

*Cole*

BULLETIN  
OF  
THE MOUNT DESERT ISLAND  
BIOLOGICAL LABORATORY  
1936

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THIRTY-EIGHTH SEASON

JUNE 15TH TO SEPTEMBER 15TH

1936

BULLETIN  
OF  
THE MOUNT DESERT ISLAND  
BIOLOGICAL LABORATORY

JANUARY, 1936

*Contents*

	PAGE
List of officers and trustees .....	2
List of members .....	3
Historical sketch of laboratory .....	4
Location .....	5
Contributors and subscribing institutions .....	6
Scientific facilities .....	7
General information .....	9
Treasurer's report for 1935 .....	11
Director's report for 1935 .....	12
Research abstracts for 1935 .....	14



Salsbury Cove, Me.

1936

# 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*

WILLIAM H. COLE  
Rutgers University, New Brunswick, N.J.  
*Secretary of the Trustees and Director of the Laboratories*

DAVID O. RODICK  
Bar Harbor, Maine  
*Clerk*

## TRUSTEES

*To serve until 1936*

DUNCAN S. JOHNSON, the Johns Hopkins University  
CLARENCE C. LITTLE, 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, N.Y.  
ROBERT W. HEGNER, the Johns Hopkins University  
\*WARREN H. LEWIS, Carnegie Institution  
E. K. MARSHALL, JR., the Johns Hopkins University  
DAVID O. RODICK, Bar Harbor, Me.

*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.

\*Members of Executive Committee

†Died Jan. 7, 1936

## MEMBERS

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, New York University  
William H. Cole, Rutgers University  
Edwin G. Conklin, Princeton University  
Ulric Dahlgren, Princeton University  
George B. Dorr, Bar Harbor, Maine  
Allan L. Grafflin, Harvard University  
J. T. Halsey, Tulane University  
†Reginald G. Harris, Cold Spring Harbor, N.Y.  
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 of Washington  
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 of Natural History  
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  
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  
Homer W. Smith, New York University  
Heinz Specht, New York University  
Benjamin Spector, Tufts College  
R. L. Taylor, College of William and Mary  
Guy E. Torrey, Bar Harbor, Maine  
Donnell B. Young, George Washington University

## ASSOCIATE MEMBERS

John Hampton Barnes, Philadelphia, Pennsylvania  
Gist Blair, Washington, D.C.  
Mrs. E. K. Dunham, New York City  
Myra Fox, Bangor, Maine  
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



## 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 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.
- 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 *Meliceria*—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*, *Acmaca*, *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 1935 rooms were supported by the following:

Carnegie Institution of Washington

Department of Embryology

The Johns Hopkins University

Department of Botany

New York University Medical School

Department of Anatomy

Department of Physiology

Princeton University

Department of Biology

Rutgers University

Department of Physiology and Biochemistry

Tufts College

Department of Zoology

University of Minnesota

Department of Zoology

## 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 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

During 1936 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, 1936.

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, 1936. 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, 1936.

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 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 Mount Desert Island disembark at 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 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 town on Mount Desert Island.

The correct address is:

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



*Star Point, Near Laboratory*

# TREASURER'S REPORT

October 1, 1934—September 30, 1935

## INCOME

Cash balance on deposit with Bar Harbor Banking and Trust Co., Bar Harbor, Me., Oct. 1, 1934 .....	\$1,102.74
Interest on deposits to Sept. 30, 1935 .....	21.25
Dues from members of the Corporation .....	185.00
Room fees for season of 1935 .....	740.00
Dining Hall receipts .....	17.70
Miscellaneous income (sales, rentals, etc.) .....	38.98
Contributions to 1935 budget .....	1,051.28
Total income .....	<u>\$3,156.95</u>

## EXPENDITURES

Administration (Including director's salary, \$250.) .....	\$ 343.18
Publication and distribution of Annual Bulletin .....	234.60
Mitchell Station	
Buildings and repairs .....	487.29
Laboratory support (chemicals, apparatus, motors and boats, collecting, electricity, water, cartage) .....	818.41
Library .....	65.02
Dining Hall .....	3.00
Insurance on buildings and motor car ....	212.60
Taxes on non-exempt property .....	77.00
Wages .....	585.75
Motion picture .....	134.29*

Total expenditures .....\$2,961.14

Cash balance on deposit with Bar Harbor Banking and Trust Co., Oct. 1, 1935 .....	195.81	<u>\$3,156.95</u>
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Contributions to 1936 budget .....	<u>\$1,562.50</u>
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Total cash on deposit with Bar Harbor Banking and Trust Co., Oct. 1, 1935 .....	<u>\$1,758.31</u>
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## ENDOWMENT FUND

One U. S. 4th Liberty Bond, valued at cost .....	\$ 500.00
Cash on deposit with Bar Harbor Banking and Trust Co., Savings Account .....	51.12

Total endowment .....\$ 551.12

\*This amount was contributed expressly for making motion pictures.



*View of Laboratory from Emery Cove*

### DIRECTOR'S REPORT FOR 1935

The laboratory again operated on a greatly restricted budget and closed its fiscal year with a small balance and free from debt. With 20 workers in the laboratory nearly all of the available space was taken.

The laboratory was again open for visitors on Wednesday afternoons when over 300 persons inspected the displays and the work being done. A benefit motion picture show was held in Bar Harbor on August 14th when the following films were exhibited: "Some Common Marine Animals," "Development of the Rabbit and Monkey Eggs," and "Mitosis." Some 400 people attended and a modest profit was realized.

The only improvement in the physical plant consisted of extensive repairs to the main piers which were badly damaged by ice during the winter of 1934.

There has been under way at the laboratory during the past two summers an exploratory study of the structure and physiological activities of the hypophysis of marine animals. During the summer of 1934 Margaret R. Lewis and Perry S. MacNeal studied the hypophyses of a few fishes. Their preliminary observations published in the BULLETIN for 1935 showed that the gland of the dogfish and of the skate affords particularly favorable material for the study of different types of hypophyseal gland cells. During the summer of 1935 more investigators were attracted to the field and a coöperative study was developed along pharmacological, physiological, histological and morphological lines by six different workers. The abstracts



of their results at the end of this BULLETIN are indicative of the possibilities in coöperative attacks on such a problem.

At the annual meeting of the Trustees on August 8th the Executive Committee was authorized to seek associate members who are interested in the research work of the laboratory and willing to contribute annually to its support. It is gratifying to report that from a small selected list to whom invitations were sent sixteen have become associate members.

At the meeting also Mr. Guy E. Torrey was elected a trustee and treasurer. Mr. David O. Rodick found it necessary to retire as treasurer but continues to serve as clerk and trustee. Four new members of the Corporation were elected as follows: Earl O. Butcher, Hamilton College; J. T. Halsey, Tulane University; Dwight E. Minnich, University of Minnesota; and Guy E. Torrey, Bar Harbor, Me.

As has been said so many times before the laboratory will never reach its maximum efficiency until some sort of guaranteed annual income is secured. The laboratory exists solely for research in biology and related fields. No restrictions are placed on the investigators as to choice of subject or as to method of procedure. Research must remain free from arbitrary restraints. As such it is bound to be expensive and the Trustees realize that the major portion of the laboratory's expenditures must be met by contributions from those interested in research and willing to support it. During the summer of 1935 the amount contributed to the 1936 budget exceeded by several times the amounts received during each of the four preceding summers.

The following workers were at the laboratory during the summer:

*Independent Investigators*

Adelmann, Howard, B., Cornell University  
Butcher, Earl O., Hamilton College  
Cole, William H., Rutgers University  
Clarke, Robert W., New York University  
Dahlgren, Ulric, Princeton University  
Halsey, J. T., Tulane University  
Lewis, Warren H., Carnegie Institution  
Lewis, Margaret R., Carnegie Institution  
Minnich, Dwight E., University of Minnesota  
Smith, Homer W., New York University

*Junior Investigators and Assistants*

Gordon, Thurlow M., Jr., Princeton University  
Kaplan, Leo, New York University  
Mason, J. Tufton, Princeton University  
Matson, Donald D., Cornell University  
Miles, Samuel S., Princeton University  
Morris, Jack, Princeton University  
Riesman, Mary, Philadelphia  
Seronde, Joseph, Jr., Yale University  
Smith, Allen L., Princeton University  
Tarofsky, Jack, New York University

*Laboratory Staff*

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

## RESEARCH ABSTRACTS FOR 1935

The following abstracts summarize the results of investigations carried on at the laboratory during the summer of 1935. 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.*, 1936, p—.")

ON THE DEARTH OF *CRAGO BOREAS* AT SALSBUARY COVE DURING 1934\*

BENJAMIN KROPP, *Boston, Massachusetts*

During the months of July and August, 1932, the small decapod crustacean, *Crago* (= *Crangon*) *boreas*, was present in large numbers in all of the shallow coves on the south side of Frenchman's Bay, west of the laboratory. They were always encountered in quantity on sandy, shelly and gravelly bottoms, especially in localities where *Fucus* or other water plants were present. Dredging from low water line to depths of about 15 feet invariably brought up 50 or more in a single haul together with large numbers of the sea urchin *Strongylocentrotus*. In some places where the bottom could be seen the latter were numerous enough to give the appearance of dense mats. These same localities yielded extraordinarily few specimens of *Crago* during August 1934. A whole afternoon's dredging often produced as few as 25 adults. Most of the adult females obtained were egg-bearing. A few such females were taken during 1932 but, although no complete records of their abundance were kept, no more than 10 to 20 egg-bearing females were encountered all that summer. Very striking were the large numbers of very young larvae—an-

\* These observations were made during the summer of 1934.