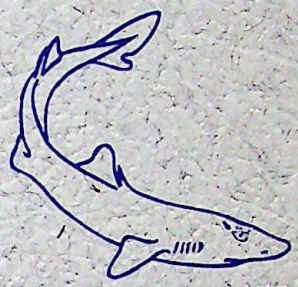
THE BULLETIN

Volume 7

MOUNT DESERT ISLAND
BIOLOGICAL LABORATORY
Salisbury Cove, Maine



1967

THE BULLETIN OF
THE MOUNT DESERT ISLAND
BIOLOGICAL LABORATORY
SALISBURY COVE, MAINE
1967

Volume 7 **Issued 1968**

CONTENTS

DESCRIPTION OF FACILITIES

The Mount Desert Island Biological Laboratory is an independent marine biological station on the coast of Maine near the mouth of the Bay of Fundy which provides a seasonal research facility for investigations on local flora and fauna. Basic laboratory space for 27 research programs, simple glassware, common chemicals and certain specialized equipment are available for investigators. During 1966 there were 63 scientific personnel in 29 research groups representing 22 institutions in 16 states. There were 38 professional scientists with 14 students in the 1966 programs.

No formal courses are offered, but some advanced undergraduate, graduate, and medical students spend the summer as assistants to senior investigators, thereby gaining research training. Most of these students are selected by the investigators from their home institutions.

History and Organization

The Laboratory was founded in 1898 by J. S. Kingsley, of Tufts College, and its original location was at South Harpswell, Maine. The site at Salisbury Cove was donated to the Laboratory by the Wild Gardens of Acadia, a group instrumental in the establishment of Acadia National Park, and removal to this location was completed in 1921. The first laboratory buildings, the original salt water system and some of the residential cottages were constructed or obtained by the gifts of local summer residents.

The Mount Desert Island Biological Laboratory was incorporated in 1914 under the laws of the State of Maine as a nonprofit scientific and educational institution, and it is owned and operated by the Trustees and members of the Corporation. At present there are 262 members of the Corporation. It functions without full time professional administrative personnel and in most ways it is a cooperative enterprise. Income is derived from membership dues, laboratory fees, cottage rentals, investments, private and corporate donations, and grants. The business and scientific management of the Laboratory is in the hands of the Director and the Board of Trustees.

The Directors have been: Ulrich Dahlgren, Princeton University (1920-26); H. V. Neal, Tufts College (1926-31); William H. Cole, Rutgers University (1931-40); Roy P. Forster, Dartmouth College (1940-47); J. Wendell Burger, Trinity College (1947-50); Warner F. Sheldon, University of Pennsylvania (1950-56); Raymond Rappaport, Jr., Union College (1956-59); Alvin F. Rieck, Marquette University (1959-64); William L. Doyle, University of Chicago (1964-67); Charles E. Wilde, Jr. (1967-).

Location

Mount Desert Island lies in the Gulf of Maine about 150 miles northeast of Portland, Maine, and is connected to the mainland by a short bridge. Year round air service is available to Bangor, Maine with seasonal service to Bar Harbor Airport. The island has an area of more than 100 square miles and is traversed east to west by a range of glaciated mountains and north to south by a narrow fiord six miles long that partially divides the east and west halves. Among the mountains lie several deep fresh water lakes and shallow ponds. Much of the mountainous area is a

part of Acadia National Park. The Island is separated from the mainland and adjacent islands by narrow deep bays. Spring tides average 13.2 feet and neap tides 8.7 feet.

The many varied biological resources of the Acadian area are readily available. In summer, the cold waters of the Gulf of Maine are rich in marine life. The rocky shores, mud flats and strong tidal currents provide a variety of habitats. Fresh water lakes and ponds and the mixed terrain give further diversity to the forms available. Certain forms are abundant, others are scarce. The research abstracts in past Bulletins will give a good indication of the common forms. (See especially Vol. 5, No. 1.) The director will be glad to furnish an estimate of the availability of any special forms.

Physical Plant

The Laboratory is situated on a tract of about 150 acres fronting on Frenchman Bay at Salisbury Cove in the Township of Bar Harbor. In addition to shore frontage, the Laboratory owns part of a fresh water pond and brook, and its land varies from meadow and forest to sphagnum bog. Investigation is carried on in single story buildings of frame construction located along the shore. These buildings are as follows:

(1) The Neal Laboratory. This, the oldest and largest of the laboratory buildings, was remodeled in 1955 and now contains eight laboratories: four large rooms that will each accommodate 3 to 4 persons, and four small rooms suitable for single investigators. All rooms are provided with gas, and fresh and salt water. Water troughs, aquaria, and larger tanks are located along the north wall outside.

(2) The Halsey Laboratory was remodeled in 1961 and consists of four rooms each capable of accommodating 3 to 4 persons. The rooms all have gas, fresh and salt water. Refrigerators, ovens and aquaria are located on a common terrace at the entrance to the building.

(3) The Lewis Laboratory consists of two adjacent rooms for 3 to 4 persons.

(4) The Kidney Shed is a single large laboratory that was used for several years by Dr. Homer Smith's research group.

(5) The Hegner Laboratory contains 10 laboratory rooms provided with salt and fresh water each accommodating 1 to 2 persons.

(6) The Darkroom-Laboratory erected in 1962 contains one laboratory suitable for 2 to 3 persons and is equipped with salt and fresh water, and a photographic darkroom for general use.

(7) The Instrument Room was renovated in 1955 for the purpose of housing equipment used in common by members of the Laboratory. It contains a refrigerated centrifuge (International PR2), Warburg apparatus (circular), Baird flame photometer, pH meters, Coleman spectrophotometer (Junior), Beckman spectrophotometer DU, muffle furnace, clinical centrifuges, small autoclave, deep freezes, ice makers, refrigerators and stills.

(8) Biophysics Building. This building was erected in 1965. It houses isotope counting systems, ultracentrifuges, spectrophotometers, and space for chromatography.

(9) Shop and Stockroom. The shop contains power and hand tools for woodworking; the stockroom has chemical, glassware, analytical balances, a fume hood and an area for glassworking.

(10) Office and Library. A separate building was constructed in 1955 to contain the Director's Office and to house the business records and library. The library is small, comprising reference texts for biology and medicine, a few complete journals (Biological Abstracts, Biolog-

ical Bulletin and the Journal of the Marine Biological Association), as well as monographs and a sizable reprint collection.

(11) Dahlgren Hall, the former village schoolhouse, was purchased and converted to use as a meeting hall. The single large room can seat about 120 persons. It is equipped with projectors for regular lantern slides, 35 mm slides, and 16 mm silent motion pictures.

(12) The Dining Hall. This dining hall and living room for about 20 junior investigators and students was built in 1963. It is operated by a cook-manager. A small general library of books and records, and a record player have been furnished by private donation.

(13) Bowen Hall is one of the finest remaining examples of early 19th century Island architecture. It now serves as a dormitory and common room for young women.

(14) Dock. The dock consists of two floats with livewells and attached live cars for storage of specimens. It is attached to the shore by an inclined ramp and a bridge and abutment.

(15) Collecting Boats. A 32' gasoline powered collecting boat, the Squalus, was purchased in 1958. It is provided with a circulating water tank for the transportation of specimens. Some simple dredging gear is available for collecting purposes and arrangements can be made with local fishermen for offshore specimens. A Nova Scotia skiff with an outboard motor is also used for collecting and a few hand powered skiffs are available to investigators.

Housing

Sixteen cottages suitable for families with children stand on land owned by the Laboratory and are within easy walking distance of it. The cottages are rented by the season, or occasionally for shorter periods. Occupants must supply their own blankets, linen, and silver, pay for utilities (electricity and gas), and pay the Laboratory for the use of the cottage (including water rent and garbage disposal). Rent is $350 to $450 per season, depending upon the size of the cottage. A few privately owned cottages are also available for rental near the Laboratory, and in other communities on the island. An automobile is essential for family mobility in the area.

Single investigators, student assistants, and couples without children rent rooms in the village and take their meals in the Laboratory Dining Hall. The weekly charge for meals is based on self-sustaining nonprofit operation.

In order to encourage private construction and ownership of cottages by workers, the Laboratory has a policy of issuing leases on certain plots of laboratory land. Provision is made for sale or rental of the cottages to other workers in case the owner finds it impossible to continue to work at the Laboratory. In this way, the Laboratory is able to encourage capital investment by individuals and at the same time ensure that the land will remain under its own jurisdiction. At present eight cottages are privately owned in this way.

Recreational Activities

Mount Desert Island has long been known to have one of America's most desirable summer climates. The ocean, rocky shores, and mountains provide scenery of unexcelled beauty. The distance from large metropolitan areas has so far helped to keep it relatively unspoiled. Swimming, hiking, mountain climbing, picnicking, boating and sailing, tennis, golf, and other sports are readily available. Acadia National Park with its excellent naturalists' program contributes to the general interest. There are small museums of Indian and local lore, public gardens, a good public library and cultural exhibits. Proximity to the Jackson Laboratory adds scientific interest and

resources. Salisbury Cove is an old fishing and farming community on the northern shore of the Island near the main road from Bar Harbor to Ellsworth. It has one general store. The Laboratory colony comprises about 100 adults and 60 children of assorted ages, and forms a considerable portion of the summer population of the village. Bar Harbor, the largest town on Mount Desert Island, is about six miles from the Laboratory and provides many of the services of a city including excellent shopping facilities and a good hospital. The fire of 1947 did no damage to the Laboratory area, nor are its visible effects on the Island as marked as might be expected. For biologists, the ecological changes produced by this fire are of great interest.

Acknowledgments

The Mount Desert Island Biological Laboratory is endebted to the National Science Foundation for substantial support during the past decade. Funds for renovations of buildings and new construction have permitted the laboratory to expand and upgrade its facilities. Contributions to operating costs and for specialized research equipment have greatly improved the efficiency of research activities. The individual research projects which have been served by this laboratory are variously funded by private and government agencies and by individuals and all of these projects have benefited from the National Science Foundation grants to the laboratory. Current support under grant GB 4701 is gratefully acknowledged. The research reports and index for 1967 were compiled by Dr. H. V. Murdaugh.

Applications

Fees for research space vary according to the demand made on the facilities. They range from $165 to $600 depending on the space assigned and the number of workers. All investigators have the use of the general facilities, but special arrangements are necessary if unusual demands are anticipated. Investigators are urged to bring their own specialized equipment and chemicals. On occasion, the Laboratory may be able to provide apparatus which would have long term usefulness for other workers. Since the Laboratory is closed for nine months of each year, the general policy has been to maintain as little delicate or especially valuable equipment as possible. Isotope counting systems and ultracentrifuges are available on a fee basis. Persons planning to use isotopes must make prior arrangements in conformity with our Radiation Safety Committee requirements.

Limited fellowships are supported by funds from the Ulrich Dahlgren Memorial Fund (a gift from the American Philosophical Society) and by The National Science Foundation.

Application and inquiries should be addressed to the Laboratory Director, Dr. Charles E. Wilde, Jr.

June 1 - September 1	Mount Desert Island Biological Laboratory Salisbury Cove, Maine, 04672
September 1 - June 1	Department of Histology and Embryology School of Dental Medicine University of Pennsylvania Philadelphia, Pennsylvania, 19104

The Mount Desert Island Biological Laboratory
Salisbury Cove, Maine

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Name	Institution
Dorothy Antkowiak	S.U.N.Y. at Buffalo
Peter Banks	Harvard Medical School
Dr. John Boylan	S.U.N.Y. at Buffalo
Mary Brandes	University of Iowa
Craig Brown	New York Medical College
Dr. Maurice Burg	N.I.H., Heart
Dr. J. Wendell Burger	Trinity College
Patricia Challender	Wellesley College
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Dr. Helen Czerr	Harvard Medical School
Dr. Robert Danielson	Case Western Reserve University
Dr. William L. Doyle	University of Chicago
Dr. Joseph Fenstermacher	N.I.H., Cancer

Name	Institution
Dr. Roy P. Forster	Dartmouth College
Gary Fouty	Dartmouth College
Deborah Funkhauser	Harvard Medical School
Dr. Leon Goldstein	Harvard Medical School
Arnold Goodman	Brandeis University
Dr. William C. Grant	Williams College
Dr. Jack Harclerode	Bucknell University
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Mary Rieck	Marquette University
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Dr. Warner F. Sheldon	University of Pennsylvania
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Dr. Vincent G. Stenger	University of Florida
Dr. Hilmar Stolte	S.U.N.Y. at Buffalo
Shafic Twal	S.U.N.Y. at Buffalo
Robert Vidinghoff	Bucknell University
Peter Weller	Harvard Medical School
Dr. Charles E. Wilde, Jr.	University of Pennsylvania
Dr. Robert A. Wolbach	University of Utah
Dr. Charles W. Young	Sloan-Kettering Institute

John W. Boylan, M.D.
Associate Professor of Physiology and Medicine

E. J. Meyer Memorial Hospital
462 Grider Street
Buffalo, New York

Program: (1) Osmoregulation in Squalus acanthias
(2) Renal Glucose Transport in Squalus acanthias
(3) Microperfusion Studies of Urea Transport in Squalus acanthias

Associates: Shafic Twal
Dorothy Antkowiak
Hilmar Stolte, M.D.

Maurice B. Burg, M.D.
Senior Investigator

National Institutes of Health
Bethesda, Maryland 20014

Program: Studies of Transport in Isolated Perfused Renal Tubules

Associate: Peter Weller

J. Wendell Burger, Ph.D.
Professor of Biology

Trinity College
Hartford, Connecticut 06106

Program: Electrolyte Fluxes Through the External Surface of the Dogfish

Richard B. Crawford, Ph.D.
Associate Professor of Biology

Trinity College
Hartford, Connecticut 06106

Program: Regulation of Development in Fundulus Embryos

Associates: Charles E. Wilde, Jr., Ph.D.
Fred Hendler

William L. Doyle, Ph.D.
Professor of Anatomy

Department of Anatomy
University of Chicago
Chicago, Illinois 60637

Program: Fine Structure and Ionic Regulation in Squalus, Myxine and Cucumaria

Associate: Harold F. Parks, M.D.

Roy P. Forster, Ph.D.
Ira Allen Eastman Professor

Department of Biological Sciences
Dartmouth College
Hanover, New Hampshire 03755

Program: Biosynthesis and Excretion of Nitrogenous Compounds in Marine Vertebrates

Associate: Gary Fouty

Leon Goldstein, Ph.D.
Assistant Professor of Physiology

Harvard Medical School
25 Shattuck Street
Boston, Massachusetts

Program: Regulation of Nitrogen Metabolism and Renal Function in Fishes

Associates: Patricia Challender
Deborah Funkhouser

William C. Grant, Jr.
Professor of Biology

Williams College
Williamstown, Massachusetts

Program: (1) Effect of Catecholamines and Adenohypophyseal Hormones on Carbohydrate Metabolism in Elasmobranchs
(2) Displacement Activity and Aggression in the Hermit Crab, Pagurus acadianus

Associate: Peter Banks

Jack E. Harclerode, Ph.D.
Assistant Professor of Zoology

Department of Biology
Bucknell University
Lewisburg, Pennsylvania 17837

Program: Respiration and Oxidative Phosphorylation in Tissue Homogenates of Certain Marine Fish and Invertebrates

Associate: Robert P. Vidinghoff

Robert B. Hiatt, M.D.
Associate Professor of Surgery

Columbia University, College of Physicians and Surgeons
630 West 168th Street
New York, New York 10032

Program: The Phylogeny of Intestinal Motor Control

Associate: Anne Moore

C. Adrian Hogben, Ph.D.
Professor and Head of the Department of Physiology and Biophysics

University of Iowa
Iowa City, Iowa 52240

Program: Role of Histamine as a Mediator of Excitation of Gastric Secretion

Associate: Mary Brandes

Manuel E. Kaplan, M.D.
Assistant Professor of Medicine

Washington University of St. Louis
Jewish Hospital of St. Louis
216 South Kingshighway
St. Louis, Missouri 63110

Program: Vitamin B12 Absorption in Fish and Other Aquatic Vertebrates

William B. Kinter, Ph.D.
Professor of Physiology

Department of Physiology
State University of New York
Upstate Medical Center
766 Irving Avenue
Syracuse, New York 13210

Program: Kinetics of Bidirectional Dye Transport in Isolated Renal Tubules of Flounder and Dogfish

Associate: Thomas M. Maack, M.D.

Kenneth W. McKerns, Ph.D.
Professor of Obstetrics and Gynecology

University of Florida School of Medicine
Department of Obstetrics and Gynecology
Gainesville, Florida

Program: Regulation of Ovarian Function in the Dogfish

Thomas H. Maren, M.D.
Professor and Chairman of Pharmacology

Department of Pharmacology
College of Medicine
University of Florida
Gainesville, Florida

Programs:
(1) Excretion of Drugs Across the Gill
(2) Measurement of Gill Blood Flow by Clearance Methods

Associate: Vincent Stenger, M.D.

H. V. Murdaugh, Jr., M.D.
Associate Professor of Medicine

University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania 15213

Programs:
(1) Study of Pulmonary Arterial Constrictor Substance in Dogfish Gill and in Seal Pulmonary Circulation
(2) Energetics of Sodium Transport in Seal and Dogfish Erythrocytes
(3) LDH Patterns in Sharks and Seal
(4) O_2 Stores in Seal
(5) Urea Cycle as a Function of pCO_2 in Tadpole
(6) Effective Circulating Blood Volume in Seal
(7) Studies of Hypercapnia in Sharks

Associates: Carroll E. Cross, M.D.
Valeria Phillips
James Linta

E. Converse Peirce II, M.D.
Associate Professor Surgery and Physiology

Emory University School of Medicine
69 Butler Street, S.E.
Atlanta, Georgia 30303

Programs:
(1) Study of Acid-Base Balance in Dogfish and Other Marine Animals
  (a) Temperature Relationships of pH
  (b) Total Body CO_2 Titration
  (c) Whole Body Fixed Acid Titration
(2) Study of Force Velocity Parameters in Dogfish Heart

Associate: Esther M. Peirce

David P. Rall, M.D., Ph.D.
Medical Director

National Institutes of Health
National Cancer Institute
Building 10, Room 6N115
Bethesda, Maryland 20014

Programs:
(1) Entry of Compounds into Brain and CNS of Dogfish
(2) Drug Metabolism in Marine Vertebrates and Invertebrates

Associates: Joseph Fenstermacher, Ph.D.
Helen Cserr, Ph.D.
Jeffrey Ratner

Raymond Rappaport, Ph.D.
Professor of Developmental Biology

Department of Biological Sciences
Union College
Schenectady, New York 12308

Program: Experimental Studies of Cytokinesis in Animal Cells

Johannes A. G. Rhodin, M.D.
Professor and Chairman of Anatomy

Department of Anatomy
New York Medical College
5th Avenue and 106th Street
New York, New York 10029

Program: Structure and Function of the Microcirculation in Frogs, Fish and Dogfish Embryos

Associate: Craig Brown

Alvin F. Rieck, Ph.D.
Associate Professor

Marquette University School of Medicine
561 North Fifteenth Street
Milwaukee, Wisconsin 53233

Program: Photoproducts in Zygotes of E. parma from UV at Times During Cell Cycle When Complete Photoreactivation is Possible

Associates: Mary Christiano
Mary Rieck

Eugene D. Robin, M.D.
Professor of Medicine

University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania 15213

Programs:
(1) Pulmonary Arterial Constrictor Substance on Gill
(2) Pulmonary Arterial Constrictor Substance on Seal
(3) Na^+ Transport in Seal Erythrocyte and Shark Erythrocyte
(4) Lactic Dehydrogenase in Seal and Shark
(5) Urea Cycle as a Function of Ambient CO_2 in Tadpole
(6) O_2 Stores in Seal
(7) Effective Circulating Blood Volume in the Seal
(8) CO_2 Titration Curve and Response to Hypercapnia in Shark

Associates:
Bernard Packer
Lucy Nelson
Elaine Le Poris
Donald Robin

Bodil Schmidt-Neilsen, Ph.D.
Professor of Biology

Case Western Reserve University
Department of Biology
Cleveland, Ohio 44106

Programs:
(1) Micropuncture Study of Urea Movements Across the Renal Tubules of Squalus acanthias
(2) Micropuncture Study of Urea Movements Across the Renal Tubules of Rana clamitans

Associates:
Robert Danielson, Ph.D.
Dieter Pagel
Scott Long
Arnold Goodman

Warner F. Sheldon, M.D.
Professor of Pathology

School of Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19104

Program:
Gil Circulation in Dogfish

Vincent G. Stenger, M.D.
Assistant Professor

University of Florida College of Medicine
Gainesville, Florida

Program:
Transport of Drugs Across the Gill

Charles E. Wilde, Jr., Ph.D.
Professor of Histology and Embryology

School of Dental Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19104

Program:
The Kinetics of Morphogenesis in Fundulus heteroclitus

Associates:
Richard B. Crawford, Ph.D.
Fred Hendler

Robert A. Wolbach, M.D., Ph.D.
Department of Physiology

University of Utah Medical Center
Salt Lake City, Utah 84112

Program: Phosphate Secretion in the Goosefish

Charles W. Young, M.D.
Assistant Professor of Medicine

Sloan-Kettering Institute
410 East 68th Street
New York, New York 10021

Program: Protein and Nucleic Acid Metabolism During Oogenesis and Embryogenesis in the Sand Dollar

Associates: David A. Karnofsky, M.D.
Lisa Karnofsky
Carol Sheppard

The Mount Desert Island Biological Laboratory

Tuesday Evening Seminars

1967

Dahlgren Hall - Salisbury Cove, 8:00 P.M.

July 11	Dr. Roy P. Forster Dartmouth College	"MDIBL and the Kidney"
July 18	Dr. H. V. Murdaugh University of Pittsburgh	"Adaptations of Vertebrates to Diving"
July 25	Dr. Johannes Rhodin New York Medical College	"The Microcirculation"
August 1	Dr. Wendell Burger Trinity College	"Problems of the Dogfish in Frenchman's Bay"
August 15	Dr. J. Charles Brennan S.U.N.Y. at Buffalo	"Microanatomy of the Dogfish Nephron"
August 22	Dr. Kenneth Allen University of Maine	"Effect of Salinity Stress on the Free Amino Acids in Aquatic Invertebrates"

Friday Afternoon Seminars

1967

Dahlgren Hall - Salisbury Cove

July 7 and 14 - Synopsis of work to be done in 1967. All investigators.

July 21	Dr. Leon Goldstein	"Distribution and Significance of Trimethylamine Oxide in Fish"
	Dr. Charles Young	"Protein and Nucleic Acid Metabolism During Sand Dollar Development"
July 28	A Colloquium on Intracellular pH	Leaders: Dr. Eugene Robin Dr. Robert Wolbach
August 4	Dr. Kenneth McKerns	"Sex Hormones in S. acanthias"
	Dr. E. Converse Peirce II	"Cardiac Function in S. acanthias"
August 18	Dr. Thomas Maren and Dr. Vincent Stenger	"Pharmacology of MS222 (Ethyl meta-amino benzoate) in S. acanthias
	Dr. John Harclerode	"Oxidative Metabolism in Fish. Effect of Thyroid Hormones"
August 25	Dr. Emanuel Kaplan	"Vitamin B12 Absorption in Eel Intestine"
	Dr. John Boylan	"Further Studies on Renal Reabsorption of Glucose in S. acanthias"