interfered wit,h would maintain a constant rate of br akdown, implying constant velocity, as already explained.

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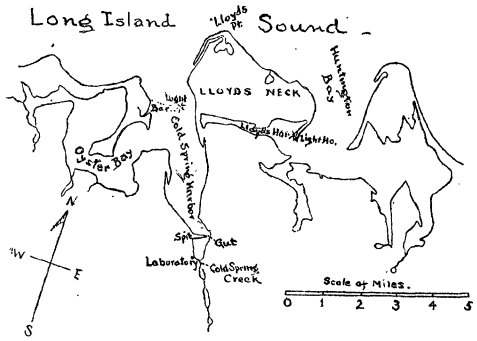
THE FAUNA AND FLORA ABOUT COLDSPRING HARBOR, L. I.

THE Biological Laboratory of the Brooklyn Institute of Arts and Sciences, located at Coldspring Harbor, Long Island, has during the nine years of its existence accumulated an important lot of information concerning the animals and plants of the vicinity. Especially during the present season has the attention of the investigators been in great part directed towards a biological survey of the locality. Of the survey the following may be regarded as a preliminary report.



The conditions at Coldspring Harbor are as follows: The Harbor is a body of water about five miles long and from one and a quarter miles to a quarter of a mile wide, which opens at its broader end into Long Island Sound, itself an inland sea, about eighty miles from where it debouches into the open ocean. Opening into Coldspring Harbor at about the middle of its western side is Oyster Bay, a tortuous body of water running back some six or seven miles and having a breadth varying from one and a-half miles to half a mile. Both Coldspring Harbor and Oyster Bay receive at their upper ends fresh-water streams of considerable volume, and at intervals along their coast line, smaller ones. Consequently the density of the water is low, being about 1.019 at flood-tide near the surface in the middle of the outer harbor. Coldspring Harbor is a sunken river valley with abrupt fiord-like sides, which extend back into the country for three miles from the upper end of the Harbor. In the valley runs the stream of Coldspring Creek, which expands at three different levels into broad, deep ponds, connected by waterfalls and shaded by dense foliage. The woods which rise from these ponds are densely grown with a rank vegetation and are rich in the fleshy fungi which accompany a moist climate.

Coldspring Creek, flowing, laden with silt, into the upper end of the Harbor, has formed there, with the aid of the sea, a sand spit which nearly cuts off an inner basin, about 3,000 feet long by 2,000 feet wide, from the outer harbor. The water of the inner basin is decidedly brackish, at high tide varying from 1.006 to 1.016 at the surface and from 1.006 to 1.018 at the bottom. The passage from the inner basin to the Harbor is only 200 to 300 feet wide at low tide, and through this 'gut' the water flows at times with great rapidity. The mean range of tide is 7.3 feet. The inner basin, which is gradually silting up, exposes about half of its bottom at every low tide for an hour or so. In the outer harbor, above the entrance of Oyster Bay, the water is uniformly 15 to 18 feet deep at low tide. Immediately below Oyster Bay entrance is a bar with only 6 to 10 feet of water at low tide. At the eastern end of this bar is a channel 72 feet deep. Outside the bar the water deepens steadily towards the middle of the sound.

The steep sides of the harbor are piles of glacial drift, full of clay, siliceous sand, gravel and boulders of varying size. This

determines the prevailing character of the shore line, sandy or gravelly beaches with boulders extending into deep water and most abundant at the base of the worn-off bluffs.

Mud flats are common, but for the most part underlaid by sand at a depth of one to three feet. A mud flat extends from parts of the sand spit at the level of mean low tide. No rock occurs in place, but on many headlands the accumulated boulders at the base of the bluffs form an extensive rock-work. At intervals the shore line of the harbor is diversified by salt meadows, partly enclosed salt ponds and shallow 'harbors' and bays.

THE FAUNA ABOUT COLDSPRING HARBOR.

The situation of the laboratory is unique in its combination of immediately accessible faunas of the sea, fresh-water and woodland, all very rich in individuals and species. Some of the commoner or more interesting forms may here be enumerated. The list may be prefaced with the statement that, owing to the fact that the Harbor is so nearly an inland sea, there are few stragglers in the marine fauna; what one finds belongs to the place—its presence is determined by the local environment.

Protozoa: Volvox and Stentor are extremely abundant in the lakes.

Spongiæ: *Spongilla* (?) in the stream connecting the lakes. The boring sponge, *Clione sulphurea* Desor, is abundant. There are various other species in the Harbor, unidentified.

Anthozoa: The coral *Astrangia Danæ* is one of the common products of dredging at the lower end of the Harbor. Three species of sea anemones are common. Among them *Sargartia leucolena* and *Halocampa producta* are common in the sand.

Hydrozoa: Hydra is common in the lakes. Of the hydroid stocks may be mentioned *Obelia*, *Campanularia*, *Podocoryne*, *Hydractinia*, *Plumularia* and *Bougainvillia*, which are abundant, and *Perigonimus*, *Eudendrium* and *Tubularia*, which are less common. Jelly-fishes of several other species occur in the tow.

Ctenophoræ: *Mnemiopsis Leidyi* has been abundant throughout the present summer.

Echinoderma: *Asterias forbesii* is very abundant, especially on the outer bar. Its numerous abnormalities have attracted some attention this season. The sea-urchin, *Arbacea punctulata* Gray, is found occasionally in dredging, but is not abundant. The Holothurian *Synapta Girardii* is abundant in the sand spit near the laboratory and is sometimes found in the tow. *Synapta roseola* Verrill also occurs. The tow frequently contains star-fish larvæ.

Balanoglossus: A form of this genus, apparently different from *B. Kowalevskii*, occurs in the sand spit.

Mollusca: The shores of Long Island have long been famous for the richness of their molluscan fauna. About 100 species from the Harbor have been identified* during the present season. Among the more abundant genera are *Chiton*, *Fulgur*, *Sycotypus*, *Tritia*, *Ilyanassa*, *Urosalpinx*, *Eupleura*, *Neverita*, *Littorina*, *Teredo*, *Xylotrya*, *Mya*, *Solen*, *Mactra*, *Venus*, *Liocardium*, *Nucula*, *Scapharca*, *Mytilus*, *Modiola*, *Pecten*, *Anomia*, and the semi-domesticated oyster. Slugs of various species are common in the woods. Few of the various nudibranchs have been identified. Squids' eggs are occasionally dredged and adult squids occur, although they are irregular in their appearance.

Bryozoa: Among the common marine forms may be mentioned *Crisea eburnea*, *Bowerbankia*, *Alcyonidium hispidium* and *Bugula turrita*. In the lakes *Pectinatella magnifica* Leidy is abundant. *Pedicillina* has been found.

Tunicata: *Botryllus* is common. *Molgula*,

*Chiefly by Mr. Francis N. Balch.

probably of two species, is obtained abundantly. *Perophora viridis* is found on algæ from near the Sound. Common also is *Amaræcium constellatum*, found at the Harbor's mouth.

Platyhelminthes: Fresh-water *Turbellaria* are abundant. *Bdelloura propinqua* is common on *Limulus*. *Apoblema* (*Distomum*) *appendiculatum*, which occurs abundantly in Copepods here, has been made the subject of a memoir by Professor Henry S. Pratt, of Haverford College. The large Nemerteans, *Cerebratulus Leidyi* and *C. lacteus*, occur in the sand spit. Of Annelids over fifteen species have been identified, chiefly by Dr. J. I. Hamaker. *Nereis virens*, although near the southern limit of its area of distribution, is extremely abundant. The more southern *Nereis limbata* is abundant. Other common species are: *Arabella* (*Lumbriconereis*) *opalina*, *Euglycera* (*Rhincobolus*) *dibranchiata*, *Clymenella torquata*, *Amphitrite ornata*, *Chætobranchus sanguineus*, *Cirratulus grandis* and *Serpula dianthus*.

Rotifera: These organisms are extremely abundant in the lakes, but no species have been identified.

Sipunculoidea: *Phascolosoma* occurs on a sand spit near the lighthouse at the entrance to Lloyd's Harbor.

Entomostraca of many kinds are abundant in the lakes. A few minutes' towing will collect a countless number of individuals of *Daphnia*. Of the marine copepods *Acartia* is one of the most abundant. Many Balanidæ occur and their larvæ are common on the tow.

Amphipoda: *Caprella acutrifrons*, new variety, can be obtained by the pint in the 'gut.' *Talorchestia longicornis* is abundant on the sand spit.

Isopoda: *Bopyrus* is very common on prawns, *Idothea irrorata* on eel grass, and the *Oniscidæ* about the springs.

Podopthalmata: *Squilla empusa* is common at the sand spit and *Mysis* in the tow. Among the decapods there have been identified *Homarus vulgaris*, *Callianassa* and *Gebia*, which occur in the sand spit. Numerous hermit crabs occur. Other crabs are unusually abundant. The dredge or tangle brings up from the region of the outer bar *Libinia caniculata*, very large and numerous; *Libinia dubia; Callinectes hastatus*, not common; *Platyonichus ocellatus*, or 'lady crab;' *Panopeus Sayi; P. depressus; Cancer irroratus*. On the shores fiddler crabs of two or three species abound.

Pycnogonidia: *Pallene empusa* Wilson is common.

Limulus is abundant on the sand spit, near the laboratory.

Insects: The moist woodland about the lakes and springs offers a remarkably rich collecting ground for insects. One of the most striking species, on account of its size and abundance, is a form of the cricket-grasshopper, *Ceuthophilus*

Vertebrates: Some twenty species of fish have been identified.* Dogfish and sand sharks seem to be common. The stomachs of nine of the former have been examined during July of this year, and an aggregate of eleven squillas, four spider crabs, four hermit crabs, three other crabs, several teleosts and a squid have been found in their stomachs.

Newts and frogs are common. Many tortoises, snakes, water and land birds and mammals are seen by the most casual observer.

I am indebted to Dr. D. S. Johnson, instructor at the Laboratory, for the following description of

THE FLORA ABOUT COLDSPRING HARBOR.

The physiographic conditions of this region are considerably varied, as has been noted above. On the outer coasts of the north side of the island are extensive sandy beaches, almost or completely washed over by the sea during hard storms.

*Chiefly by Mr. Francis B. Sumner.

Just above the reach of the ordinary tides these beaches are partially covered with *Spartina juncea* interspersed with *Rhus toxicodendron*, *R. copallina* and *Lathyrus maritimus*, while *Arenaria peplodes Salsola kali*, *Cakile maritima*, *Opuntia Rafinesquii* and *Solidago sempervirens* are among the other halophytes and xerophytes met with. *Juniperus Virginiana*, *Myrica cerifera* and *Prunus maritima* are the only considerable shrubs found here.

On the more barren spots farther from the spray numerous tufts of *Hudsonia tomentosa* and *Cladonia rangiferina* are interspersed with *Geasta* and other *Cladonias*. Several other species of lichens and several woody toadstools are found on the stems of the dead clumps of *Prunus*.

In the quiet mud-bottomed pools a hundred yards back from the outer beach, which are flooded at high water by salt creeks, *Spartina polystachya* forms thick growths, along the edge of which grow *Salicornia*, *Buda marina* and several genera of *Schizophyceæ* with many green and red algæ.

Farther in from the Sound the shores of the Harbor are scattered with boulders on which are found many rock-bearing algæ. Among the Chlorophyceæ, *e. g.*, *Bryopsis* and various species of *Cladophora* and *Enteromorpha* are found; while the Phæophyceæ are represented by such genera as *Ectocarpus*, *Sphacelaria*, *Punctaria*, *Chorda*, *Mesogloia*, *Fucus*, *Ascophyllum* and *Sargassum;* and such genera of the Rhodophyceæ as *Chantransia*, *Nemalion*, *Ceramium*, *Callithamnion*, *Griffithsia*, *Polysiphonia* and *Chandriopsis* are abundant at or just below the lower sidemark. On the beach near these boulders several interesting fresh-water algæ are found growing in springs which flow from the top of a stratum of clay just at high-water level.

In the quiet brackish covers near the inner end of the harbor *Chondriopsis*, *Grinnellia*, *Dasya*, *Rhabdonia* and *Gracillaria*, with various species of *Ceranium* and *Polysiphonia* are very abundant, as are also the species of *Monostroma*, *Ulva*, *Enteromorpha* and *Cladophora*.

In the ponds at the upper end of the valley occupied by the harbor, fresh-water algæ are present in great abundance and variety. Besides several unusual species of Schizophyceæ, such genera as *Pandorina*, *Volvox*, *Oedogonium* and *Bulbochæte* are of frequent occurrence. In the springs and pools on the edges of these ponds an unusually large number of genera of desmids are present and *Batrachospermum* is occasionally found. Many interesting hydrophile phanerogams are also present in these ponds.

It is in the dense woods surrounding these ponds that we find the most interesting feature of the whole region. These woods are chiefly of oak, chestnut, beech and birch, with an undergrowth of *Clethra* and *Hamamelis* in the damper portions and of *Kalmia* in the drier ones. The damp soil and air make exceptionally favorable conditions for parasites and saprophytes. Such forms as *Cuscuta*, *Monatropa* and *Corallorhiza* are abundant, while the variety and abundance of the Myxomycetes and Fungi are quite remarkable. Fifteen genera of Myxomycetes, six of them new to the island, have already been noted and many new species of the more common genera will probably be found when the study of the region can be carried beyond the limited territory already visited. Among the Fungi the Pyrenomycetes, Hysteriaceæ, Discomycetes and Helvellaceæ of the Ascomycetes, and the Hymenomycetes, Phalloideæ and Gasteromycetes of the Basidiomycetes, are represented by large numbers of both individuals and species.

In conclusion a few words may be added concerning the value of the laboratory at Coldspring Harbor as a center for the study of localities other than that of the Harbor

itself. Long Island Sound is easily reached from the laboratory and excursions have been made on the launch of the laboratory to the rocky shores of Connecticut. A two hours' ride on the bicycle over good roads brings one to the Great South Bay, which contains certain oceanic animals not found at Coldspring, *e. g.*, *Cyanœ*, *Aurelia* and *Zygodactyla*. This great bay is almost a new field for the biologist. The few attempts at dredging there, made during the past season, indicate that it will be a fruitful field for exploration. Finally, the eastern end of Long Island, with its extensive bays, can best be studied from the Coldspring Harbor laboratory as a base.

The general outlines of our fauna and flora are already sketched. This much knowledge is necessary as a basis for further work, whether in the way of instruction or in the way of research in anatomy, embryology or physiology, or in such systematic study as shall reveal more completely the kinds of organisms living here and the conditions which determine their occurrence.

CHAS B. DAVENPORT.

COLDSPRING HARBOR, August 8, 1898.

THE NERNST LAMP.

THE *Frankfurter Zeitung* contained recently a very interesting account of Professor Nernst's new electric lamp. As information on this subject has heretofore been so difficult to obtain, a brief abstract from this article may be of interest to the readers of SCIENCE.

As has been previously announced, Professor Nernst employs magnesium oxide for the illuminating material which at ordinary temperatures is a non-conductor, but when heated to a sufficiently high degree (and herein lies Professor Nernst's discovery) becomes a perfect conductor and emits a brilliant white light. The preliminary heating of the magnesia (*A*) Professor Nernst accomplishes by placing it in the focus of a reflecter (*C*) as seen in Fig. I. On the inner side of the reflector is a spiral wire of

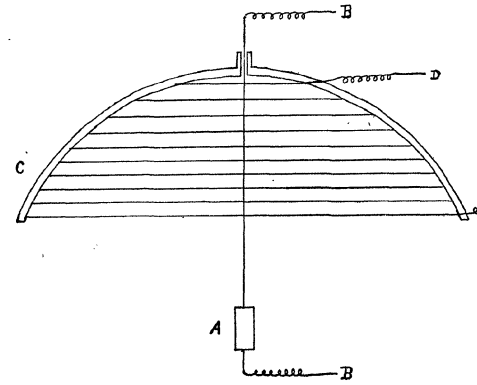


FIG. 1.

platinum (*D*) which, when brought to incandescence by a current, produces heat sufficient to render the magnesia a conductor; a current is then passed directly through the oxide by the wire (*B*) and that in the spiral is shut off. A complicated form of lamp is seen in Fig. II. Here the magnesia (*A*) is placed within a cylinder (*C*), which also incloses a platinum spiral (*D*). As soon as the incandescent spiral has heated the magnesia

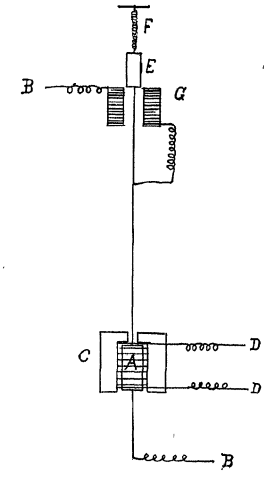


FIG. 2.