesley's Point.

## RADIATA.

87. ASTERACANTHION RUBENS, Müll. et Trosch. Very abundant at Point Judith.

88. ECHINUS GRANULATUS, Say. Abundant at Point Judith.

## REFERENCES TO PLATES X. AND XI.

Fig. 1.—A branch of *Eucoryne elegans*, the size of nature.

Fig. 2.—*Eucoryne elegans*. A portion of a stem with three branchlets and polypes. a, young bud; b, medusa bud fully developed; c, young medusa bud. Magnified.

Fig. 3.—A polype of *Eucoryne elegans*, with two fully developed medusa buds (b) and a young one (c).

Fig. 4.—*Eucoryne elegans*. Extremity of one of the filiform tentaculæ with the filiferous cells (a) placed inferiorly and at the tip, and with an axis of large nucleated cells (c). Highly magnified.

Fig. 5.—*Eucoryne elegans*. Extremity of one of the superior tentaculæ with the globular end filled with filiferous cells (a), a few of which (b) are represented as separated and with their threads ejected. c, central axis of large nucleated cells, surrounded with muscular fibres and a ciliated epithelium.

Fig. 6.—A filiferous cell of the *Hydra*, resembling those of *Eucoryne*. Highly magnified.

Fig. 7.—A filiferous cell of the *Hydra*, with the style and thread emitted.

Fig. 8.—Two styliiferous cells, highly magnified, from the tentaculæ of *Laomedea*.

Figs. 9—16.—Filiferous cells of *Astrangia astræformis*, highly magnified.

Fig. 9.—Filiferous cell with a style; from the tentaculæ.

Fig. 10.—Filiferous cell with a style; from the white cords of the interior of the body.

Figs. 11, 12.—Filiferous cells; from the white cords.

Figs. 13, 14.—The same as figs. 11, 12, with the apparent structure of the partially emitted thread.

Figs. 15, 16.—Filiferous cells, with the thread partially and the style entirely emitted, exhibiting their apparent structure.

Figs. 17—21.—Filiferous cells, from the interior white cords of the body of *Actinia marginata*.

Figs. 17, 18.—Filiferous cells with styles.

Fig. 19.—One of the varieties of filiferous cells with the thread and style emitted.

- Fig. 20.—The same as fig. 19, more highly magnified, exhibiting the apparent arrangement of the emitted structure.
- Fig. 21.—A second variety of the filiferous capsules, with the apparent arrangement of the emitted structure.
- Fig. 22.—Cells of *Escharina lineata*. Magnified.
- Fig. 23.—Cells of *Escharina pediostoma*. Magnified.
- Fig. 24.—A retracted polype of *Alcyonidium? pellucidum*. Magnified.
- Fig. 25.—*Pedicellina americana*. Magnified.
- Fig. 26–32.—*Cepon distortus*. Highly magnified.
- Fig. 26.—Posterior view of the male.
- Fig. 27.—Head of male, with the antennæ.
- Fig. 28.—A right foot of the male.
- Fig. 29.—The abdominal segments of the male, with peculiar appendages (branchial?).
- Fig. 30.—Dorsal view of the female.
- Fig. 31.—Ventral view of the female.
- Fig. 32.—A foot of the female.
- Fig. 33.—*Clava multicornis*. Magnified.
- Fig. 34.—*Clava multicornis*, with bunches of ova. Magnified.
- Fig. 35.—*Hydractinia echinata*. a, neuter individuals; b, ovigerous individuals. Magnified.
- Fig. 36.—Polypidom of *Laomedea dichotoma*.
- Fig. 37.—Cells of *Escharina variabilis*.
- Fig. 38.—*Bowerbankia gracilis*.
- Fig. 39–43.—*Cirrhatulus fragilis*.
- Fig. 39.—The worm, having many of the cirri broken off.
- Fig. 40.—Side view of the head.
- Fig. 41.—Extremity of one of the cirri, more highly magnified.
- Fig. 42.—Fasciculus of setæ.
- Fig. 43.—One of the podal hooks.
- Fig. 44.—One of the setæ of *Terebella ornata*.
- Fig. 45.—One of the podal hooks of *Terebella ornata*.
- Fig. 46.—Anterior extremity of *Naraganseta corallii*.
- Fig. 47.—One of the setæ of *Naraganseta corallii*.
- Fig. 48.—One of the podal hooks of *Naraganseta corallii*.
- Fig. 49.—Pinna from the anterior third of *Glycera americana*.
- Fig. 50.—Pinna from the posterior third of *Glycera americana*.
- Fig. 51.—Two views of one of the setæ of *Torquea eximia*.
- Fig. 52.—Podal hook of *Torquea eximia*.
- Fig. 53.—Head of *Sigalion Mathildæ*.
- Fig. 54.—Head of *Lepidonote armadillo*.
- Fig. 55.—Tentaculæ of *Sabella oculifera*. a, eye-spots.
- Fig. 56.—One of the tentaculæ of *Sabella oculifera*. a, eye-spots.
- Figs. 57, 58.—Two forms of setæ of *Sabella oculifera*.
- Fig. 59.—One of the posterior podal hooks of *Sabella oculifera*.
- Figs. 60, 61.—Associated setæ and podal hook from the anterior part of the body of *Sabella oculifera*.
- Figs. 62, 63.—*Leucophrys cochleariformis*.
- Fig. 64.—A podal hook of *Lumbriculus tenuis*.



