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BULLETIN
OF
THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY
1939

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BULLETIN
OF
THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

JANUARY 30, 1939

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Salsbury Cove, Maine
1939

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

(FORMERLY THE HARPSWELL LABORATORY)

Founded by John Sterling Kingsley in 1898

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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 *Pisciola*—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*, *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. The scenic features of the unusual combination of wooded mountains rising from the sea have been preserved for all time by the establishment of the Acadia National Park, the only national park in the country in direct contact with the ocean.

Situated in a region of great beauty, unspoiled by commercial exploitation or nearness to large cities, the laboratory has the advantage of being near the wild life sanctuary of the park which secures a permanent and singularly rich area for biological study. The usual summer climate of the island is pleasant and invigorating, with cool nights and daytime temperatures rarely exceeding 80°F.

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, universities, and foundations have supported research rooms occupied by members of their respective staffs. During 1938 rooms were supported by the following:

Hamilton College
Department of Biology
The Johns Hopkins University
Department of Pharmacology
New York University Medical School
Department of Physiology
Princeton University
Department of Biology
Rutgers University
Department of Physiology
Tufts College
Department of Biology
University of Minnesota
Department of Zoology
Vassar College
Department of Zoology

SCIENTIFIC FACILITIES

WEIR MITCHELL STATION

Research

At the Weir Mitchell Station in Salsbury Cove a group of buildings provides facilities for research in biology. 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, gas and compressed air are also available. The main building contains 10 research rooms accommodating 2 persons each. Along the central hallway are 2 salt water shelves providing running salt water. A new research laboratory of 4 rooms for 2 workers each, built in 1938, has a concrete floor. Each room has running fresh and salt water and 120 square feet of floor space. A stock room in the main building 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. Another building with 2 research rooms is supplied with running salt water and a laboratory especially equipped for chemical studies. A fourth building is arranged as a dark room for experimental and photographic work. Two other buildings provide space for a shop, an office and a library. The latter contains 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.

The sea water for the laboratories is pumped from well below the lowest tide by a lead pump into a 2100 gallon wooden reservoir, and is delivered through lead pipes and hard rubber spigots. Insulation of the reservoir prevents heating of the water, so that the temperature of water delivered to the aquaria is only from 1 to 2 degrees 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.

For collecting and dredging in deeper 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 there.

Instruction

A course in Invertebrate Zoology will be offered to college undergraduate and graduate students from July 6 to August 17 inclusive. A new laboratory, named in memory of Isabelle Hegner, has been built with special

facilities for instruction in marine zoology. Emphasis will be placed on the study of living animals and the students will be urged to make as many of their observations as possible in the field.

The course will be in charge of Professor Ulric Dahlgren, of Princeton University, assisted by Drs. J. Wendell Burger of Trinity College and Gairdner B. Moment of Goucher College. It will consist of lectures, laboratory exercises, collecting trips, discussions and a thesis by each student on some aspect of zoology. Occasional lectures on special topics will also be given by other members of the laboratory colony, among whom are Professors Warren H. Lewis, Herbert V. Neal, Robert W. Hegner, Homer W. Smith, E. K. Marshall, Jr., and Dwight E. Minnich. The anatomy, taxonomy, development, physiology, ecology and distribution of animals representing the invertebrate phyla will be studied, with varying emphasis on each topic according to the species being considered. A final examination will be arranged for those who wish it, especially for those who plan to offer the course to colleges for credit. Students showing proficiency in the course may continue work at the laboratory after August 17, either independently or with some member of the staff, until September 15.

Tuition fee for the course will be $60 payable on or before July 6, 1939. If the fee is to be paid by a college or other institution for the student, notice to that effect must be received prior to July 6th. Applications for admission to the course must be received before May 10th, 1939, by Prof. William H. Cole, Rutgers University, New Brunswick, N. J., from whom application blanks may be secured upon request. Each application must be accompanied by an enrollment fee of $5. If the applicant is not accepted his fee of $5 will be refunded; otherwise it will be applied towards the tuition fee.

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 1939 the laboratory will be open from June 15th to September 15th.

Applications for use of the research 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, 1939.

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, 1939. 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 and bus 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. An air 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

View of Laboratory from Emery Cove

DIRECTOR'S REPORT FOR 1938

During the past year the laboratory lost by death one of its earliest members and most loyal supporters, Dr. Harold D. Senior. He became a member of the laboratory in 1910 and was actively associated with it from that year up to his death on August 6, 1938. During those 28 years he unselfishly served the Corporation in various official capacities, as trustee, Vice-President and President. His friendly presence and help will be sorely missed by the laboratory colony.

After many years of service as trustee and former treasurer, Mrs. Louise DeKoven Bowen, of Chicago and Bar Harbor, found it necessary to relinquish her trusteeship, and it was with deep regret that the other trustees and officers accepted her resignation. A large part of the laboratory's success since 1922 has been due directly to the work and benefactions of Mrs. Bowen. It is good to know that she continues as a friend and member of the Corporation.

Due to the death of Mr. Guy E. Torrey, reported last year, Mr. A. S. Johnson, Treasurer and Comptroller of Rutgers University, generously served as treasurer from January to August, 1938. At the annual meeting on August 11th, Mr. John Whitcomb of Bar Harbor, Maine, was elected member, trustee and treasurer of the Corporation. Mr. Whitcomb is associated with Fred Lynam and Co., insurance brokers of Bar Harbor, succeeding Mr. Torrey in that firm.

The season of 1938 was marked by resumption of instruction and the erection of two new buildings: the Isabelle Hegner Laboratory for instruction and a new research laboratory. Each one was built with concrete foundation and floor, and with ample floor space for its required use. The course in Invertebrate Zoology was taken by 5 graduate and 7 undergraduate students from 9 different colleges from South Dakota to Massachusetts, and was considered an outstanding success by both students and instructors.

Once more, the facilities of the laboratory were taxed to the limit most of the summer. Twenty four investigators and their assistants carried on their studies in 17 different subjects. The new research laboratory proved highly satisfactory and it is hoped that the other 3 rooms can be ready for use in 1939.

The seminar program for 1938 was well attended and served to stimulate discussion of mutual problems. The meeting of August 22nd was attended by many physicians from Hancock County who were especially invited to hear Dr. Marshall. The complete program was as follows:

July 11, "Evolution of the *millieu interieur*," by Dr. Homer W. Smith.

July 18, "The response to light of a tubificid worm," by Dr. Dwight E. Minnich.

July 25, "Light and the breeding time of animals," by Dr. J. Wendell Burger.

Aug. 1, "Animal parasites in wild life," by Dr. E. Clifford Nelson.

Aug. 8, "Development of the snail's egg following anesthesia," by Dr. G. B. Moment.

Aug. 15, "Kidney function from an anatomical point of view," by Dr. Rudolf T. Kempton.

Aug. 22, "The use of sulfanilamide in infectious diseases," by Dr. E. K. Marshall, Jr.

With the cooperation of the Acadia National Park, Visitor's Day on Wednesdays was again well attended each week during the season. Displays of marine animals and plants in aquaria and of a few fresh water forms were attractively arranged by members of the Invertebrate Course in the Isabelle Hegner building.

At the annual meetings of the Corporation and of the trustees, all the officers were re-elected and seven new active members were elected. Three members were dropped, so that the total of active members is now 49. Associates have increased in number from 20 to 28.

The following workers were at the laboratory during the season:

Senior Investigators

Burger, J. Wendell, Trinity College
Butcher, Earl O., Hamilton College
Cole, William H., Rutgers University
Dahlgren, Ulric, Princeton University
Gordon, Helmut, University of Budapest
Halsey, J. T., Tulane University
Hansen, Ira B., George Washington University
Hegner, Robert, Johns Hopkins University
Kempton, Rudolf T., Vassar College
MacDougall, Mary S., Agnes Scott College
Marshall, E. K., Jr., Johns Hopkins University
Miller, James A., University of Michigan
Minnich, Dwight E., University of Minnesota
Moment, Gairdner B., Goucher College
Mortensen, Edith, George Washington University
Nelson, E. Clifford, University of Maine
Pearse, A. S., Duke University
Pitts, Robert F., New York University
Shannon, James A., New York University
Smith, Homer W., New York University
Smith, Willie, New York University

Scientific Assistants

Bardsley, Helen F., Philadelphia, Pa.
Farber, Saul, New York University
Golden, Abner, Harvard University
Kazalski, Louis A., Rutgers University
Pitts, Robert F., Mrs., New York University
Tilson, Katherine, New York University
Troast, Leonard, New York University

Students in Course

Burney, Thomas E., De Pauw University
Calver, Jessie C., George Washington University
Crotta, Rita L., Princeton University
Jewell, E. Louise, Tufts College
Lingard, Mildred S., Connecticut College
Lofthus, Orin M., Augustana College
Marchand, Doris, Smith College
Murray, Robert G. E., McGill University
Salom, Mary Ellen, Connecticut College
Small, Leonard, George Washington University
Streett, J. Clark, Jr., Princeton University
Subarsky, Zachariah, Benjamin Franklin High School, New York

Staff

Atchley, John, Assistant Collector
Burger, J. W., Assistant in course
Cole, William H., Director
Dahlgren, Ulric, In charge of course
Hodgdon, Virginia, Secretary
Johnson, Kenneth, Assistant Collector
Moment, G. B., Assistant in course
Russell, Walter G., Caretaker

RESEARCH ABSTRACTS FOR 1938

The following abstracts summarize the results of investigations carried on at the laboratory during the summer of 1938. The reports have been edited only to insure uniformity of style and arrangement, but 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. ——.")

LITTORAL POLYCLADS FROM NEW ENGLAND, PRINCE EDWARD ISLAND, AND NEWFOUNDLAND

A. S. Pearse and Almeda M. Walker

Duke University

Since the time of Girard (1893) and Verrill (1893) no work has been done on the polyclads of New England, except for a fine paper on *Hoploplana inquilina* by Wheeler (1894) and a brief note on *Notoplana atomata* by Hyman (1938). During July and August, 1938, we collected at four localities along the coasts of Massachusetts, Maine, Prince Edward Island, and Eastern Newfoundland. In each locality an effort was made to make collections from all littoral habitats where polyclads were likely to be found. Though fourteen species have been reported from the New England coast, we found only five. In carrying on our work we received help from several persons and for this we express our thanks:- Woods Hole, Mass.: Henry A. Walker, Dr. Charles Packard, James McInnis, and George M. Gray; Salsbury Cove, Mt. Desert Island, Me.: Dr. W. H. Cole; Ellerslie, Prince Edward Island: Dr. Alfred H. Needler; and St. Johns, Newfoundland: Nancy Frost. Dr. Libbie Hyman has kindly examined some of our specimens and given valuable opinions.

Conditions along the shores of Mt. Desert Island resembled those on Newfoundland, and the same single species of polyclad was found at both localities. In general the littoral fauna at the former station was very rich and the latter rather barren. The shore fauna of Prince Edward Island included oysters and other southern species. Two species of polyclads were found there. The region about Woods Hole, on the southern shore of Cape Cod, yielded five species. The polyclads along the east coast of North America appear to a collector to grow fewer in passing from south to north, but, if all old records are accepted, about as many species have been reported from New England as from Florida. Temperatures in shore waters