BULLETIN
OF
THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY
1935

Announcement for 1935
Reports for 1934
Research Abstracts for 1934

THIRTY-SEVENTH SEASON
JUNE 15TH TO SEPTEMBER 15TH
1935

THE CORPORATION OF THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

James B. Allison, Rutgers University
Gerrit Bevelander, New York University
Louise DeKoven Bowen, Chicago, Illinois
Hermon Carey Bumpus, Waban, Massachusetts
Esther F. Byrnes, Philadelphia, Pennsylvania
Robert W. Clarke, New York University
William H. Cole, Rutgers University
Edwin Grant Conklin, Princeton University
Ulric Dahlgren, Princeton University
George B. Dorr, Bar Harbor, Maine
Allan Grafflin, Harvard University
Reginald G. Harris, Cold Spring Harbor
Robert W. Hegner, Johns Hopkins University
Hope Hibbard, Oberlin College
Margaret M. Hoskins, New York University
Duncan Starr Johnson, Johns Hopkins University
Percy L. Johnson, Missouri Valley College
Abram T. Kerr, Cornell University
Warren H. Lewis, Carnegie Institution of Washington
Frank Rattray Lillie, University of Chicago
Clarence Cook Little, Jackson Memorial Laboratory
Edward F. Malone, University of Cincinnati
Eli K. Marshall, Jr., Johns Hopkins University
Samuel O. Mast, Johns Hopkins University
Roy Waldo Miner, American Museum of Natural History
Stuart Mudd, University of Pennsylvania
Frank J. Myers, Ventnor, New Jersey
Herbert V. Neal, Tufts College
Thurlow C. Nelson, Rutgers University
George Howard Parker, Harvard University
Robert F. Pitts, New York University
George B. Roth, George Washington University
Harold D. Senior, New York University
James A. Shannon, New York University
Homer W. Smith, New York University
Heinz Specht, New York University
Benjamin Spector, Tufts College
G. Ledyard Stebbins, Harvard University
R. L. Taylor, William and Mary College
William Morton Wheeler, Harvard University
Donnell B. Young, George Washington University

David O. Rodick, Clerk, Bar Harbor, Maine

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

(FORMERLY THE HARPSWELL LABORATORY)

Founded by John Sterling Kingsley in 1898

OFFICERS

WARREN H. LEWIS
Carnegie Institution of Washington
President of the Corporation

DUNCAN STARR JOHNSON
Johns Hopkins University
Vice-President of the Corporation

DAVID O. RODICK
Bar Harbor, Me.
Treasurer of the Corporation

WILLIAM HARDER COLE
Rutgers University, New Brunswick, N.J.
Secretary of the Corporation and Director of the Laboratories

TRUSTEES

To serve until 1935

LOUISE DE KOVEN BOWEN, Chicago, Ill.
HERMON C. BUMPUS, Waban, Mass.
*ULRIC DAHLGREN, Princeton University.
GEORGE B. DORR, Bar Harbor, Me.
HERBERT V. NEAL, Tufts College.

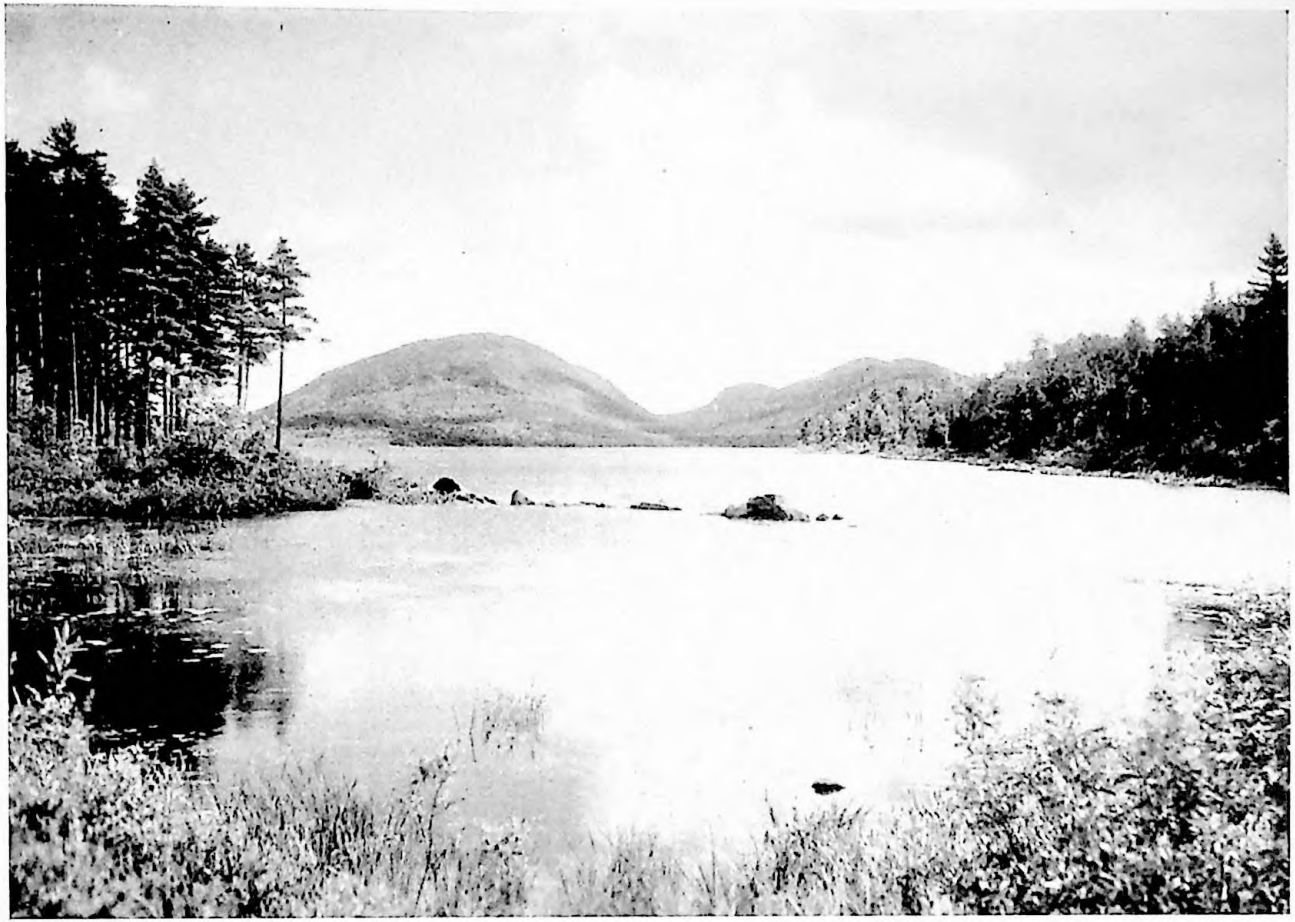
To serve until 1936

DUNCAN S. JOHNSON, Johns Hopkins University.
CLARENCE C. LITTLE, Roscoe B. Jackson Memorial Laboratory.
FRANK J. MYERS, American Museum of Natural History.
HAROLD D. SENIOR, New York University.
*HOMER W. SMITH, New York University.

To serve until 1937

*WILLIAM H. COLE, Rutgers University.
REGINALD G. HARRIS, Cold Spring Harbor.
ROBERT W. HEGNER, Johns Hopkins University.
*WARREN H. LEWIS, Johns Hopkins University.
E. K. MARSHALL, Jr., Johns Hopkins University.
*DAVID O. RODICK, Bar Harbor.

**Members of Executive Committee.*



Eagle Lake, Mt. Desert Island

HISTORICAL

1898 Laboratory established at South Harpswell, Maine, by J. S. Kingsley.

1913 Reorganization of laboratory as a scientific corporation under the laws of the State of Maine with a board of ten trustees and J. S. Kingsley as director.

1921 Removal of laboratory to Salsbury Cove on Mount Desert Island, Maine, and designation as the Weir Mitchell Station of the Harpswell laboratory under the directorship of Ulric Dahlgren.

1922 Eighty acres of land near the Weir Mitchell Station purchased from Louis B. McCagg, since then developed as home sites for biologists working in the laboratory.

1923 Land for Weir Mitchell Station deeded by the Wild Gardens Corporation to the laboratory, the name of which was changed to the Mt. Desert Island Biological Laboratory.

1926 H. V. Neal elected Director of the Weir Mitchell Station.

1928 Amalgamation of the Mt. Desert Biological Laboratory with the laboratory founded by Clarence Cook Little at Bar Harbor. The latter was designated the Dorr Station with C. C. Little as director.

1929 Land opposite the Weir Mitchell Station deeded to the laboratory by John D. Rockefeller, Jr.

1931 William H. Cole elected Director of the Weir Mitchell Station, and R. L. Taylor, Director of Dorr Station.

1933 All instruction at the Dorr Station discontinued; facilities to be devoted to research in terrestrial and fresh water biology, under the same direction as the Weir Mitchell Station.

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 hun-

dreds of pelagic forms are found on the surface in their season. The deep bottoms furnish brachiopods, huge actinians, basket stars, tunicates and other rare forms. Mud flats furnish a great abundance of invertebrates and plants. The tide rises and falls from eleven 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 species not ordinarily easy to secure in still waters.

In the following list are mentioned some of the common aquatic animals which may be secured at Mount Desert Island for investigation during the summer season.

1. Many different types of bryozoa and rotifers—very abundant.
2. Several genera of colonial hydrozoa—very abundant; the scyphozoa *Aurelia, Cyanea* and *Melicerta*—frequently abundant; the actinozoa *Metridium* and *Sagartia*—abundant.
3. The nemertean *Cerebratulatus lacteus*—available in small numbers with ripe eggs from July to August 20th.
4. A great variety of annelids, including *Echiurus*—sometimes with ripe eggs and sperms; *Amphitrite, Clymenella, Myxicola* and *Piscicola*—abundant.
5. The brachiopod *Terebratulina*—very abundant.
6. The molluscs *Mya, Mytilus, Chrysodomus, Natica, Chiton, Yoldia, Saxicava, Acmaea, Dentalium, Astarte, Pecten maximus, Venericardium* and many others—abundant.
7. Many genera of echinodermata, including *Asterias, Ctenodiscus, Strongylocentrotus, Echinarachnius* (sexually mature June to October), *Ophiopholis, Cucumaria*—very abundant; *Crossaster, Solaster* and *Henricia*—available in moderate numbers.
8. Crustacea in great abundance and diversity.
9. The tunicates, *Cynthia, Molgula* and *Boltenia*—abundant.
10. The fresh-water fishes, *Perca, Micropterus, Eupomotis, Leptodoras,* etc.—abundant in the lakes.
11. The marine fishes, *Myxine,* the slime eel, and *Petromyzon*—abundant; *Fundulus heteroclitus,* with ripe eggs from July 1st to August 20th, very abundant; *Lophius,* or goosefish—easily obtainable; dogfish, skates, cod, haddock, sculpins, flounders, and hake—very abundant, the hake being sexually mature in summer.

Upon a survey of the fauna it becomes evident that a research laboratory, situated at some point on the gulf of Maine, is highly desirable for the biologists of the country.

Cape Cod, as has been pointed out in past years by Gould, Dana, Verrill, Packard and many others, is the dividing boundary between the more northern Acadian, and the southerly Virginian fauna and flora of the Atlantic 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 Laboratory brings the worker in contact with the rich Acadian groups.

In addition to its marine fauna, the island, which comprises about one hundred square miles, 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 the highest to over 1500 feet, are lakes, streams, and marshes with rich fresh-water fauna and flora. Several of the lakes are large and deep; one of lesser size is 1100 feet above the sea. Brooks of cold water are abundant, containing trout and a great variety of northern fresh-water invertebrates. Besides being the home of numerous plant and animal communities, the island is on the migration route of many birds.

Situated in a region of great beauty, unspoiled by commercial exploitation or nearness to cities, the laboratory has the advantage of being near the wild life sanctuary in the Acadia National Park. This is the only national park in the eastern portion 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 biological study.

CONTRIBUTORS AND SUBSCRIBING INSTITUTIONS

The financial support of the Mt. Desert Island Biological Laboratory has come chiefly through 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 a few colleges, universities, and foundations have supported research rooms occupied by

members of their respective staffs. During 1934 rooms were supported by the following:

Carnegie Institution of Washington
Department of Embryology

Johns Hopkins University
Department of Botany

New York University
Department of Anatomy
Department of Physiology

Princeton University
Department of Biology

Rutgers University
Department of Physiology

The Commonwealth Fund

Tufts College
Department of Biology

SCIENTIFIC FACILITIES

WEIR MITCHELL STATION

At the Weir Mitchell Station in Salsbury Cove a group of buildings provides facilities for research in biology. No instruction is offered. All of the buildings are supplied with fresh water and electricity for light, heat, and power of 110 volts, 60 cycles, single phase, alternating current. Distilled water and compressed air are also available. The main building contains 10 research rooms accommodating 2 persons each. Along the central hallway are two salt water shelves providing running salt water from a non-toxic system, in which the water comes in contact only with a lead pump, lead pipe, a wooden tank and rubber spigots. The sea water is pumped from well below the lowest tide level and is stored in a 2100 gallon reservoir. Insulation of the reservoir prevents heating of the water, so that the temperature of the water delivered to the aquaria is only from 1 to 2° above that of the sea, which varies from 8 to 16° C. during the summer. Besides being cold the water is uncontaminated with wastes and oils, thus allowing prolonged observations

on sensitive organisms in the laboratory. A stock room supplies the equipment and reagents commonly required for ordinary experimental work in biology. All special and unusual pieces of apparatus and equipment must be requested well in advance or brought by the investigator. A second building with two research rooms is supplied with salt water shelves and a laboratory especially equipped for chemical studies. A third building, also supplied with salt water, is arranged as a dark room for experimental and photographic work. A fourth building provides space for a shop and for storage. The fifth building serves as an office and library, containing many of the American biological journals, several thousand reprints and about 1000 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.

For collecting and dredging in deep water a thirty foot cabin power boat, the Dahlgren, with equipment for hauling, towing, and dredging at moderate depths is available. For work near shore a small motor boat and several row boats are supplied.

On the McCagg tract, about one-quarter mile distant, a small dwelling has been equipped for such research as does not require sea water. Six or eight investigators can be accommodated in that building.

THE DORR STATION

The Dorr Station is located one and one-half miles south of Bar Harbor, and about seven miles from Salsbury Cove. It abuts on the Acadia National Park which is available for exploration and study. The land and buildings, which are now the property of the Jackson Memorial Laboratory and which are available through the courtesy and cooperation of that institution, were originally provided by the generous gift of George B. Dorr, Superintendent of the Acadia National Park

The station offers facilities for the study of plants and animals (exclusive of marine forms) in their natural environment. No instruction is offered.

The physical equipment consists of a wooden laboratory building, a small recreation building, a dining hall, and

tents with wooden floors. All of the buildings are supplied with running fresh water and electricity. The laboratory is equipped for elementary work in biology. All optical apparatus and all special and unusual supplies must be requested well in advance or brought by the investigator.

GENERAL INFORMATION

Applications for use of the laboratory facilities by investigators at the Weir Mitchell and Dorr Stations will be considered on May 1st, and assignments made according to order of receipt and special needs. Requests received after that date may have to be denied due to lack of space. Application blanks will be sent to anyone interested. They should be returned to Prof. William H. Cole, Rutgers University, New Brunswick, N.J., before May 1st, 1935.

The fees for use of research rooms during the summer season including ordinary glassware, chemicals and supplies is $100. at the Weir Mitchell Station, and $50. at the Dorr Station, payable July 1st, 1935. In special cases the Executive Committee may remit part or all of such fees. Applications for remission should be made as early as possible and in no case later than May 1st, 1935.

Board for those connected with the laboratory and their immediate families will be provided in the laboratory dining hall in Salsbury Cove at $8.00 per week. For others the charge will be $10.00.

Rooms may be found in the neighboring village at reasonable prices.

Salsbury Cove is an old fishing and farming hamlet on the north shore of Mount Desert Island, about five miles from Bar Harbor and on the main road between Bar Harbor and Ellsworth on the mainland, the terminus of the Boston and Maine Railroad. The village of Salsbury Cove is a quiet market-gardening and farming community with its own post office and general store. Bar Harbor has good stores of every sort, an excellent hospital, express, telegraph, cable facilities, bus and boat service.

Those wishing to come to the Laboratory by rail may arrive from Portland, Boston, New York, Philadelphia, or Washington on the Bar Harbor Express over the Boston and Maine Railroad, which will bring them directly to Ells-

worth whence a bus runs through Salsbury Cove to Bar Harbor. Convenient rail connections from intermediate stations are served by the Boston and Maine, the Boston and Albany, and the New York, New Haven and Hartford. Connections by water from Boston are excellent and less expensive. A Boston and Bangor Steamship Line boat leaves Boston for Bangor every evening except Sunday. Passengers for Mt. Desert may change at Rockland in the early morning for a boat to Bar Harbor arriving about noon, or may continue to Bucksport on the Penobscot River, whence a bus runs through Salsbury Cove arriving at Bar Harbor about eleven in the morning. An airplane line from Boston to Bangor provides rapid service between the two cities at only slightly greater expense than by rail. Prices of fares, staterooms, time of departure and arrivals and similar information may be obtained from travel bureaus. Through automobile roads from all sections of New England to Bar Harbor are excellent, with ample facilities for overnight stops. The laboratory car will meet arrivals in Bar Harbor, provided notice is received by the Director well in advance. Personal baggage and cartage of workers at the laboratory will be carried by the laboratory car for a nominal charge. Correspondents are advised against addressing mail to Mount Desert, which is the official name of Somesville, a town on Mount Desert Island.

The correct address is:

The Mount Desert Island Biological Laboratory,
Salsbury Cove, Maine.

TREASURER'S REPORT

October 1, 1933—September 30, 1934

Income

Cash balance on deposit with Bar Harbor Banking and Trust Company, October 1, 1933	$2,099.97
Interest on deposits to October 1, 1934	24.04
Dues from members of Corporation	130.00
Room fees	900.00
Miscellaneous income (rentals and sales)	235.54
Contributions	2,285.00
Total Income	$5,674.55

Expenditures

Administration (including Director's salary of $500)	$798.09	
Publication and distribution of annual Bulletin	267.59	
Mitchell Station		
Buildings and repairs	1,097.34	
Laboratory support (chemicals, apparatus, collecting, motors and boats, electricity, water, cartage)	906.53	
Library	172.40	
Insurance	62.10	
Taxes	70.00	
Wages	993.74	
Motion picture	204.02*	
Total expenditures	$4,571.81	
Cash balance on deposit in Bar Harbor Banking and Trust Company, October 1, 1934	$1,102.74	$5,674.55

Endowment Fund

One U. S. 4th Liberty Bond, valued at cost	$500.00
Cash on deposit in Bar Harbor Banking and Trust Company	51.12
Total endowment	$551.12

* Funds for making the motion picture were contributed expressly for that purpose.

DIRECTOR'S REPORT FOR 1934

DIRECTOR'S REPORT FOR 1934

During the summer of 1934 the laboratory again operated on a restricted budget, but met all demands upon it, and closed the fiscal year free from debt. The laboratory exists solely for research in biology and related fields, and it offers to each worker complete freedom in choosing and investigating his own problems. The following workers were in attendance at the laboratory for at least one month each:

INVESTIGATORS

Allison, J. B., Rutgers University
Cole, W. H., Rutgers University
Dahlgren, Ulric, Princeton University
De Lamater, E. D., Johns Hopkins University
Goldberg, Benjamin, Johns Hopkins University
Hibbard, Hope, Oberlin College
Johnson, D. S., Johns Hopkins University
Kaylor, C. T., Princeton University
Kropp, Benjamin, Harvard University
Lewis, Margaret R., Carnegie Institution
Lewis, Warren H., Carnegie Institution
Shannon, James A., New York University
Shannon, Mrs. James A., New York University
Sizer, I. W., Rutgers University
Smith, F. G. Walton, Commonwealth Fellow, Princeton University
Specht, Heinz, New York University

RESEARCH ASSISTANTS

Hibbard, Jean, University of Missouri
Knocke, F. J., Princeton University
MacNeal, P. S., University of Michigan

LABORATORY STAFF

Cole, William H., Director
Crabtree, William, Boatman and Collector
Russell, Walter, Caretaker
Sizer, I. W., Assistant Collector

PUBLIC ACTIVITIES

In place of lectures and seminars previously held, the laboratory was thrown open to visitors on Wednesday after-

noons from July 18th to August 29th inclusive, and exhibited the motion picture film taken at the laboratory during 1933 and entitled, "Mt. Desert Island and Some of Its Marine Animals," at the Criterion Theater in Bar Harbor on July 22nd. Nearly 300 persons came to the laboratory on the seven visitors' day and took real interest in the aquaria displays and the experimental demonstrations arranged by the investigators. At the showing of the film the theater was filled to its capacity of 1100 persons, who showed their appreciation by frequent applause. The film was made possible by financial support from the Maine Development Commission, The Bar Harbor Chamber of Commerce and Mr. George B. Dorr. A copy is now in possession of the Commission to which requests for its loan should be addressed at Augusta, Maine. Portions of the film showing only typical marine animals of the island have been collected and prepared for use in school and college instruction. Information concerning contents and rental may be secured from the Director.

During the summer there was distributed to the residents of the island and neighboring towns an 8-page pamphlet containing a brief historical sketch of the laboratory and a summary of its research activities during recent years.

GENERAL REMARKS

By careful planning and strict economy it was possible to continue the needed repairs to buildings begun last year, and to make three inexpensive but very valuable improvements in the laboratory's facilities. The salt water reservoir was insulated so that the temperature of the water did not rise more than 2° C. above that of the water in the bay even on the hottest days of the summer, and an automatic switch for the salt water pump was installed, thereby insuring an adequate supply of cold water at all times. A small shop building was erected near the laboratories, thus providing quarters and facilities for general storage, and for repairing and constructing apparatus and other equipment.

The laboratory again received the approval and some financial aid from the National Research Council and the American Association for the Advancement of Science, to which organizations the laboratory gratefully expresses

its thanks. Although it is unlikely that funds for endowment can be secured during the present economic depression, the trustees are aware of the need and will continue efforts to secure them. Modern biological research is unavoidably expensive and will probably continue to be so for years to come. In order to maintain its facilities offered to biologists of the world, the Mt. Desert laboratory must secure some sort of guaranteed income. The investigators themselves cannot be expected to bear the major portion of the expense involved.

RESEARCH ABSTRACTS

As in the past four years the following summaries of research accomplished are presented for the season of 1934. The reports have been edited only to insure uniformity of arrangement, and are otherwise in the form contributed by the authors. (For bibliographic reference it is recommended that the following form be used: "Bull. Mt. Desert Is. Biol. Lab., 1935, p——".)

A STUDY OF THE PITUITARY GLAND OF CERTAIN FISHES BY MEANS OF TISSUE CULTURES

MARGARET REED LEWIS AND PERRY S. MACNEAL

Carnegie Laboratory of Embryology, Johns Hopkins Medical School and School of Medicine, University of Michigan

Only a few of the many kinds of fish to be found in the waters of the Mount Desert Island region were studied—the dogfish and skate representing the cartilaginous group; the flounder, sculpin and angler fish (*Lophius piscatorius*) as specimens of the bony variety.

Some preparations were stained supra-vitally with neutral red, janus green, brilliant cresyl blue and fluorescent X. Brilliant cresyl blue stained the cells more differentially than the other dyes.