REPORT OF A DREDGING EXPEDITION OFF THE SOUTHERN COAST OF NEW ENGLAND, SEPTEMBER, 1899.

BY FREELAND HOWE, JR.

On July 29, 1880, the Fish Hawk left the builder's yard at Wilmington, Del., and proceeded to Newport, R. I., and after some preliminary dredging in the shallow water off the southern coast of New England started for the locality where the tile-fish had been discovered in May, 1879. The remarkable results of the work of September 4, September 13, and October 2, 1880, were published in the American Journal of Science, November, 1880, and created general comment among men of science, for it had been thought improbable that such a wealth of marine life existed on this portion of the sea bottom. During the following year the Fish Hawk made seven excursions to the edge of the continental elevation, and Professor Verrill wrote:

It is probable that the remarkable richness of the fauna in this region, both in the number of species and in the surprising abundance of the individuals of many of them, is due very largely to the unusual uniformity of the temperature enjoyed at all seasons of the year at all those depths that are below the immediate effects of the atmospheric changes. The region under discussion is subject to the combined effects of the Gulf Stream on one side and the cold northern current on the other, together with the gradual decrease in temperature in proportion to the depth. The vast quantities of free-swimming animals continually brought northward by the Gulf Stream and filling the water, both at the surface and bottom, furnish an inexhaustible supply of food for many of the animals inhabiting the bottom, and probably directly, or indirectly, to nearly all of them. (Report U. S. Fish Commission, 1882, p. 642.)

In the spring of 1882 many forms of life on this portion of the sea bottom were almost exterminated, although the Fish Hawk found an abundance of animal life at certain localities. The following year the Fish Hawk made only one excursion to the Gulf stream, and the dredges were not lowered into water deeper than 62 fathoms. Although the Albatross dredged in the region in 1883, 1884, and 1885, no serious biological examination of this portion of the sea bottom was made until 1899. It was because the results attending a reexamination of this area would prove of considerable scientific interest that arrangements were made for the excursion herein described.

On August 31, 1899, the Fish Hawk, under command of Capt. J. A. Smith, left Woods Hole with Prof. H. O. Bumpus and other members of the biological laboratory, and at 5 a.m. September 1st arrived at the spot where nineteen years before the wonderful marine fauna had been discovered.

The principal piece of collecting apparatus was a 7-foot beam trawl. An attempt was made to use a large surface net, but the leverage interfered so materially with the steering of the vessel that its continued use was found to be impracticable. Small tow nets and long-handled dip nets were used in its place. Most of the material was
preserved in 5 per cent formalin. The day was such as to promise excellent surface collecting; the air was calm and the water smooth. Large numbers of chain salpas were seen swimming near the surface and below as far as the sight could penetrate. The chains varied in length from an inch to several feet, and solitary individuals, or those arranged in rings, occasionally drifted by. The longer chains moved through the water much more rapidly than the smaller ones, and in addition to the branchial action they exhibited distinct serpentine movements. The salpas were not present during the midday hours, and my observations would indicate that they were not present at the surface on cloudy or windy days.

In the forenoon 4 dredgings were made, and at each station the trawl was on the bottom from 15 to 30 minutes. The afternoon and evening were spent in the course homeward, the latter part of the journey being through water of remarkable phosphorescence. At about midnight the vessel came to anchor off Nobsque light.

On this excursion fully 100 species of animals were collected, and many of the hauls brought up a surprising variety of bottom forms. A much larger number would doubtless have been recorded if the means for picking over and sorting the material had been adequate and if there had been more time for working up the material preserved. Inasmuch as the four stations were quite near one another, it has not been thought necessary to arrange the specimens in separate groups.

Table of stations at which dredgings were made on September 1, 1899.

<table>
<thead>
<tr>
<th>Station</th>
<th>Lat. N.</th>
<th>Long. W.</th>
<th>Locality off</th>
<th>Fath.</th>
<th>Bottom</th>
<th>Date</th>
<th>Temperature</th>
<th>Hour</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gay Head.</td>
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<tr>
<td>7068</td>
<td>40 04 00</td>
<td>70 20</td>
<td>S. 89 miles...</td>
<td>95</td>
<td>Hard sand</td>
<td>Sept. 1</td>
<td>55.4 71.6</td>
<td>5.05 n.m.</td>
</tr>
<tr>
<td>7069</td>
<td>40 01 30</td>
<td>70 21</td>
<td>S. 82 miles...</td>
<td>122</td>
<td>...do...</td>
<td>...do...</td>
<td>50.7 73.94</td>
<td>6.55 n.m.</td>
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<tr>
<td>7070</td>
<td>39 58 30</td>
<td>70 16</td>
<td>S. 86 miles...</td>
<td>198</td>
<td>Sand, mud</td>
<td>...do...</td>
<td>48.6 74.15</td>
<td>8.45 n.m.</td>
</tr>
<tr>
<td>7071</td>
<td>39 59 30</td>
<td>70 19</td>
<td>S. 87 miles...</td>
<td>108</td>
<td>...do...</td>
<td>...do...</td>
<td>48.2 75.74</td>
<td>10.25 n.m.</td>
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</tbody>
</table>

LIST OF SPECIMENS.

In the following list the previously ascribed range of each species is given. The fish were identified by Dr. Hugh M. Smith and Mr. Barton A. Bean. It will be noticed that 8 species are recorded from new localities. The pelagic copepoda collected are accounted for in a special paper by Prof. W. M. Wheeler, entitled “The Free-swimming Copepods of the Woods Hole region,” in the Bulletin of the United States Fish Commission for 1899, pages 157-192:

CELENTERATA.

REPORT OF A DREDGING EXPEDITION. 239

VERMES.

Hyalinocia artifex Verrill. Range, 150 to 640 fathoms. Trawled by thousands, each tube generally bearing two or three Sagartia abyscosa.

Notthria conchylaphila Verrill. Range, 100 to 300 fathoms. Six specimens. Trawled.


Aphroditia aculeata Linneaus. One specimen trawled in Færø Channel in 530 fathoms.

Cerebratulus ledius Verrill. Range, 64 to 192 fathoms. Three specimens. Trawled. Three long rubber-like tubes, about 3 feet long and 3 inches in diameter, possibly some worm-tube.

MOLLUSCOIDA.

Bagua sp. Very abundant on sargassum. Surface.

Polyconus. Several specimens growing on broken bottle. Trawled.

Membranipora sp. Very abundant on fronds and vesicles of sargassum. Surface.

Terebratulina septentrionalis Couthouy. Range, 16 to 396 fathoms. Three whole shells. Trawled.

ECHINODERMA.

Lincia sp. Twelve specimens. Trawled.

Poraniomorpha borealis Verrill. Range, 192 to 225 fathoms. Two specimens. Trawled.

Diploaster multipes Sars. Range 124 to 610 fathoms. Two specimens. Trawled.

Archaster ochrascii Verrill. Range, 182 to 1,342 fathoms. Five specimens. Trawled.

Archaster (robustus) Verrill. Range, 338 to 1,467 fathoms. Five specimens. Trawled.


Ophiopholis aculeata Gray. Range, shore to 1,000 fathoms. About 20 specimens. Trawled.

Ophiucoles glacialis Müller & Troesch. Range, 101 to 1,000 fathoms. Several hundred. Trawled.

Ophiacantha (segesta) Lyman. The specimens most resemble the species segesta taken by the Chalutager near the Philippines. Numerous. Trawled.

Ophiura. Can not be referred to any described species.

Thyonreccurva Théel. Range, Kerguelen Islands, 10 to 100 fathoms. Nine specimens. Trawled.


MOLLUSCA.


Lucina filosla Stimpson. Range, 4 to 349 fathoms. Two whole shells. Trawled.


Cyprina islandica Lamarck. Range, 8 to 128 fathoms. One live specimen. Trawled.

Anomia aculeata Miller. Range, shore to 640 fathoms. Several specimens on broken bottle and on shells of Fusus islandicus. Trawled.

Chiton sp. One specimen recorded by Dr. Mulligan, but not found in preserved specimens.

Fusus islandicus Martini. Range, 16 to 300 fathoms. About 30 shells inhabited by Eupagurus politus; 3 contained the animals; several served for attachment of Anomia aculeata. Trawled.


Lunatia graminifolia Stimpson. Range, 125 to 368 fathoms. Two shells inhabited by small Eupagurus politus. Trawled.


Aporrhais occidentalis Sowerby. Range, 34 to 640 fathoms. About 20 shells, nearly all inhabited by Eupagurida; one shell bearing Sagartia abyscosa. Trawled.


Scaphander mundus Watson. Range, 600 fathoms off Arrow Island. One live specimen and one shell. Trawled.

Platybranchus tarda Verrill. Range, 28 to 640 fathoms. Several specimens. Trawled.

Argonauta argo Linneaus. Range, 61 to 647 fathoms. One broken shell. Trawled.

Bosellia sublenta Verrill. Range, 115 to 640 fathoms. Several specimens. Trawled. These contain a new Gigantoid which will be described by Prof. W. M. Wheeler.

CRUSTACEA.

Cerithellus agassizii Smith. Range, 263 to 659 fathoms. One specimen. Trawled.


Hippolyte sp. About 30 specimens. Surface.


Pandalus antarcticus Leach. Range, Mediterranean; east coast of America, etc. Ten specimens. Trawled.

Munidida caribba Smith. Range, 56 to 264 fathoms. About 30 specimens, some with eggs. Trawled.

Nephrupis aquatilis A. M.-Edwards. Range, West Indies. One specimen taken at Station 7088. Very rare. When taken was a very brilliant red. Trawled.


Cancer borealis Stimpson. Shore to 435 fathoms; south to Cape Hatteras. One specimen. Trawled.


Eupagurus kirjyeri Stimpson. Range, 35 to 640 fathoms. One large specimen having no "house shell." Trawled.

Eupagurus pubescens Stimpson. Range, 26 to 86 fathoms. Abundant as commensal of Epizoanthus americanus. Trawled.

Eupagurus politus Smith. Range, 31 to 640 fathoms. About 30 specimens inhabiting large Fusus shells; one small specimen in shell of Fusus pigmeus; two small specimens in shells of Lunatia heros; two small ones in shells of Lunatia grunlandica; about 20 small ones in shells of Aporrhais. Trawled.


TUNICATA.

Molgula sp. Several specimens covered with small sand particles.

Salpa sp. Large, solitary form, about 6 cm. long.

Salpa cordiformis-zonaria Quoy & Gaimard. Very plenty in chain form, a few solitary individuals with characteristic, broader muscle bands being taken. A tunic 75 mm. long, containing a dead and much contracted animal, was trawled. The size of the individuals of the chain as well as the length of the chains varied considerably. The individuals were in various stages of reproduction. Surface.

CycloBalpa (pinnafla) Forskal. Range, Pacific Ocean between Papua and Japan. Several colonies in various stages of reproduction. These forms are of especial interest, as Herdman in Challenger Expedition Report records only one poor specimen of a solitary individual. Surface.

PISCES.

I. SURFACE SPECIES.

Seriola fasciata (Bloch). Range, West Indies north to Charleston, S. C. One specimen.

Trachurus crumenophthalmus (Bloch). Range, Atlantic coast of United States. Two specimens.

Caranx crysens (Mitchill). Range, Cape Cod to Brazil. One specimen.

Glossogobius panda (Goode & Bean). Range, deep water off Chesapeake Bay. One specimen.

Abudefuda saxatilis (Linneus). Range, both coasts of tropical America. One specimen.

Balistes vetula Linneus. Range, tropical parts of the Atlantic, Gulf Stream to Woods Hole. One specimen.

Monacanthus hispidus (Linneus). Range, Cape Cod to Brazil. Several specimens.

Lycenchelys serrillii (Goode & Bean). Range, coast of Massachusetts and northward. One specimen.

Merluccius bilinearis (Mitchill). Range, coast of New England and northward. Two specimens.

II. DEEP-WATER SPECIES.

Raia eglanteria Bosc. Range, Cape Cod southward to Florida. One specimen.

Helicoelurus maderensis Goode & Bean. Range, deep waters of Atlantic coast from Narragansett Bay to Chesapeake Bay. One specimen.

Peristomias minutum Goode. Range, Gulf Stream. Two, large specimens.

Macourous bairdii Goode & Bean. Range, West Indies to Massachusetts Bay. One specimen.


Monolene sessilicauda Goode. Range, deep waters of Gulf Stream. Two specimens.

Symphurus psyllus (Goode & Bean). Range, off Atlantic coast of United States, in deep water. One specimen.

Dibranchus atlanticus Peters. Range, Gulf Stream. Several specimens.

HARVARD UNIVERSITY, December 30, 1899.