(2) "Cyto-physiology of the Kidney," by Dr. Aldo Defrise, University of Milano.

August 10—(1) "Disease Among the Invertebrates," by Professor Ulric Dahlgren, Princeton University.
(2) "Biological Control of Bubonic Plague," by William B. Wherry, University of Cincinnati.

August 17—(1) "The Behavior of the Cercariae of Bucepulus elegans," by Mr. Gerrit Bevelander, Union College.
(2) "Urine Flow and Diuresis in Marine Teleosts," by Dr. Allan L. Grafflin, Harvard University.

August 24—(1) "Biological Aspects of Fox Farming," by Dr. Donnell B. Young, University of Maine.
(2) "Some Observations on the Biochemistry of Creatine," by Dr. Isidor Greenwald, New York University.

August 31—(1) "Suprarenal Insufficiency," by Dr. L. C. Wyman, Boston University.
(2) "Some Phases of Human Tissue Culture," by Mr. George O. Gey, Johns Hopkins University.

## SUMMARIES OF RESEARCH ACCOMPLISHED DURING 1931

Continuing the custom begun last year of publishing brief summaries of the research work accomplished by individuals, the following series is presented for 1931. The reports are printed in the form contributed by their authors.

### REPORT ON THE SUMMER WORK AT THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY, 1931

By ULRIC DAHLGREN, *Princeton University*

The ecology of several marine invertebrates was studied with successful results in some cases, and delayed results in others. The conditions of marine plankton in Frenchman's Bay were exceptional, due, it is believed, to heavy spring and summer rains which brought solutions of land soil into the Bay and favored the growth of floating

marine micro flora. *Chaetoceras* and a long, filamentous, form of alga was so abundant as to give the water a brownish hue. The tow always consisted of such masses of this that it was difficult to extract the other material. Strictly pelagic forms, as *Calanus, Sagitta, Ceratium tripos, Euphasids,* and *Tomopteris,* found in normal years were nearly absent. *Asterias* and *Echinarachnius* larvae were present as usual. *Harpacticus and other* Harpactids, usually found on or near the bottom were of manifold abundance, and found in the upper strata with the Algae.

For short periods there occurred remarkable pulses or abundance of two marine rotifers. One *Synchaeta johanseni* (Harring) appeared in vast numbers for a few days around the 8th of July. The other, *Trichocera marina* (Dady) hitherto rare, occurred in countless numbers in Frenchman's Bay near Salisbury Cove during the evening of July 14th. It was never found again in many tows taken, although several tows taken some miles apart on that evening showed it to be the most abundant organism.

Work on the soft mud fauna was continued. An unusual form met here was a fine living specimen of a Holothurian belonging to the family Molpadiidae. It was not *Caudina* and has been sent to Dr. H. L. Clark for identification.

Another feature of the season was the very abundant presence from about August 8th to early September of the trochophore larva of an unknown Polychaet annelid which swarmed in such numbers that it stained vast bodies of the sea a dark red, a color somewhat between brick red and blood red.

It appeared, usually within a mile of the land, sometimes right up to the beach line, the countless individuals showing a strong tendency to congregate which cause them to show in rifts and clumps. The tide and wind streaked these masses out into lanes and circular areas. The individuals were so small that they readily passed through Nr. 20 bolting cloth nets, and strange to say were never entangled in the large quantities of *Chaetoceras* that these nets held. They were found at varying depths, often directly at the surface, sometimes a foot or more down and at other times forming a layer whose upper surface was eight or ten feet below the surface in the middle of the day.

Each days' swarm was the result apparently of a single separate breeding and sank toward evening never to appear again. The next day's swarm appeared shortly after the sun was well up and seemed to be of the same age as those of the day before. Some days showed vastly larger swarms than others. The methods used so successfully by the writer in 1929 to identify the swarm of Polydera trochophores and larvae that appeared in June failed utterly here since although these red worm larvae could be captured in any quantity and brought into the laboratory, they would not live for over 48 hours on the aquarium stand at nearly sea temperature, and with a fresh sea water jet running into the vessel. A drop of this water placed under the microscope showed hundreds of the trochophores swimming with incredible speed in all directions and stopping for an instant when they

hit the glass slide which was frequent because of their curved course. They gave the impression of a small box full of fleas jumping in all directions frantically. When placed thus in an uncovered drop of sea water they all died in from two to four minutes. First they would swim slower, then they would oscillate, and then suddenly the cytoplasm of their cells would dissolve and all their nucleii would drop to the slide in a small heap. It was taken that the concentration of sea salts due to evaporation was the cause of this histolysis. It did not occur in larger bodies of water.

Attempts were made to find the larvae in a more advanced stage of development by securing samples of the surface mud under the localities in which the larvae had settled at the end of each day. No young worm larvae could be obtained in this way and samples of mud from one inch deep to three inches deep also failed to disclose any older larvae that could be attributed to the red trochophores that were so abundant.

Some attempts were also made to find and collect the parents of these larvae by dissecting out the eggs and finding a worm with red eggs that were ripe and of the proper size to produce the red larvae. Such worms should be numerous and easily determined once found. Here again no success was attained, which possibly was due to not starting early enough. This work will be continued another season.

Only once before since the writer and the laboratory have been on Mount Desert Island has such a spawning of the red larvae taken place. That was nine years ago, but it is hoped that a lesser brood will be present at an early date and the breeding history of this form can be worked out in the interest of further investigations.

This "red water" often is caused by other organisms. A colonial dinoflagellate which reddens areas of the sea to about the same color has been observed by the writer in August near the lower ends of Chesapeake and Delaware bays. Also a lighter or pink band of water has been seen in Frenchman's Bay which was found to be caused by a large pink dinoflagellate, a *Peridinium*. Again the larva of *Cerianthus* has sometimes been so abundant as to tinge the water. *Noctiluca* has been reported to form reddish areas of the sea on the Pacific Coast, but has not been seen on the Maine Coast.

The Maine fishermen recognize this red water of Frenchman's Bay as a much used herring feed. While the red water is present they say that all the sardine herrings' intestines are full of it and it is considered that it renders them poor to keep and unfit to sell. Some of the fishermen called the writer's attention to the fact that the droppings of such fish were red, and an early morning examination of the mud flats at low tide showed them to be covered by these droppings from the herring schools that had swum over them during the high water of the preceding night. This shows how efficient the gill rakers of these small herring are.

A "red feed" appearing in the stomach and intestines of fair sized mackerel must also be investigated as it could not consist of such small organisms. It was reported also by fishermen.