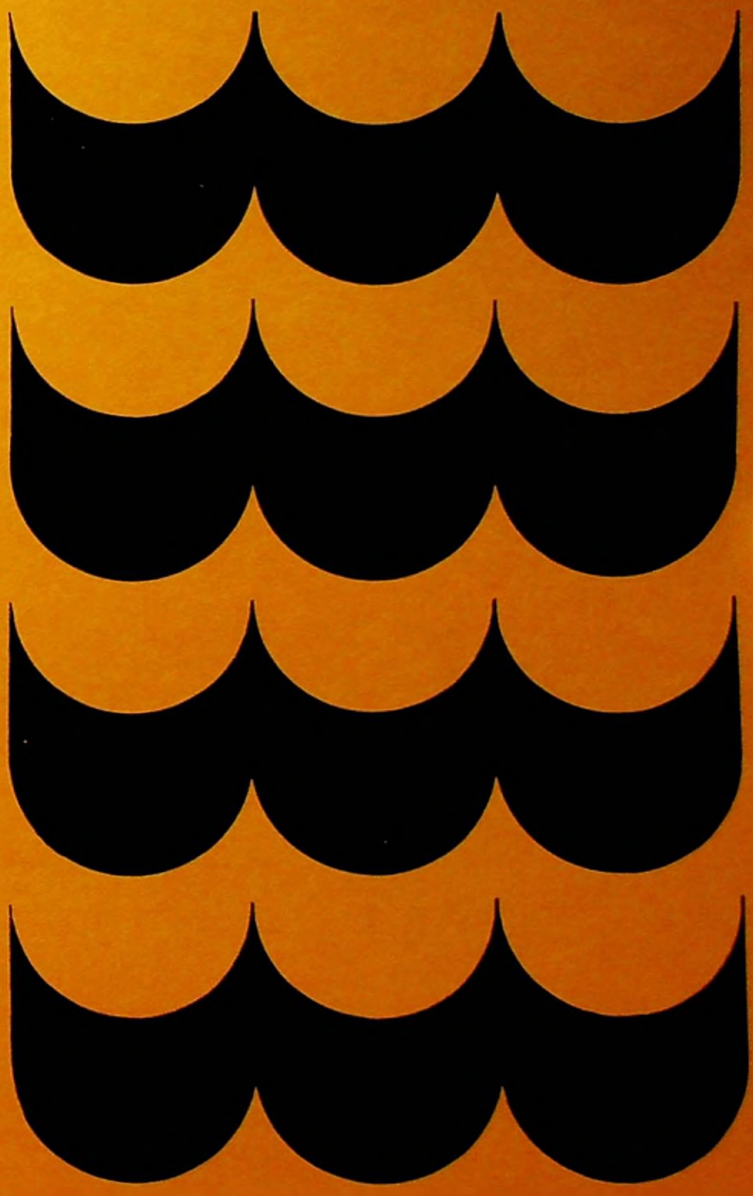
THE BULLETIN

Volume 11

Mount Desert Island
Biological Laboratory
Salisbury Cove, Maine



1971

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

Volume 11 **Issued 1972**

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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. There is basic laboratory space for 32 research programs. Certain specialized equipment is available. During 1970 there were 73 scientific personnel in 31 research groups representing 29 institutions both here and abroad. There were 40 professional scientists and 24 students in the 1970 programs.

No formal courses are offered, but some advanced undergraduate, graduate, medical, and post doctoral 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 281 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., University of Pennsylvania (1967-70); H.V. Murdaugh, Jr., University of Pittsburgh (1970-).

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 of these 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. Special arrangements may be made for collections in Acadia National Park.

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. It accommodates two research groups.

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

(6) *The Karnofsky Laboratory*, constructed in 1970, contains 4 large laboratories, one large enough to accommodate 2 research groups.

(7) *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.

(8) *The Instrument Room* was renovated in 1955 for the purpose of housing equipment used in common by members of the Laboratory. In 1969 one-half of this space was equipped as a research laboratory.

(9) *Biophysics Building*. This air-conditioned building was erected in 1965. It houses isotope counting systems, ultracentrifuges, spectrophotometers, and a chemical hood.

(10) *Shop and Stockroom*. The shop contains power and hand tools for wookworking; the stockroom has chemicals, glassware, analytical balances, a fume hood and an area for glassworking, and an isotope vault.

(11) *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, Biological Bulletin and the Journal of the Marine Biological Association), as well as monographs.

(12) *Dahlgren Hall*, the former village schoolhouse, was purchased and converted to use as a meeting hall; it houses a reprint collection. 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.

(13) *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.

(14) *Bowen Hall* is one of the finest remaining examples of early 19 century Island architecture. It now serves as one of two dormitories and has a common room for young women.

(15) *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.

(16) Collecting Boars. 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 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 $520 to $890 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 seven 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.

Acknowledgements

The Mount Desert Island Biological Laboratory is indebted 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 8662 is gratefully acknowledged. The research reports and index for 1971 were compiled by Dr. John W. Boylan.

Applications

Fees for research space vary according to the demand made on the facilities. They range from $300 to $800 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).

Application and inquiries should be addressed to the Laboratory Director, Dr. H.V. Murdaugh, Jr.

July 1 - September	Mount Desert Island Biological Laboratory Salisbury Cove, Maine 04672
September 1 - July 1	Department of Medicine University of Pittsburgh School of Medicine Pittsburgh, Pennsylvania 15213

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MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

RESEARCH PROGRAMS FOR 1971

Adamson, Richard H.

1. The Disposition of Xenobiotics by Elasmobranchs.
2. The Cytotoxic Effect of Elasmobranch Plasma.

Arias, Irwin M., and Gerald Fleischner.

1. Presence and Fate of Human Hepatitis Virus in Shellfish.
2. Organic Anion Binding Proteins in Tissues of Various Marine Species.

Block, Jerome.

Effect of Temperature on Cleavage Rate and Miscellaneous Drug Uptake in the Fertilized Sand Dollar Egg.

Boyer, James.

Factors Determining Hepatic Organic Anion Transport (BSP) in the Elasmobranch.

Boylan, John, Hilmar Stolte, George Eisenbach, and Dorothy Antkowiak.

Osmoregulation and Fluid Reabsorption in the Skate Nephron, Micropuncture Study.

Cserr, Helen F.

Comparative and Developmental Aspects of Blood Brain and Blood Cerebrospinal Fluid Barriers in Cyclostomes, Elasmobranchs and Teleosts.

Davis, Bernard.

The Adenyl-cyclase System in the Kidney of *Squalus Acanthias.*

Doyle, William L.

1. Fine Structure in Relation to Fluid Transport in Squalus Intestine.
2. Morphology of Chloride Cells in Cortisol Treated Eels in Relation to Adaptation to Seawater.

Dvorchik, Barry.

Further Studies on the Fate of DDT in *S. Acanthias.*

Eichenholz, Alfred.

Carbamino Compounds in Blood of *Squalus Acanthias.*

Eisenbach, G.M., M. Weise, R. Weise, K. Hanke and H. Stolte.

Renal Handling of Protein in the Hagfish, *Myxine glutinosa.*

Epstein, Franklin H., John Forrest and Allen Cohen.

Endocrine Control of Seawater Adaptation in *Anguilla Rostrata.*

Fenstermacher, Joseph.

1. The Distribution of Various Polar Compounds Between Blood and Tissue in *Squalus Acanthias.*

2. The Composition of Body Fluids in *Squalus Acanthias.*

Forster, Roy P., and John W. Danforth.

1. Transport of Strong Electrolytes by Various Epithelial Membranes of Marine Teleosts.
2. Role of Nitrogen Metabolism and Excretion in Osmoregulation.

Goldstein, Leon and Patrick Payan.

Renal and Branchial Urea Excretion in the Euryhaline Skate, *Raja Erinacea.*

Grant, William, and Kevin Ulmer.

Behavioral Aspects of Niche Diversification in Hermit Crabs.

Guarino, Anthony, and D.P. Rall.

1. Fate and Distribution of ^{14}C-DDT in the Lobster.
2. Fate and Distribution of ^{14}C-Methyl Mercury in the Lobster.

Guarino, Anthony, and R.H. Adamson

1. Comparison of the Biliary vs. Urinary Excretion of Phenyl Red and Its Glucuronide in the Dogfish.
2. Biliary and Urinary Excretion of Drugs and Their Metabolites in the Dogfish.

Harvey, William.

Active Ion Transport in Arthropods.

Hayslet, John, Bodil Schmidt-Nielsen and J. Larry Renfro.

The Relationship of Glomerular Filtration Rate and Number of Functioning Nephrons in the Eel, *Anguilla Rostrata.*

Hayslett, John, Jack D. Myers, H. Victor Murdaugh, Mark Epstein, and Franklin H. Epstein.

Effect of Calcitonin in the Serum Calcium Level and Renal Reabsorption of Sodium in the Spiny Dogfish.

Hayslett, John, Jack D. Myers, John Forrest, Lee Jampol, H. Victor Murdaugh, Mark Epstein, and Franklin H. Epstein.

The Role of Na-K-ATPase in the Renal Reabsorption of Sodium in the Spiny Dogfish.

Hogben, C. Adrian M.

1. Response of Isolated Dogfish Gastric Mucosa to Extracellular Cation Substitution.
2. Response of Isolated Dogfish Gastric Mucosa to N-Methyl Histamine.

Hokin, Lowell.

Purification of the (Sodium + Potassium) - Activated Adenosine - Triphosphatase from the Rectal Gland of the Dogfish.

Istin, Michel.

pH Measurement and Bicarbonate Formation in the Frog Skin.

Istin, Michel and Thomas Maren.

The Effect of pCO_2 on Sodium Influx in Fresh Water Fish.

Janicki, Ralph H. and William L. Kinter.

1. The Effect of DDT on Osmotic Regulation in Teleosts and Elasmobranchs.
2. The Cellular Aspects of Salinity Adaptation in the Intestinal Mucosa of the Euryhaline Eel, *(Anguilla Rostrata)*

Mackay, William C.

Effect of Environmental Ca Concentration on Water Uptake by Freshwater Eels.

Maren, Thomas, Michel Istin, Robert Welliver, and Robert Woodworth.

The Effect of Hypercapnia on CSF Electrolytes in *S. Acanthias.*

Merkins, Louise, and William L. Kinter.

The Toxicity of Polychlor Inatecl Biphenyls (PCBs) on *Fundulus Heteroclitus.*

Murray, Marion.

Axonal Transport of Proteins in Flounder Optic System.

Myers, Jack D., H. Victor Murdaugh, Bernard Davis, and Alfred Eichenholz.

1. Effect of Diuretic Substances on Renal Function in *Squalus Acanthias.*
2. Cation and Urea Excretion in *Squalus Acanthias.*

Opdyke, D.F., James McGreehan, and Steven Messing.

Correlation of Induced Changes in Plasma Volume with Dorsal Aorta Blood Pressue in *Squalus Acanthias.*

Parks, Robert.

Purine Metabolism in Primitive Erythrocytes.

Passano, L.

1. Neurophysiology of Hydromedusan (Coelenterata) Pacemaker Systems.
2. Synchrony of Impulse Conduction in Parallel Neurons in the Giant Fiber Nerve-net of *Cyanea* (Coelenterata; scyphomedusa).

Passano, L. and K. Passano.

Histology of the Peripheral Nervous System of Pelagic Polychaetes (Annelida).

Peirce, E.C., and B. Kent.

1. Normal Blood Flow Distribution Patterns in *S. Acanthias* Measured by Isotopically Labelled Microspheres.
2. Oxygen-hemoglobin Dissociation curves in *S. Acanthias.*

Pritchard, John and William Kinter.

1. Metabolism of ^{14}C-DDT in the Winter Flounder.
2. Inhibition of Organic Acid Transport by DDA in the Flounder Kidney.

Rall, David.

Comparative Aspect of Blood Brain and Cerebrospinal Fluid Barriers.

Rappaport, Raymond and Ann Rappaport.
Induction of Spawning in *Mytilus Edulis.*

Rieck, Alvin, Mary Borowski, and George Rieck.
Photobiological Studies on Early Development.

Schmidt-Nielsen, Bodil, and J. Larry Renfro.
Renal Regulation in Saltwater and Freshwater Adapted Eels, *Anguilla Rostrata*, and the Effect of Methyl Mercury.

Schmidt-Nielsen, Bodil and W.C. Mackay.
The Use of Inulin and Polyethylene Glycol to Measure Urine Flow in Uncatheterized Tadpoles and Frogs.

Spector, David, J. Larry Renfro, Bodil Schmidt-Nielsen, and John Hayslett.
Mechanism for the Regulation of Glomerular Filtration Rate in Lower Vertebrates.

Szidon, J.P.
Circulation of the Seal During Diving.

Theil, George.
Isolation and Characterization of Mackeral (Scomber Scombrus) Myoglobin.

Wilde, Charles E., and Richard Crawford.
Temporal Relationships of Protein Synthesis to Morphogenesis in Embryos of *Fundulus Heteroclitus.*

SEMINARS 1971

Evening seminars are held each Tuesday evening at 8:00 P.M. in Dahlgren Hall, Salisbury Cove, Informal, luncheon seminars are held on each Thursday in July and on the first three Thursdays of August at 12:00 noon in Dahlgren Hall.

MDIBL VISITING SCIENTIST PROGRAM

Dr. Isidore S. Edelman of the Cardiovascular Research Institute, University of California, San Francisco Medical Center, was the third Visiting Scientist to be in residence at the Laboratory. In addition to holding informal consultation with many MDIBL investigators, Dr. Edelman delivered two lectures to the laboratory Community: (1) "Thyroid Calorigenesis: The Role of Active Na^+ Transport." and (2) "Aldosterone Receptors in the Mammalian Kidney."

Sir Hans Krebs was the first Visiting Scientist and Dr. Hans Ussing the second.