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ART. XLIII.—*Brief Contributions to Zoology from the Museum of Yale College.* No. XXXII.—*Results of Dredging Expeditions off the New England Coast in 1874;* by A. E. VERRILL.

DURING the summer of 1874 Prof. S. F. Baird, U. S. Commissioner of Fish and Fisheries, established the headquarters of the Commission at Noank, Conn., a village situated on Fisher's Island Sound, a few miles east of New London. A large party of naturalists, who were invited to take part in the investigations of the commission, availed themselves of the unusual facilities there offered for the study of marine life. The investigations of the invertebrate animals, in general, were placed in charge of the writer, but several others, especially Mr. S. I. Smith, Prof. A. Hyatt, and Mr. S. F. Clark, took a prominent part in this work. Extensive dredging operations were carried on from this station, by means of the U. S. steamer "Blue-light," under Commander L. C. Beardslee, U. S. N. These dredgings extended from 30 to 40 miles from Noank, in different directions; westward to the mouth of the Connecticut River; southward to Gardiner's and Peconic Bays and the waters south of Montauk Point; and eastward to the banks several miles south and east of Block Island, so as to connect with the dredgings of 1871. Temperatures of the surface and bottom waters were taken at more than ninety stations, and dredgings were made in a still larger number of localities.

A very large and interesting collection of invertebrate animals was secured. Among these are over 100 species new to the fauna of southern New England. Most of these are northern species, but many are undescribed. A large collec-

tion of algæ was made by Prof. D. C. Eaton and others. Prof. Baird, with several assistants, took direct charge of the fishes and fisheries, and made many interesting discoveries. He also obtained a valuable collection. A more detailed account of these investigations will be given in a future article.

During part of the month of September the Superintendent of the U. S. Coast Survey offered Prof. Baird the use of the steamer *Bache*, Capt. Platt commanding, to continue the dredging operations off the coast of Maine. This work was put in charge of Dr. A. S. Packard, as in 1873, and he was assisted by Mr. C. Cooke and Mr. Robert Rathburn. They made dredgings at about forty stations in the Gulf of Maine, off the coasts of Maine and New Hampshire, at various depths down to 125 fathoms. These localities may be conveniently grouped in five series.

- a. Several dredgings on hard bottoms, near the Isles of Shoals and on Jeffrey's Ledge, in 25–51 fathoms (see Nos. 44, 46, 48, 77, 78).
- b. An interesting series of dredgings on Cashe's Ledge, about 90 miles off Mt. Desert I., in 27 to 39 fathoms, hard and rocky bottoms.
- c. One dredging on a new bank, discovered by Capt. Platt, in 32 fathoms, sandy bottom (No. 69).
- d. Several dredgings in 36–48 fathoms, muddy bottoms, between Cape Ann and the Isles of Shoals (Nos. 38–41, and 78 in part).
- e. Numerous localities in 50 to 125 fathoms, muddy bottoms, including most of the localities not already mentioned, over a wide area, both east and west of Jeffrey's Ledge, and extending from No. 62, off Pemaquid, Me., to the deeper parts of the Gulf of Maine, south of Cashe's Ledge.

Hard bottoms.—The collections from the hard bottoms (included under *a*, *b*, *c*) are much like those from similar and adjacent localities explored in 1873, of which nearly complete lists were published in this Journal (vol. vii, p. 502, May, 1874). Cashe's Ledge, as before, proved to be a rich dredging ground, remarkable for large numbers of rare northern species. Locality 78, in 35 fathoms, near Jeffrey's Ledge, was, properly speaking, a mixed bottom, mud predominating; but the dredge brought up some stones and large quantities of masses of firmly consolidated ferruginous mud and sand, most of which were irregularly broken and curved pieces, but some had the form of large, slightly conical tubes, 3 to 6 inches in diameter, and 12 to 15 inches long, the walls often being an inch or more thick. These are probably old uninhabited tubes of *Cerianthus borealis*, which have become firmly consolidated by some chemical action. Upon these fragments of tubes numerous species of Bryozoa, Ascidians and Sponges had established themselves,

causing the collection from this place to resemble that of certain rocky bottoms.

Table of Stations in the Gulf of Maine, where dredgings and temperature determinations were made, in 1874.

Current No.	Date. Sept.	Hour.	Locality.	Nature of bottom.	Depth in fathoms.	Temperature.*		
						Air.	Sur-face.	Bot-tom.
38	2	12 M.	Thatcher's I. Light, about 10 miles south	Soft blue mud.	41	70° F.	66°	45°
39		1.38 P.M.	Do., about 13 miles south	Mud, -----	48	70	69	45.5
40		2.23 "	Do., 16 miles south	Blue mud, ---	43	70	69	47
41		3.00 "	Do., 18 $\frac{1}{2}$ miles south	Mud—rocks, -	36-27	70.5	69	45.5
42	3	11.35 A.M.	Boon I. Lt., 6 m. N.W. by W. $\frac{1}{2}$ W.	Brown mud, -	68	69.5	67	52.5
43		2.32 P.M.	Boon I., N. by E.; hotel on shoal S.W. by W. $\frac{1}{2}$ W.	Brown mud, -	43	75	65	47
44		5.00 P.M.	Star I., S.W.; Duck I., W.	Rocky, -----	25	75	67.5	51
45	4	0.50 "	Boon I., 12 $\frac{1}{2}$ miles W.N.W.	Soft mud, ---	88	65	67	40
46		2.28 "	Agamenticus Mt., N.W. by W. $\frac{1}{2}$ W.	Hard, sandy mud, -----	51	65	69.5	42
47		4.00 P.M.	Jeffrey's Ledge, near last,	Sand & gravel,	25	64	58.5	45.5
48		4.30 "	Near last, Agamenticus N. W. $\frac{1}{2}$ W.	Gravel, -----	36	64	56.5	47.5
49			Boon I., W.N.W. 27 miles,	-----	113	64	65	40
50		7.00 P.M.	Lat. 43° 01' 20", lon. 69° 45',	-----	100	60	56	40
51	5	2.15 A.M.	Lat. 42° 56', lon. 69° 08',	Mud & gravel,	105	60	55	41
52		5.10 "	Cashe's Ledge	Rocks & grav.	27	60	55	42
53		7.00 "	Cashe's Ledge	Soft mud, ---	73	63	55	42
54		8.24 "	Do. 3 $\frac{1}{2}$ miles N.W.	Mud, -----	110	61	61	42
55		2.00 P.M.	Do. 2 $\frac{1}{2}$ miles S.	Gravel, -----	40	60.5	65	43
56		2.50 "	Do. 1 $\frac{1}{2}$ miles S.S.E.	Gravel, -----	30	62	59	46
57		3.15 "	Near last	Rocky, -----	37	-----	-----	-----
57a		4.00 "	Near last	Rocky, -----	39	-----	-----	-----
58		7.00 "	Lat. 42° 03', lon. 69° 05',	Mud & gravel,	65	60.5	57	40
59		12.00 "	Lat. 43° 22', lon. 69° 17',	Mud, -----	92	61	55	41
60	6	4.00 A.M.	Lat. 43° 17', lon. 69° 24',	Mud and sand,	65	61	57	41
61		7.30 "	Boothbay, Me., harbor,	-----	5	64	58	51
62	7		Pemaquid Pt., 10 miles N.	Mud, -----	48	62	62.5	47
63		0.40 P.M.	Pumkin I., 4 miles N.E.	Brown mud, -	42	68	65	48
64		2.45 "	Pemaquid, 12 miles N.	Mud, -----	58	61.5	57	42.5
65		4.28 "	Monhegan I., 2 miles E by N.	Soft mud, ---	47	64.5	59	44
66	8	1.20 "	Do., 14 miles N.E. $\frac{1}{2}$ E.	Brown mud & gravel, ---	65	66	64	40
67		3.30 "	Seguin Lt., 19 miles N. by W.	Brown mud, -	86	68	64	40
68		6.00 "	Do. N.W.; near last,	Mud, -----	91	64.5	59	40
69		8.30 "	Lat. 43° 11', lon. 69° 35',	Sand, -----	32	64	60	46
70		11.00 "	Lat. 43° 03', lon. 69° 36',	Mud, -----	91	61.5	58	40
71	9	1.00 A.M.	Lat. 42° 55', lon. 69° 36',	Brown mud, -	96	61	58	40
72		4.03 "	Lat. 42° 57', lon. 69° 50',	" "	125	61	57	39.5
73		6.30 "	Lat. 42° 58' 30", lon. 70° 00',	" "	102	62	59	40
74		8.00 "	Lat. 43° 01', lon. 70° 09',	" "	88	62	60	39
75		9.30 "	Lat. 43° 02', lon. 70° 15',	" "	92	64	64	40
76		11.10 "	Lat. 43° 03', lon. 70° 25',	Mud & gravel,	51	64	63	42
77		1.30 P.M.	White I. Lt., 3 $\frac{1}{2}$ miles E. $\frac{1}{2}$ S.	Rocky, -----	33	69	65	44
78	12	12.00 M.	Agamenticus Mt., N.W. by N. $\frac{1}{2}$ N.	Blue clay, mud and sand, ---	35	61.5	60	43

* I am informed by Dr. Packard that the surface temperatures cannot be regarded as perfectly reliable, for they were taken in a bucket of water in which the bulb of the thermometer was not always submerged. All the water-temperatures were taken with a Miller-Casella thermometer (numbered 18491), which was left down from 5 to 10 minutes for bottom temperatures. Our experience shows that these instruments should be down 10 to 20 minutes to insure perfect accuracy.

The following list includes the species additional to those enumerated last year. Those from Cashe's Ledge are marked c; those from Jeffrey's Ledge, J; those from Capt. Platt's new bank (loc. 69), P; those from locality 78 are marked loc. 78.

Additions to the list of hard-bottom species.

Crustacea.

Hippolyte Phippsii.	c.	loc. 78.	Epimera cornigera.	loc. 78.
Diastylis quadrispinosa.	J.		Monoculodes, sp.	c.
Pardalisca cuspidata.		loc. 78.	Melphidippa, sp.	c.
Stegocephalus ampulla.	J.		Melita, two sp.	c.

Annelida.

Lagisca rarispina.	J.		Sabella neglecta?	J.
Nephtys circinata V.	J.		Spirorbis valida V.	loc. 78.
Grymæa spiralis V.	J.			

Gastropoda.

Bela cancellata.	J.		Diodora noachina, var.	
B. violacea.	c.		princeps.	c.
Aporrhais occidentalis.	J.		Onchidoris pallida.	c. J. J.
Trichotropis borealis.	c. J.		Dendronotus robustus V.	
Menestho albula.	c.		Philine quadrata.	c. J.
Adeorbis costulata.		J. loc. 41.		

Lamellibranchiata.

Neæra arctica.		P. loc. 69.	Cardium Islandicum.	J.
Thracia truncata.	c.		Nucula tenuis.	c. J.

Bryozoa.

Discofascigera lucernaria.	c. J.	loc. 78.	E. elegantula.	c. J.
Tubulipora serpens.	J.	loc. 78.	E. lævis (= <i>Porella</i> l Sm.)	c. J.
T. hispida (= <i>T. crates</i> St.)	J.	loc. 78.	Hippothoa vulgaris.	c.
T. incrassata.	J.	loc. 78.	H. divaricata.	J.
Diastopora hyalina.	c.	loc. 78.	Escharella porifera.	c. J. loc. 78.
D. hyalina, var. simplex.		loc. 78.	E. auriculata.	c. J.
Discoporella verrucaria.	J.	loc. 78.	E. Landsborovii.	c. J. loc. 78.
Cellularia scabra.	P.	loc. 78.	E. candida (St. sp.).	c. J.
C. Peachii.	c.	loc. 54.	E. solida.	c. J.
Bugula avicularia.	J.		= <i>Flustra solida</i> St., 1853.	
Flustra papyracea.	J.		= <i>Eschara palmata</i> Sars, 1862.	
Membranipora unicornis.	c. J.		Discopora scabra, v. plicata.	c. loc. 78.
M. unicornis, var. Americana.	J.		D. scabra, var. ovata.	loc. 78.
Lepralia spathulifera.		loc. 78.	D. coccinea.	c. J.
Eschara verrucosa.	c. J.		D. coccinea, var. ovalis.	c. J. loc. 78.
E. verrucosa, v. propinqua.	c. J.		D. Jacontini (= <i>Escharella</i> J.	
E. verrucosa, var. patens.	c. J.		Sm.).	c. J.

Echinodermata.

Crossaster papposus. c

Hydroida.

Gonothyraea hyalina.	c.	loc. 69.	Lafoëa gracillima.	c.
Clytia Johnstoni.	c. J.	loc. 69.	Halecium tenellum.	c.
Calycella plicatilis (Sars, sp.)	J.	loc. 46.	H. sessile.	loc. 69.

Muddy bottoms.—The dredgings on muddy bottoms agree closely with those of the previous year, as might be expected from the similarity of the localities, and their proximity. Most of the rare species previously obtained were again met with, so that for many species additional specimens of great interest were obtained. Thus a second specimen of *Pleurotomella Packardii* V. was dredged at loc. 54; and several of *Anachis Haliæti* at loc. 58 and 60; *Caridion Gordoni* and large specimens of *Stegocephalus ampulla* at loc. 54 and 58, etc. A fine new species of *Asterina*, with dark dorsal spots, occurred at locality 54.

The following list includes most of the additional species, not enumerated in the lists published last year in this Journal (vol. vii, p. 411), though quite a number found on some of the muddy bottoms, but belonging properly on hard ones, are here omitted.

List of additions to the fauna of the muddy bottoms.

Crustacea.

Hippolyte polaris.	loc. 54.	Ædiceros lynceus.	loc. 41.
H. Phippsii.	loc. 54.	Syrrhoë crenulata.	loc. 41.
Orangon boreas.	loc. 41.	Metopa, sp.	loc. 54.
Stenothoë peltata.	loc. 54.	Byblis Gaimardii.	loc. 38-40.
Tritropis aculeata.	loc. 58.	Ampelisca macrocephala.	

Annelida.

Eunoa nodosa.		Amphitrite Grayi.	loc. 72.
Euphrosyne borealis.		A. intermedia.	
Ancistria capillaris V.			

Gastropoda and Lamellibranchiata.

Astyris rosacea.	loc. 63.	Glycimeris siliqua.	loc. 72.
Diodora noachina, var. princeps.	loc. 51.		

Bryozoa.

Diastopora hyalina.	loc. 38-40.	Bugula flexilis V., sp. nov.*	loc. 54.
Membranipora unicornis.	loc. 40.	Eschara elegantula.	loc. 62-65.

* *Bugula flexilis*, sp. nov. Plate VII, figures 1, 2.

Several rather long, slender, flexible, dichotomously divided branches radiate from close to the point of attachment, making a stellate cluster. Zoœcia in two alternating rows, smooth, oblong, slightly swollen in the middle, with a short tooth or spine on the outer angle; aperture terminal, oblique, rounded or oval. Avicularia, on the front of the zoœcia, remarkably large, nearly as broad as the zoœcia and more than half their length, compressed, fusiform, tapering gradually to the point of attachment. East of St. George's Bank, 430 fathoms, 1872; off Casco Bay, 95 fathoms, 1873; Gulf of Maine, 110 fathoms, 1874.

Discopora nitida, sp. nov. Plate VII, figure 3. From Vineyard Sound and Long Island Sound.

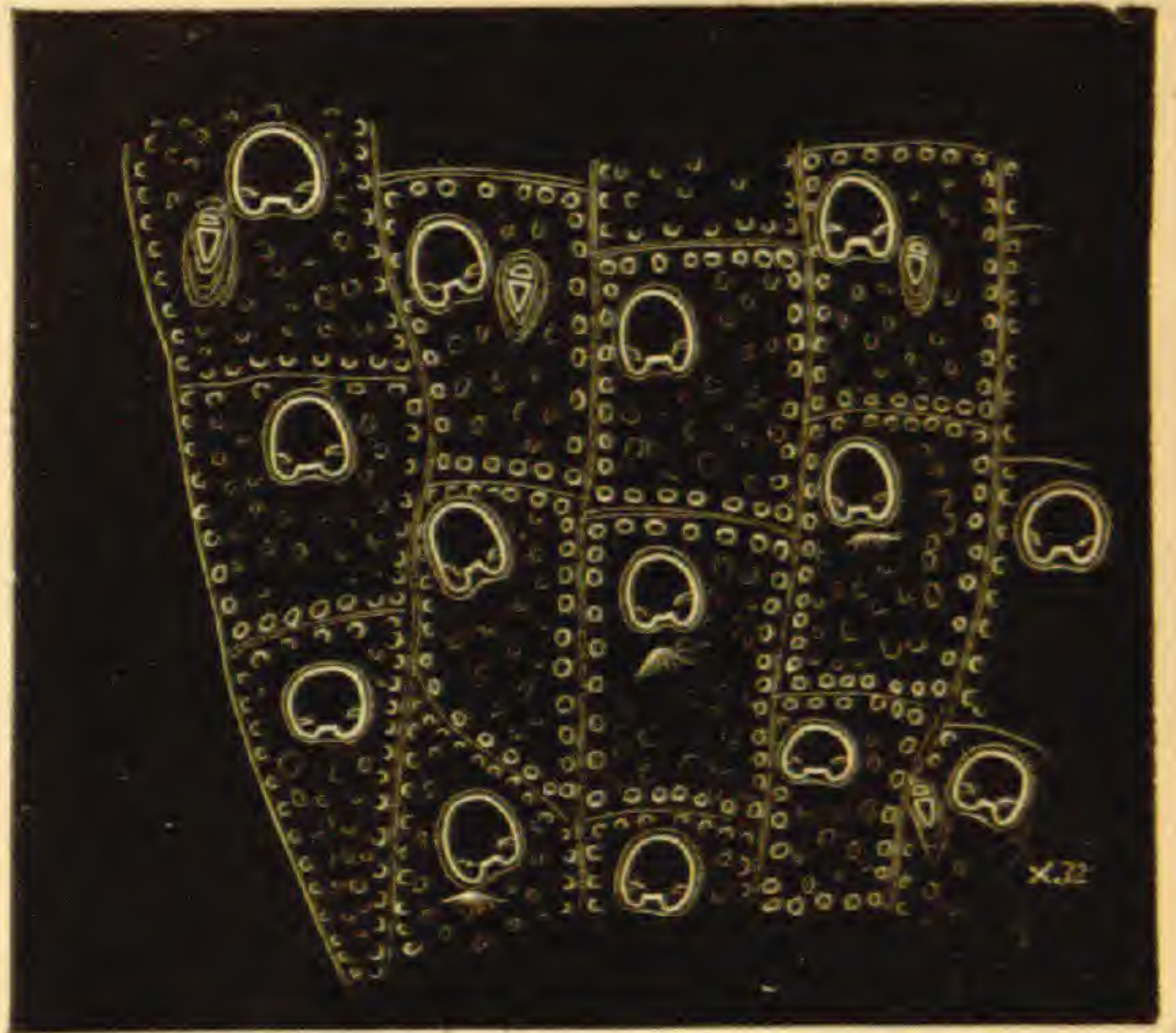
Easily distinguished by the very small apertures with elongated processes projecting inward from the sides; and by the acute lateral avicularia.

Lepralia Americana, sp. nov. Plate VII, figures 4, 5. = *L. Pallasiana?* V., in former papers. Long Island Sound to Beverly, Mass., low-water to 30 fathoms.

1



3



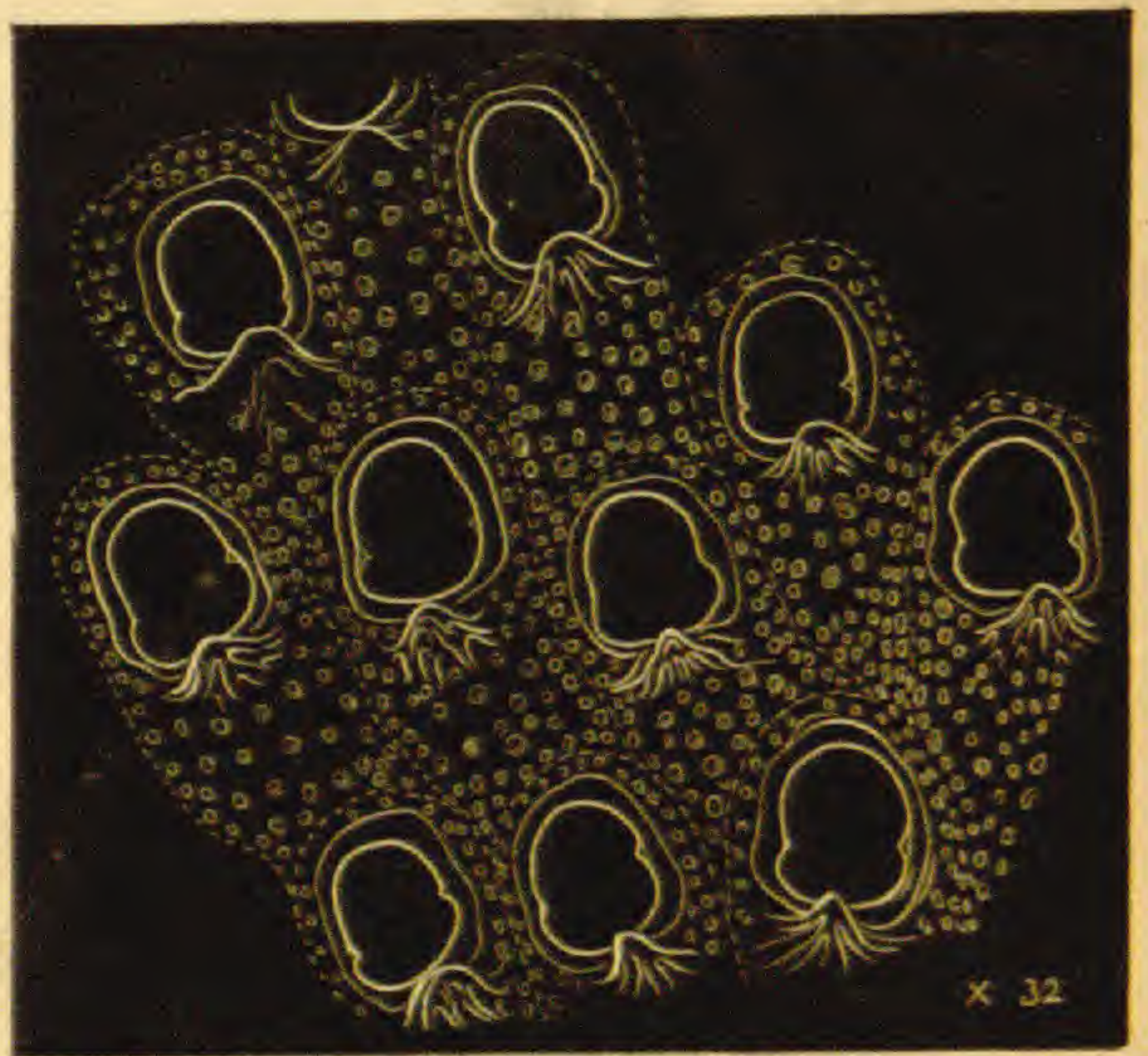
4



2



5



Figs. 1, 2, *Bugula flexilis* V.; 3, *Discopora nitida* V.; 4, *Lepralia Americana* V.; 5, the same without ootheca. Drawn, from nature, by A. E. VERRILL.