THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

THIRTY-THIRD SEASON



Work to be conducted at the Weir Mitchell Station at Salisbury Cove and at the Dorr Station at Bar Harbor, upon Mount Desert Island, Maine, from June 15th to September 15th

THE CORPORATION OF THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

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Eagle Lake, Mt. Desert Island

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

(FORMERLY THE HARPSWELL LABORATORY) Founded by John Sterling Kingsley in 1898

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MOUNT DESERT ISLAND



A house on the McCagg tract



The Dining Hall

PREFACE

The Mount Desert Island Biological Laboratory was founded at South Harpswell, Maine, in 1898 under the name of The Harpswell Laboratory as a summer school of Biology by Dr. J. S. Kingsley, then Professor of Biology in Tufts College, Massachusetts. In 1913 it was reorganized as a scientific corporation under the laws of the State of Maine, with a board of ten trustees.

In the spring of 1921 the Laboratory under the Directorship of Professor Ulric Dahlgren of Princeton University moved to Mount Desert Island, and a temporary building was erected on a tract of land located on Salisbury Cove and leased from the Wild Gardens of Acadia. This land, consisting of fourteen and one-half acres, was designated as the Weir Mitchell Station. In December, 1923, the Wild Gardens Corporation deeded this land to the Laboratory, the name of which had been changed on November 10, 1923, to its present one of The Mount Desert Island Biological Laboratory.

A tract of eighty acres, located almost next the Weir Mitchell Station on Salisbury Cove, with an ample shore frontage bordering on the deep pure waters of Frenchman Bay, was purchased in September, 1922, from Louis B. McCagg. Part of this large wooded tract has been developed as home sites for biologists working in the Laboratory.

In 1929 through the generosity of Mr. John D. Rockefeller, Jr., three acres of land and a house opposite the Weir Mitchell tract in the village of Salisbury Cove were deeded to the Laboratory. The house upon this land is now used as a summer home by one of the Laboratory workers.

During the Summer of 1928 the amalgamation of the Mt. Desert Island Biological Laboratory with the Laboratory founded

LOCATION

at Bar Harbor by Dr. Clarence Cook Little was effected. Dr. Little's Laboratory was organized primarily for the study of plants and animals in their natural surroundings and to meet a long-felt need of field-courses in biology. For such out-door biology the resources of Mt. Desert Island are unique. Ecological work of this sort supplements and completes the research work of the Laboratory.

The Dorr Station of the Mount Desert Island Biological Laboratory is situated on the land of the Roscoe B. Jackson Memorial Laboratory about a mile and a half from the town of Bar Harbor. It abuts directly on land of the Acadia National Park, all facilities of which are available to students for exploration, investigation and research.

The Station contains a large dining hall and a wooden laboratory building as well as wooden platforms and tents accommodating about twenty to thirty students.

The land and buildings are provided through the generosity of George B. Dorr, Director of the Acadia National Park and a long-time resident of Mount Desert Island. They are available for use on the part of the Mount Desert Island Biological Laboratory through the courtesy and co-operation of the Roscoe B. Jackson Memorial Laboratory.

LOCATION

Mount Desert Island is situated on the coast of Maine, one hundred miles east of Portland. Its cold waters are extraordinarily rich in marine life, including forms found on rocky, surf-beaten shores, in muddy coves, on the sea bottom at a multitude of depths and conditions, and floating on the surface of bays, inlets, and open sea. Depths of over a hundred fathoms are found within twenty miles, where Salpa, Staurophora, Tomopteris, Siphonophores, and hundreds of other pelagic forms are found on the surface in their season. The deep bottoms furnish brachiopods (Terebratulina), huge actinians, basket stars, Boltenias, and many other rare forms. Cerebratulus and the echinodern Echinarachnius are abundant and furnish ripe eggs for study in the summer. The large holothur-

LOCATION

ian, Pentacta, sea-urchins, and several starfish are extremely abundant and of large size.

Mud flats furnish a great abundance of common forms of mollusks, worms, and other animals for study in the Laboratory and for investigation. The tide rises and falls from twelve to fourteen feet, giving ample opportunity to secure many forms on the bottom or in rock pools, while the strong currents from the outer sea bring in many jelly-fishes and floating forms not ordinarily easy to secure in still waters.

Upon even a casual survey of the fauna it becomes evident that a good research laboratory, situated at some point on the gulf of Maine, is a necessity to the working naturalists of the country. Cape Cod, as has been pointed out in past years by Gould, Dana, Verrill, Packard, Smith, Harvey, Farlow, Sumner and many others, is the dividing boundary between the more northern Acadian and the southerly Virginian fauna and flora of our coast, and no other boundary is so sharp in its delimiting of many species and genera. The Marine Biological Laboratory at Woods Hole serves as a point of access to the Virginian fauna, and the Mount Desert Island Biological Laboratory serves in the same way to bring the worker in contact with the rich Acadian groups.

In addition to its marine fauna, the island has a range of bold, deeply divided, ice-eroded mountains that form a belt across its southern half. Their lower sides are clothed by forests, and between their peaks, rising at highest over 1500 feet, are lakes, streams, and marshes with a rich fresh-water fauna. Several of these lakes are large and deep; one of lesser size is 1100 feet above the sea. Brooks are abundant and of cold water, containing trout and a great variety of northern fresh-water invertebrates.

Besides being situated in a region of great beauty, unspoiled by commercial exploitation or nearness to large cities, the Laboratory in its new site has the advantage of being placed in close contact with the wild-life Sanctuary of Acadia National Park, created recently on Mount Desert Island by the United States through the efforts of a group of its public-spirited summer residents. This is the only National Park in the eastern por-

MOUNT DESERT ISLAND



Laboratory Point, Weir Mitchell Station



McCagg Tract, Salisbury Cove

SCIENTIFIC FACILITIES

tion of the continent and the only one in the country in direct contact with the sea. This secures for all time a permanent and singularly rich area for biologic study in every field, vertebrate and invertebrate.

Salisbury Cove is an old fishing and farming hamlet on the north shore of Mount Desert Island, about five miles from the town of Bar Harbor and on the county road from it to the town of Ellsworth on the mainland, where there is a railroad station and an important railroad junction. The village of Salisbury Cove is a market-gardening and farming community of a quiet and simple kind, but Bar Harbor has good stores of every sort, an excellent hospital, express, telegraph, cable facilities, good train and boat service.

SCIENTIFIC FACILITIES

The Laboratory has adequate facilities for research in marine biology. On the Weir Mitchell tract are four buildings devoted to this purpose. The largest and oldest of these was built in 1921 and contains ten research rooms, in each of which one or two persons can work. This building is served with electricity of 110 volts, 60-cycle single phase current, with running fresh water and running sea-water from a non-toxic system, in which the salt water touches only a hard rubber pump, lead pipe, glass, and a wooden tank. The cold sea-water of this region runs directly from deep water into the aquaria, only a surplus passing on to the tank. This insures the same cold temperature of sea-water on the delivery trough and in the aquaria as is found in the cold ocean of this locality. Each research room is supplied with electricity for light, heat, and power. The building is furnished with the equipment and reagents required for experimental work.

The remaining three buildings on the Weir Mitchell tract were built and presented to the laboratory by Mr. William Procter of Bar Harbor. One of these with accommodations for four workers is supplied with aquaria and with running fresh and salt water. A second building is used as an experimental dark-room to test the effects of different kinds of light upon organisms. The third building is being used as a library until

SUBSCRIBING AND CO-OPERATING INSTITUTIONS

a more suitable fire-proof library can be built. The library contains most of the American Biological journals, many reprints, and about a thousand bound volumes. It is hoped that biologists will place the Laboratory on their exchange lists. Books not found in the library may be borrowed by arrangement with the Boston Society of Natural History and the Boston Medical Library.

On the McCagg tract a small dwelling house has been equipped for such research as does not require the presence of running sea-water. Six or eight research workers can be accommodated in this building.

SUBSCRIBING AND CO-OPERATING INSTITUTIONS

The financial support of the Mt. Desert Island Biological Laboratory has been chiefly through annual contributions of summer residents of Mt. Desert Island who are interested in biological research. To such gifts are added fees for laboratory tables and annual dues paid by members of the Corporation. For several years, however, a few colleges and universities have supported research rooms occupied by members of their respective Faculties. These institutions are:

> Johns Hopkins University New York University Princeton University Tufts College

THE WORK FOR THE SEASON OF 1931

A strong sea-worthy gasoline boat—the gift of James F. Porter of Chicago—and rowboats with scrapers, nets, dredges, tow-nets make collecting possible in water as deep as thirty to fifty fathoms.

For the work in oceanography a thirty-foot boat, the Dahlgren, has been equipped with a powerful four-cylinder Scripps gasoline engine and with the necessary hauling and towing apparatus.

The Laboratory also owns a motor dory equipped with a twocylinder, four cycle engine used for towing at night and for collecting near the Laboratory.

PROBLEMS IN FIELD NATURAL HISTORY

Each investigator should bring his own microscope, since the laboratory is not equipped to supply microscopes to workers.

A Laboratory Collector is present to furnish investigators with the animals and plants required for research. Investigators are requested to notify the Director well in advance of the materials they desire and the equipment required by them.

The fee for the use of a research room is \$50 for the season, payable in advance.

PROBLEMS IN FIELD NATURAL HISTORY (ZOOLOGICAL)

Work on problems of college undergraduate or graduate grade will be open to a limited number of students from June 22nd to August 29th. Mt. Desert Island is peculiarly fitted for work of this sort. Forms for study among the insects, arachnids, fishes, amphibians, birds and mammals are plentiful and varied. It is desired that the work be intensive but informal. It will be conducted under supervision of a general rather than of a detailed nature. It will aim to develop in the student individuality and an appreciation of the value of field work in natural history. While not neglecting laboratory methods it will attempt to focus its major interest on problems of behavior or ecology in the field. Applicants for admission considered individually. For information write Dr. C. C. Little, Jackson Memorial Laboratory, Bar Harbor, Maine. A small number of scholarships covering board and tuition are available.

PROBLEMS OF ORNITHOLOGY

The large number of species of bird life on or near Mt. Desert Island makes possible unusual opportunities for field study. Work in the field will include investigations of the distributions, nesting habits, and other interesting phases. This work will be open to undergraduates of colleges or to others particularly interested or qualified to pursue it and will be in charge of trained assistants familiar with the terrain.

PROBLEMS IN MAMMALIAN GENETICS

Opportunity for a limited number of advanced undergraduates or graduate students to take up personal problems under

GENERAL INFORMATION

the direction of the staff of the Roscoe B. Jackson Memorial Laboratory will be offered. The problems will be in the general field of genetics, physiology, or histology, and will in general center about the work of cancer research being carried on at that laboratory. Since the time of work is limited problems must naturally be agreed upon in advance and followed by the student with sustained interest throughout the period indicated. Opportunity will be given, should it seem desirable, to continue in residence until approximately October 1st.

GENERAL INFORMATION

Those wishing to come to the Laboratory may come by rail from Boston, New York, Philadelphia, or Washington on the Bar Harbor Express, which will bring them directly to Mount Desert Ferry, where a boat runs across Frenchman Bay to Bar Harbor. The connections by water from Boston are excellent and less expensive, the Boston and Bangor Steamship Line leaving Boston every evening and connecting at Rockland in the early morning with a Bar Harbor boat, which passes through the beautiful Fox Island thoroughfare, among the spruce-clad islands of the Maine coast, and arrives at Bar Harbor about noon. Prices of fares, staterooms, etc., time of departures and arrivals will be sent to those who consider coming as soon as the summer schedules of railways and steamships are made up Those coming to the Laboratory should notify for the season. the Director ahead, so that they may be met on arrival in Bar Harbor by the Laboratory car.

Board for those connected with the laboratory and their immediate families will be provided in the Laboratory dining hall in Salisbury Cove at \$10.00 per week.

Rooms may be found in the neighboring village at reasonable prices, and for those who wish, lodging will be provided on the Laboratory grounds in army tents on wooden bases at \$2.00 per week per person, two persons in a tent. All bills will be presented at the end of each week.

Applications for rooms in the Weir Mitchell Station for the season of 1931 should be addressed to Dr. H. V. Neal, Tufts College, Mass. Inquiries in regard to admission to courses in Field Natural History should be sent to Dr. C. C. Little, Jackson

SUMMARIES OF WORK ACCOMPLISHED IN 1930

Memorial Laboratory, Bar Harbor, Maine. Correspondents are advised against addressing mail to Mount Desert, which is the official name of Somesville, a town on Mount Desert Island.

The Mount Desert Island Biological Laboratory,

Salisbury Cove,

Mount Desert Island,

Maine



INVESTIGATORS AND ASSISTANTS-SEASON OF 1930

All of the Laboratory rooms have been filled throughout the season of 1930. The investigative staff of the Weir Mitchell Station has consisted of twenty-eight members, of whom nine have worked in the field of oceanography. In addition to these, seven investigators have worked at the Dorr Station under the direction of Dr. Little. There have been twelve assistants. The personnel is as follows:

Bevelander, Gerrit, The Johns Hopkins University, Baltimore, Md.

Byrnes, Esther F., The Girls' High School, Brooklyn, N. Y.

Burkholder, Paul R., Buffalo Museum, Buffalo, N. Y.

Dahlgren, Ulric, Princeton University, Princton, N. J.

Dorsey, Lewis F., Philadelphia, Pa.

Fish, Charles J., Buffalo Museum, Buffalo, N. Y.

Fish, Marie Poland, Buffalo Museum, Buffalo, N. Y.

Grafflin, Allan L., The Johns Hopkins University, Baltimore, Md.

Hegner, Robert W., The Johns Hopkins University, Baltimore, Md.

Hoskins, Margaret M., New York University Dental School, N. Y. C.

Johnson, Percy L., The Johns Hopkins University, Baltimore, Md.

Judd, Freda C., The Girls' High School, Brooklyn, N. Y.

Lutz, Brenton R., Boston University Medical School, Boston, Mass.

Marchand, Paul, Buffalo Museum, Buffalo, N. Y.

Marshall, Eli K., The Johns Hopkins School of Medicine, Baltimore, Md.

Mast, Samuel O., The Johns Hopkins University, Baltimore, Md. Myers, Frank J., The American Museum, New York, N. Y.

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Neal, Herbert V., Tufts College, Mass.

Olcott, Cornelius, Jr., Princeton University, Princeton, N. J. Pate, Vernon S. L., Cornell University, Ithaca, N. Y.

Potnic P C Tohnstown N M

Petrie, R. C., Johnstown, N. Y.

Prosser, C. Ladd, The Johns Hopkins University, Baltimore, Md.

Rakestraw, Norris W., Brown University, Providence, R. I.

Seifriz, William, University of Pennsylvania, Philadelphia, Pa.

Seiwell, H. Richard, Buffalo Museum, Buffalo, N.Y.

Seiwell, Gladys M., Buffalo Museum, Buffalo, N. Y.

Shropshire, Ralph F., Buffalo Museum, Buffalo, N. Y.

Specht, Heinz, Princeton University, Princeton, N. J.

Wilson, Charles B., Westfield Normal School, Westfield, Mass.

STUDENT INVESTIGATORS AT THE DORR STATION

Denison, Robert A., Harvard University, Cambridge, Mass. Lichtman, Frieda, Brooklyn, N. Y.

Rusden, Phillip, Harvard University, Cambridge, Mass.

Spofford, Walter R., Tufts College, Mass.

Warner, S. G., Harvard University, Cambridge, Mass.

Richardson, F., University of Vermont

Gates, W. H., Louisiana State University

THE LECTURE COURSE-1930

The fourth lecture course given under the auspices of the Laboratory has attracted large audiences and aroused much interest on the part of the summer residents of the Island. Following the lectures tea has been served in the Grange Hall by the ladies of the Laboratory.

The program of lectures is as follows:

- Dr. Robert W. Hegner, Johns Hopkins Univ.—Protozoan Parasites of Monkeys and Man. Lantern. July 14.
- Dr. Clarence C. Little, Jackson Laboratory,-Evolution and Religion. July 21.
- Dr. Kirtley F. Mather, Harvard Univ.— Mother Earth and Her Offspring. Lantern. July 31.

Mrs. Marie Poland Fish, Buffalo Museum—Fishes and their Ways. Lantern and moving pictures. August 11.

- Dr. W. T. Bovie, Bar Harbor, Me.,—How we are attuned to our Radiation Environment.
- Dr. Harlow Shapley, Harvard Univ.—Flights from Chaos. Lantern. August 25.

THE SEMINAR

The Monday night Seminar has also become an important feature of the life of the Laboratory. During the past summer the following seminar papers were read:

- E. K. Marshall, Jr., Johns Hopkins Univ. Medical School.—The Relation of Glomerular Development in the Vertebrate Kidney to Habitat. July 28.
- Ulric Dahlgren, Princeton Univ.—The Intestinal Wall of Myxine. Aug. 4.

Robert W. Hegner, Johns Hopkins School of Hygiene.—The Intestinal Protozoa of Monkeys. Aug. 4.

- Frank J. Myers, American Museum.—The Geographical Distribution of Rotifers. Aug. 11.
- Margaret M. Hoskins, N. Y. Univ.— Thyroid and Parathyroid in Relation to Tetany. Aug. 18.
- Charles B. Wilson, Westfield Normal School.—Copepods as Sand and Mud Dwellers. Aug. 18.
- Percy L. Johnson, Johns Hopkins Univ.—Concerning the Scientific Name of the Common Large Amoeba usually called Amoeba proteus (Leidy). Aug. 25.
- H. R. Seiwell, Buffalo Museum.—Some Quantitative Factors in Marine Environments. Aug. 25.
- S. O. Mast, Johns Hopkins Univ.-Amoeba. Sept. 1.
- H. V. Neal, Tufts College. The Ancestry of Vertebrates. Sept. 1.

SUMMARIES OF WORK ACCOMPLISHED IN 1930

In 1926 the publication of volumes of Contributions containing reprints of scientific papers based upon researches carried on at the Mt. Desert Island Biological Laboratory was begun. The object was to acquaint biologists and financial supporters

of the Laboratory with the amount and kind of work accomplished. After the publication of two volumes of Contributions, however, it was decided on account of expense and the difficulty of securing complete series of reprints to publish annually brief summaries of the work accomplished by individual workers. This custom is begun with the present issue of the Annual Announcement. Provision is thus made for the prompt publication of the more important results of researches carried on in the Laboratory.

1. REPORT OF SUMMER WORK AT THE MT. DESERT ISLAND BIOLOGICAL LABORATORY

By ULRIC DAHLGREN, Princeton University

The summer work consisted of collecting and mapping new collecting grounds; of studying the fresh water Bryozoa in the streams and ponds of Mount Desert Island, and of the adjacent main land within a radius of about one hundred miles; and of working out the life histories and ecology of a number of marine larval forms found in the plankton of Frenchman Bay. These larvae were traced to their adult species by successive day and night towing, and also by keeping them in tanks of running sea water in the Laboratory, a method which was found to be more successful than was anticipated before it had been tried. In some of this work the writer was assisted by his pupils from Princeton, Mr. C. Olcott and Mr. Heinz Specht.

In one of the most interesting cases an unknown worm larva was followed up with great success. On June 15th (1930) the water of Laboratory Cove was found to be full of what were evidently Chaetopod worm eggs and trochophores: also a few older larvae. At first it was attempted to find a sufficient number of breeding worms in the near surroundings to account for this large appearance of eggs and early larvae. This proving impractical, it was decided to work from the other end and try to follow the larvae in their life development. These eggs and young larvae were found in large numbers, only near the shore, and for about 100 yards out, occurring sparingly outside of that limit all over Frenchman Bay. In several days the number of eggs increased and the previous lots laid several days before had become trochophores and larvae with the "lappets" characteristic of the plankton young of so many chaetopoda. The larvae seemed to appear on the surface only at night being nearer the bottom in the daytime. By June 20th the mass of older larvae was enormous while eggs and trochophore larvae were decreasing in numbers. From June 25th to July 20th the larvae