BULLETIN
OF
THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY
1937

THIRTY-NINTH SEASON

JUNE 15TH TO SEPTEMBER 15TH

1936

BULLETIN

OF

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

FEBRUARY, 1937

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Salsbury Cove, Me.

1937

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

DUNCAN STARR JOHNSON
The Johns Hopkins University
Vice-President

GUY E. TORREY
Bar Harbor, Maine
Treasurer

DWIGHT E. MINNICH
University of Minnesota
Secretary

DAVID O. RODICK
Bar Harbor, Maine
Clerk

WILLIAM H. COLE
Rutgers University
Director of the Laboratories

TRUSTEES

To serve until 1937

*WILLIAM H. COLE, Rutgers University
ROBERT W. HEGNER, The Johns Hopkins University
*WARREN H. LEWIS, Carnegie Institution of Washington
E. K. MARSHALL, JR., The Johns Hopkins University
DAVID O. RODICK, Bar Harbor, Me.
STANLEY J. G. NOVAK, Boston City Hospital

To serve until 1938

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

To serve until 1939

J. T. HALSEY, Tulane University
DUNCAN S. JOHNSON, The Johns Hopkins University
CLARENCE C. LITTLE, Jackson Memorial Laboratory
DWIGHT E. MINNICH, University of Minnesota
HAROLD D. SENIOR, New York University
*HOMER W. SMITH, New York University

* *Members of Executive Committee*

MEMBERS

Howard B. Adelmann, Cornell University
James B. Allison, Rutgers University
Gerrit Bevelander, New York University
Louise DeKoven Bowen, Chicago, Illinois
Hermon C. Bumpus, Waban, Massachusetts
Earl O. Butcher, Hamilton College
Esther F. Byrnes, Philadelphia, Pennsylvania
Robert W. Clarke, Yale University
William H. Cole, Rutgers University
Edwin G. Conklin, Princeton University
Ulric Dahlgren, Princeton University
George B. Dorr, Bar Harbor, Maine
Edward K. Dunham, Jr., New York City
J. T. Halsey, Tulane University
Robert W. Hegner, Johns Hopkins University
Hope Hibbard, Oberlin College
Margaret M. Hoskins, New York University
Duncan S. Johnson, Johns Hopkins University
Percy L. Johnson, Missouri Valley College
Abram T. Kerr, Cornell University
Warren H. Lewis, Carnegie Institution
Frank R. Lillie, University of Chicago
Clarence C. Little, Jackson Memorial Laboratory
Edward F. Malone, University of Cincinnati
Eli K. Marshall, Jr., Johns Hopkins University
Samuel O. Mast, Johns Hopkins University
Roy W. Miner, American Museum
Dwight E. Minnich, University of Minnesota
Stuart Mudd, University of Pennsylvania
Frank J. Myers, Ventnor, New Jersey
Herbert V. Neal, Tufts College
Thurlow C. Nelson, Rutgers University
Stanley J. G. Novak, Boston City Hospital
George H. Parker, Harvard University
Robert F. Pitts, New York University
David O. Rodick, Bar Harbor, Maine
George B. Roth, George Washington University
Harold D. Senior, New York University
James A. Shannon, New York University
*Herbert N. Shenton, Syracuse University
Homer W. Smith, New York University
Heinz Specht, U. S. Dept. Industrial Hygiene
Benjamin Spector, Tufts College
Guy E. Torrey, Bar Harbor, Maine
Donnell B. Young, George Washington University
E. Lorraine Young, III, Harvard University

ASSOCIATE MEMBERS

John Hampton Barnes, Philadelphia Pennsylvania
Cecil Barret, New York City
Gist Blair, Washington, D.C.
Robert E. Blum, New York City
Richard E. Byrd, Boston, Massachusetts
Myra Fox, Bangor, Maine
Mrs. Alexander Gordon, Baltimore, Maryland
Thurlow M. Gordon, New York City
Thurlow M. Gordon, Jr., Princeton University
E. Lee Jones, McLean, Virginia
Mrs. Walter G. Ladd, Far Hills, New Jersey
Mrs. Morris Loeb, New York City
Theodore Marburg, Baltimore, Maryland
C. L. Marlatt, Washington, D.C.
Henry Morgenthau, New York City
Mrs. Henry Morgenthau, New York City
James F. Porter, Chicago, Illinois
David Riesman, Philadelphia, Pennsylvania
R. E. Schuh, Brooklyn, Maine

* Died Jan. 6, 1937

HISTORICAL SKETCH

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 Mount Desert Island Biological Laboratory.

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

1928 Amalgamation of the Mount Desert Island 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.

1935 Additional land opposite Weir Mitchell Station, containing fresh water pond, deeded to laboratory by John D. Rockefeller, Jr.

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 hundreds 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. Nemerteans: *Cerebratulatus lacteus*—available in small numbers with ripe eggs from July to August 20th; and several other genera.
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, Stronglyocentrotus, 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, Euphomotis, 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 Mount Desert Island Biological Laboratory has come chiefly through contributions of summer residents of Mount 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, univer-

sities, and foundations have supported research rooms occupied by members of their respective staffs. During 1936 rooms were supported by the following:

Carnegie Institution of Washington
Department of Embryology
Cornell University
Department of Histology and Embryology
The Johns Hopkins University
Department of Botany
New York University Medical School
Department of Physiology
Princeton University
Department of Biology
Rutgers University
Department of Physiology
Department of Zoology
Tufts College
Department of Biology
University of Minnesota
Department of Zoology

In addition to supporting two research rooms, Rutgers University also supplied two student scholarships yielding room and board.

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° 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 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

During 1937 the laboratory will be open from June 15th to September 15th.

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, 1937.

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, 1937. In special cases the Executive Committee may remit part or all of such fees. Applications for remission should be made as early as possible.

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 Ellsworth whence a bus runs through Salsbury Cove to Bar Harbor. Convenient rail connections from intermediate stations are served by the Boston and Maine, the Maine Central, the Boston and Albany, and the New York, New Haven and Hartford. Steamship service from Boston has been discontinued, but weekly service by Eastern Steamship Co. from New York City, via Portland, to Bar Harbor is maintained during July and August. An airplane line from Boston to Bar Harbor provides rapid service 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 village on Mount Desert Island.

The correct address is:

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

Star Point, Near Laboratory

TREASURER'S REPORT

(From October 1, 1935 to September 30, 1936)

Income

Balance, Oct. 1, 1935	$ 195.81	
Contributions prior to Oct. 1, 1935	1,562.50	
Contributions, during fiscal year	758.50	
Sale of bond in Endowment Fund	500.00	
Dues of active members	175.00	
Room fees	1,205.30	
Rental of cottage	150.00	
Sales, interest and refunds	59.61	
Total income		$4,606.72

Expenditures

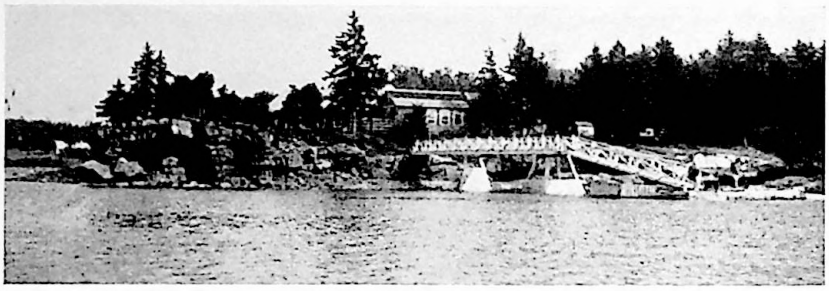
Administration	$ 108.56	
Annual Bulletin	273.73	
Repairs to buildings and equipment	207.70	
New Cottage, transferred to Endowment Fund	1,606.82	
Laboratory support (supplies, collecting, etc.)	960.22	
Library	41.00	
Dining Hall	14.77	
Insurance	81.03	
Wages	875.41	
Transferred to Endowment Fund, from rental	100.00	
Total expenditures		$4,213.24

Balance, Oct. 1, 1936	393.48
Contributions to 1937 budget prior to Oct. 1, 1936	1,153.78*
Total cash on hand	$1,547.26

Endowment Assets

Balance in savings account, Oct. 1, 1935	$ 51.12
Interest	2.71
From rental of cottage	100.00
Cost of cottage	1,606.82
Total	$1,760.65

* Including $787.28 proceeds from Admiral Byrd's lecture.



View of Laboratory from Emery Cove

DIRECTOR'S REPORT FOR 1936

During the summer of 1936 the facilities of the laboratory were used by twenty-two persons from fifteen institutions, carrying on investigations of fifteen different subjects. During most of the summer every room in the main building was occupied by at least one worker and several rooms by two workers. After an interim of three years, weekly seminars were held at which reports of recent research were presented. The program was as follows:

July 14, "A theory of anesthesia," by Dr. Vera Koehring
July 21, "The problem of cyclopia" by Dr. H. B. Adelmann
July 28, "The growth of hair in the rat," by Dr. E. O. Butcher
Aug. 4, "Interrelationships of the endocrine glands," by Dr. E. L. Sevringhaus
Aug. 11, "Recent advances in renal physiology," by Dr. R. W. Clarke
Aug. 18, "Contracture in the gastrocnemius muscle of the frog," by Dr. Willie Smith
Aug. 25, "Some experiments in respiration," by Dr. E. K. Marshall, Jr.
Sept. 1, "Blood relationships," by Dr. A. A. Boyden

The laboratory closed a little earlier than usual (Sept. 5) since several workers wished to attend the Harvard Tercentenary meetings and the Cancer Symposium in Wisconsin.

On Wednesday afternoons the laboratory was open to the public and about two hundred visitors inspected the exhibits and the work being done. A special meeting was held for associate members and invited guests, at which brief business and research reports were presented.

Late in August Admiral Richard E. Byrd gave a motion

picture lecture on his second Antarctic Expedition before a full house in the Criterion Theater in Bar Harbor. As indicated in the treasurer's report, the laboratory benefited considerably from this event, and is deeply indebted to Admiral Byrd for his generous contribution. Especially gratifying was the support received from the following business concerns of Bar Harbor and vicinity:

> Criterion Theater, Bar Harbor Club, Lions Club, Bar Harbor Times, Abbott Electric Co., F. E. Sherman Co., G. A. Liscomb, Morang-Robinson Co., E. L. Higgins, R. L. White Co., L. C. Haraden, West End Drug Co., Lynam and Co., Bar Harbor Bank and Trust Co., First National Bank, L. I. Dunton, Bangor Hydro-Electric Co., Bar Harbor Laundry, J. H. Sawyer Co., Bar Harbor Dairy, Perlinsky's, Butterfields, MacLeod Motors, Frank M. Graham Co., Bar Harbor Motors, R. Jellison, Kirk Brothers, Green Brothers, Spragues' Paint Shop, Sherman Stationary, Nickerson, Spratt and Greeley.

Last spring the laboratory built and furnished a small cottage to rent at a moderate rate to workers. It was easily rented at a fair return and demonstrated that the laboratory would profit in several ways by having cottages which can be rented to investigators, who otherwise would be unable to work at the laboratory. Other cottages should be built as soon as possible. The trustees have authorized the building or purchase of a second cottage in 1937 if funds become available.

At the annual meetings of the Corporation and of the Trustees, Dr. S. J. G. Novak, of the Surgical Research Laboratory, Boston City Hospital, was elected a trustee to fill the vacancy caused by the death of Dr. R. G. Harris last year; other trustees, in the class of 1939, were elected as follows: Dr. J. T. Halsey, D. S. Johnson, C. C. Little, D. E. Minnich, H. D. Senior and H. W. Smith; and the following were elected members of the corporation: Dr. Howard B. Adelmann, Cornell University, Mr. E. K. Dunham, Jr., New York City, Dr. H. N. Shenton, Syracuse University, Dr. S. J. G. Novak, Boston City Hospital, and Mr. E. Lorraine Young, III, Harvard University. The total membership of the corporation including associates is now sixty-six. Within recent weeks the laboratory suffered a real loss by the death of Mrs. E. K. Dunham of New York City, and Seal Harbor, who had for many years been a friend of the laboratory.

The laboratory is still in need of endowment or a guaran-

teed annual income, so that its work will not be jeopardized by uncertainty and inadequate support. Although the income from room fees during the past summer was larger than for several preceding years, it is not likely that the laboratory can ever be self-supporting. It must depend upon contributions from individuals and institutions interested in biological research.

The following workers were at the laboratory during the season:

Independent Investigators

Adelmann, Howard B., Cornell University
Boyden, Alan A., Rutgers University
Butcher, Earl O., Hamilton College
Cole, William H., Rutgers University
Clarke, Robert W., New York University (now, Yale University)
Dahlgren, Ulric, Princeton University
Halsey, J. T., Tulane University
Johnson, Duncan S., Johns Hopkins University
Koehring, Vera, Deaconess Hospital
Lewis, Margaret R., Carnegie Institution of Washington
Lewis, Warren H., Carnegie Institution of Washington
Minnich, Dwight E., University of Minnesota
Walp, R. L., Marietta College

Junior Investigators and Assistants

Evans, Ernest M., University of Pennsylvania
Miles, Samuel S., Princeton University
Ransom, Leland B., Rutgers University
Rye, Robert, Princeton University
Schaeffer, Kenneth F., Rutgers University
Seronde, Joseph, Jr., Yale University
Smith, Willie, New York University
Test, Charles E., Princeton University
Young, E. Lorraine, III, Harvard University

Laboratory Staff

Cole, William H., Director
Russell, Walter G., Caretaker
Young, E. Lorraine, III, Collector

RESEARCH ABSTRACTS FOR 1936

The following abstracts summarize the results of investigations carried on at the laboratory during the summer of 1936. 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.*, p. ——.")