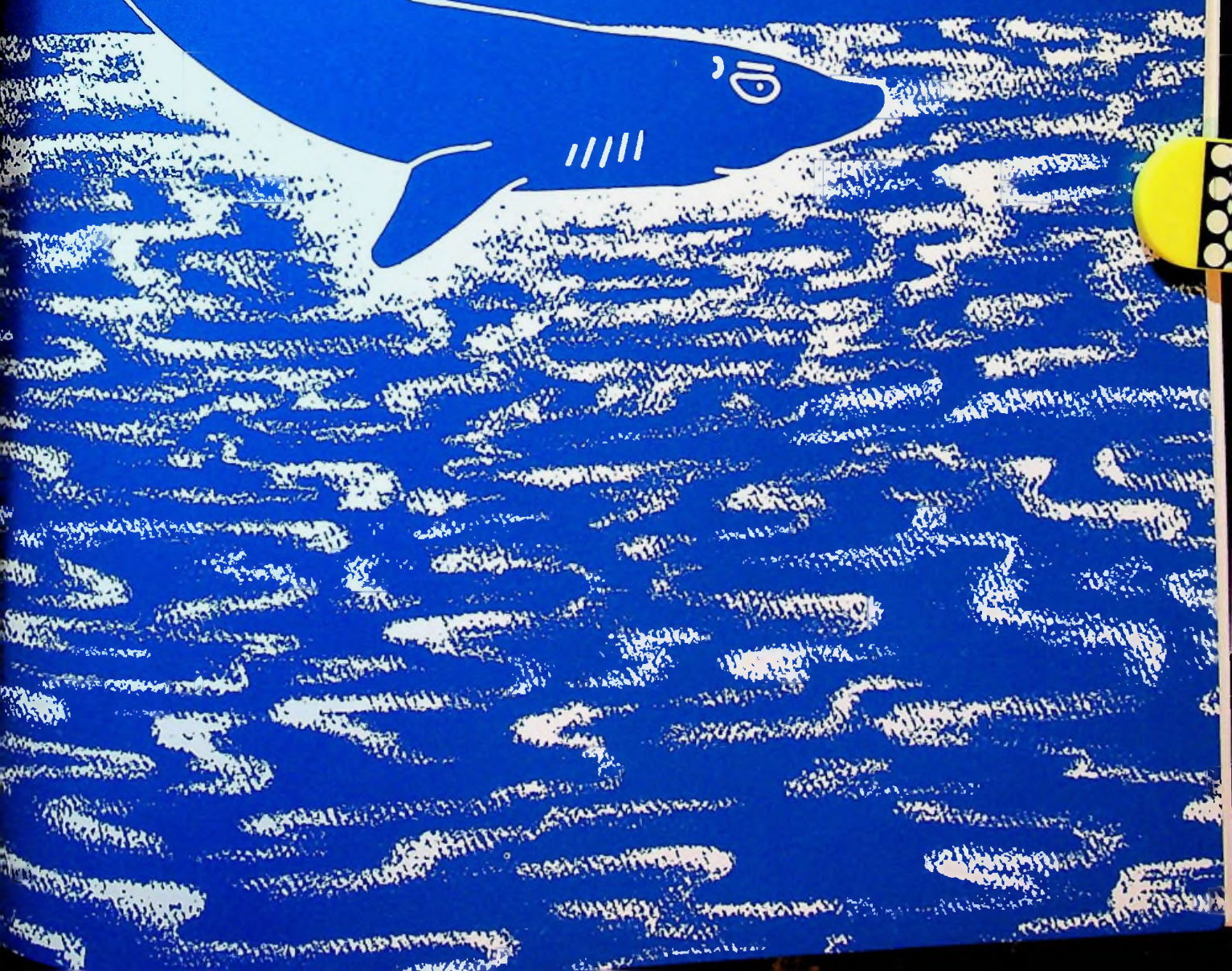




*Volume 19 • 1979*

# **THE BULLETIN**

*Mount Desert Island Biological Laboratory  
Salsbury Cove, Maine*



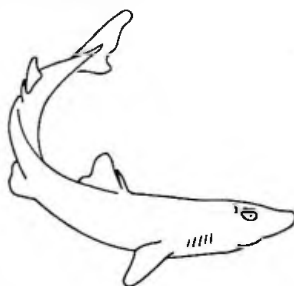
# THE BULLETIN OF

*The Mount Desert Island*

*Biological Laboratory*

*Salsbury Cove, Maine*

1979



Volume 19

Issued 1980

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(x to July 1979)  
(† effective August 1979)

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1979

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Research Scientist  
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Research Associate  
Research Associate  
Research Associate  
Research Assistant  
Research Assistant  
Research Assistant  
Research Assistant  
Research Assistant  
Research Assistant  
Secretary  
Secretary

THE MOUNT DESERT ISLAND BIOLOGICAL LABORATORY

SEASONAL SCIENTIFIC PERSONNEL - 1979

| NAME                 | INSTITUTION                             |
|----------------------|---|
| R. F. Addison        | Bedford Institute, Nova Scotia          |
| David Andrew         | University of Maine                     |
| Susan Arnold         | National Institutes of Health           |
| John Bend            | NIEHS                                   |
| John Bissonnette     | University of Oregon                    |
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| Nicholas Bradbury    | Southampton University, England         |
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| Ian Callard          | Boston University                       |
| Robert Carroll       | New Jersey Medical School               |
| Thomas Chasse        | Pennsylvania School of Medicine         |
| Namita Chowdhury     | Albert Einstein College of Medicine     |
| Jayanta Chowdhury    | Albert Einstein College of Medicine     |
| James Claiborne      | University of Miami                     |
| Lars Cleemann        | University of Pennsylvania              |
| Gary Conrad          | Kansas State University                 |
| Richard Crawford     | Trinity College                         |
| Sheila Cronin        | Yale University                         |
| Helen Cserr          | Brown University                        |
| David Dawson         | Univ. of Iowa College of Medicine       |
| Arthur DeVries       | University of Illinois                  |
| Stephen Dillon       | University of Pennsylvania              |
| William Doyle        | University of Chicago                   |
| William Driedzic     | Mount Allison University, New Brunswick |
| Michael Duffey       | SUNY at Buffalo                         |
| Henry Edelhauser     | Medical College of Wisconsin            |
| Franklin Epstein     | Beth Israel Hospital                    |
| Jon Epstein          |   |
| David Evans          | University of Miami                     |
| Bill Eveloff         | Max-Planck Institut fur Biophysik       |
| Joseph Fenstermacher | National Cancer Institute               |
| Michael Field        | University of Chicago                   |
| John Forrest         | Yale University                         |
| Roy Forster          | Dartmouth College                       |
| Gary Foureman        | NIEHS                                   |
| Nicholas Franki      | Albert Einstein College of Medicine     |
| Beth Friedland       | University of Florida                   |
| Daphne Gardiner      | The Hotchkiss School                    |

| NAME               | INSTITUTION                                |
|--------------------|--|
| Jonathan Gates     | Cornell University Medical College         |
| Dayle Geroski      | Medical College of Wisconsin               |
| Angela Gilanian    | Cornell Medical Center                     |
| Jon Goldstein      | Brown University                           |
| Leon Goldstein     | Brown University                           |
| Susanne Goldstein  |  |
| Daniel Gomez       | Cornell University                         |
| Anthony Guarino    | National Cancer Institute                  |
| Jo Ann Hannafin    | Albert Einstein College of Medicine        |
| Richard Hays       | Albert Einstein College of Medicine        |
| Shuk-Mei Ho        | Boston University                          |
| Adrian Hogben      | University of Iowa                         |
| Fred Hossler       | Louisiana State University                 |
| Roosevelt Hyman    | NIH  |
| Karl Karnaky       | Temple University School of Medicine       |
| Nancy Keller       | Lafayette College                          |
| Barbara Kent       | Bronx V. A. Hospital                       |
| Evamaria Kinne     | Max Planck Institut fur Biophysik          |
| Rolf Kinne         | Max Planck Institut fur Biophysik          |
| Patricia King      | Brown University                           |
| Arnost Kleinzeller | University of Pennsylvania                 |
| Thomas Koob        | Harvard Medical School                     |
| Rajiv Kumar        | Mayo Clinic                                |
| Martin Kushmerick  | Harvard Medical School                     |
| Gabrielle Lambert  | Canadian Wildlife Service                  |
| Diane Leone        | Beth Israel Hospital                       |
| Michael Levy       | New York University                        |
| Nancy Lindem       | Peter Bent Brigham Hospital                |
| Leigh Mansberger   | University of Miami                        |
| Thomas Maren       | University of Florida                      |
| James Maylie       | University of Pennsylvania                 |
| Thomas McCauley    | Trinity College                            |
| Jussi Melartin     | Wesleyan University                        |
| Lee Montgomery     | University of Oregon Health Science Center |
| Martin Morad       | University of Pennsylvania                 |
| Anne Murdaugh      | Yale University                            |
| Victor Murdaugh    | University of South Carolina               |
| Reibun Natori      | Harvard Medical School                     |
| David Opdyke       | CMDNJ- NJ Medical School                   |
| Stephanie Orellana | University of Chicago                      |
| Clive Palfrey      | Yale School of Medicine                    |
| Clifford Patlak    | NIMH                                       |
| David Peakall      | Canadian Wildlife Service                  |

| NAME                 | INSTITUTION                        |
|----------------------|------------------------------------|
| William Penhallurick | SUNY at Buffalo                    |
| Zoltan Petro         | Harvard Medical School             |
| Judi Petti           | Kenyon College                     |
| David Petzel         | University of Illinois             |
| Richard Philpot      | NIEHS                              |
| Lisa Pistoni         | University of Pennsylvania         |
| Barbara Rappaport    | Union College                      |
| Raymond Rappaport    | Union College                      |
| David Rieck          | University of Vermont              |
| Robert Rosa          | Beth Israel Hospital               |
| Barbara Ross         | Yale University School of Medicine |
| Barbara Schmidt      | Kansas State University            |
| Helmut Schröck       | Brown University                   |
| J. Paul Scott        | Bowling Green State University     |
| Trevor Shuttleworth  | University of Exeter, England      |
| Patricio Silva       | Beth Israel Hospital               |
| Philip Smith         | University of Chicago              |
| Richard Solomon      | Roger Williams General Hospital    |
| Katherine Spokes     | Beth Israel Hospital               |
| Michael Stern        | Medical College of Wisconsin       |
| Arthur Stevens       | Beth Israel Hospital               |
| Beth Stockstill      | North Carolina State University    |
| Jeffrey Stoff        | Beth Israel Hospital               |
| Erik Swenson         | University of Florida              |
| Jill Thompson        | University of Exeter, England      |
| Jerry Trier          | Peter Bent Brigham Hospital        |
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| Jeff Turner          | McMaster University                |
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| Avril Woodhead       | Brookhaven National Laboratory     |
| Peter Woodhead       | SUNY at Stony Brook                |
| Gregory Wulczn       |                                    |
| Susan Zell           | College of the Atlantic            |

## 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 research facility for investigations on local flora and fauna. There is laboratory space for 34 research programs. Certain specialized equipment is available. During 1979 there were 133 scientific personnel representing 55 institutions in 17 states and abroad. The personnel included 47 investigators and co-investigators of faculty rank. The work of the laboratory covers a broad area of biology, comparative physiology and biochemistry. Advanced undergraduate, graduate, medical and postdoctoral students spend the summer under supervision of senior investigators.

No formal courses are given, but weekly formal and informal seminars are scheduled. Effective in 1971, some year-round programs have been established.

The laboratory administration solicits and welcomes applications from all qualified scientists whose programs can be best fostered in its environment. With rare exceptions, investigators are required to utilize local flora and fauna. Opportunity to work at MDIBL is advertised annually in the *Journal Science*. Recently the number of applications has exceeded the capacity of the laboratory. Applications are screened for scientific merit by a Scientific Advisory Committee, made up of investigators who have worked at the laboratory for some time, and then by the Executive Committee, for feasibility and setting of priorities of acceptance. New investigators usually constitute 30% to 40% of the summer population. Acceptance notices are issued in late March or early April for tenancy in June.

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 Salsbury Cove was donated to the Laboratory by the Gardens of Acadia, a group instrumental in the establishment of Acadia National Park, and removal of 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 non-profit scientific and educational institution, and it is owned and operated by the Trustees and members of the Corporation. At present there are over 400 members of the Corporation. It functions with minimal full-time professional administrative personnel and in many 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 (1970-75); Richard M. Hays, Albert Einstein College of Medicine (1976-79); Leon Goldstein, Brown University (1979- ).

## Location

Mount Desert Island lies in the Gulf of Maine about 120 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 connecting flights on Bar Harbor Airlines, as well as direct flights from Boston to Bar Harbor. 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 fjord 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.

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, and 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. 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 250 acres fronting on Frenchman Bay at Salsbury 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:

*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.

*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, and aquaria are located on a common terrace at the entrance to the building.

*Marshall Laboratory*, a new year-round facility, contains five laboratories and a full basement which includes a tank room, common instrument space, and office space.

*The Kidney Shed* is a single large laboratory. It accommodates two research groups.

*Hegner Laboratory* contains 9 laboratory rooms provided with salt and fresh water, each accommodating 1 to 3 persons. It is next on the list of buildings to be remodeled.

*Karnofsky Laboratory*, constructed in 1970, contains 4 large laboratories, one large enough to accommodate 2 research groups. This is now a year-round facility.

*Union Station*, erected in 1962, contains two laboratories, each suitable for 2 to 3 persons, and is equipped with salt and fresh water.

*The Instrument Shed* was renovated in 1979 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.

*Lewis Laboratory*, renovated in 1979, contains two laboratories.

*Biophysics Building.* This air-conditioned building was erected in 1965. It houses isotope counting systems, ultracentrifuges, spectrophotometers, and sectioning equipment for electron microscopy.

*Director's Office.* A separate building contains the Director's Office and a small conference room.

*Shop.* A centrally located frame building that houses supplies, equipment, and machinery and serves as the headquarters for the Plant Manager.

*Business Office and Library.* In the same building as the shop, it also houses an additional common instrument room.

*Dahlgren Hall,* the former village schoolhouse, was purchased and converted to use as a meeting hall; it also houses a reprint collection. The single large room can seat about 120 persons and is equipped with projectors.

*Dining Hall (Co-op).* 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.

*Bowen Hall* is one of the oldest remaining examples of early 19th century Island architecture. It now serves as one of four dormitories and has a common room for young women.

#### Support Facilities

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

*Collecting Boats.* A 32' gasoline powered collecting boat, the *Squalus*, was built in 1958. It is provided with a circulating water tank for the transportation of specimens. Arrangements can be made with local fishermen for offshore specimens. A Nova Scotia skiff with an out-board motor is also used for collecting and skiffs are available to investigators. A motor launch is used for access to bird breeding colonies.

*Pick-up Trucks* are used for laboratory operations and specimen transport.

#### 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 and linen, as well as pay the Laboratory for the use of the cottage (which includes utilities and garbage disposal). Rent is \$990 to \$1210 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. The Laboratory business office maintains a list of available rentals. An automobile is essential for family mobility in the area.

In addition, seven cottages are presently privately owned but located on Laboratory property under a special leasehold arrangement.

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

Four dormitories (two for men and two for women) are available for summer laboratory assistants. They are relatively old wooden buildings.

#### 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. Salsbury 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 and Post Office. The Laboratory colony comprises about 180 adults and 80 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.

#### Acknowledgments

The Mount Desert Island Biological Laboratory is indebted to the National Science Foundation and the National Institutes of Health for substantial support in the past. 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 NSF and NIH grants to the Laboratory. Current support from NSF under grant DEB-7836821 is gratefully acknowledged. Additional support has been provided by NIH Biomedical Research Support Grant S07 RR 05764.

#### Applications

Fees for research space vary according to the demand made on the facilities. They range from approximately \$355 to \$1950, depending on the space assigned and the number of workers. Special arrangements may be made for facilities beyond the summer season (June 15 - September 15). 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. 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.

In an effort to make our specimen collecting facilities as self-supporting as possible, fees change almost annually. This year's fees ranged from \$3 for dogfish and skates, to \$50 per trip for unusual specimens. Some of the commonly used organisms include:

PISCES: *Myxine glutinosa*, Hagfish; *Squalus acanthias*, spiny dogfish; *Raja erinacea*, little skate; *Anguilla rostrata*, eel; *Fundulus heteroclitus*, killifish; *Lophius americanus*, goosefish; *Myxocephalus* sp., sculpins; *Pholis gunnellus*, rock eel; *Pseudopleuronectes americanus*, winter flounder; *Macrozoarces americanus*, eelpout.

INVERTEBRATES: *Echinarachnius parma*, sand dollar; *Pagurus* sp., hermit crabs; *Homarus americanus*, lobster; *Boltenia ovifera*, sea potato.

Other native fauna under investigation include: echinoderms, gastropods, frogs and salamanders, and marine birds.

Limited fellowships are supported by funds from the Ulrich Dahlgren Memorial Fund (a gift from the American Philosophical Society) and other memorial funds.

Applications and inquiries should be addressed to the Laboratory Director, Dr. Leon Goldstein.

June 15 - August 31  
Mount Desert Island Biological Laboratory  
Salsbury Cove, ME 04672  
(207) 288-3605

Division of Biomedical Sciences  
Brown University - Box 8  
Providence, RI 02912 (401) 853-2341

Inquiries regarding specific matters such as laboratory charges and facilities can also be directed to:

Mr. Jonathan S. Gormley  
Executive Secretary  
Mount Desert Island Biological Laboratory  
Salsbury Cove, ME 04672  
Tel. (207) 288-3605



(CO-OP ENTRY - July 4, 1979 - "Most Unusual" -)

# MDIBL WINTER SEMINAR SCHEDULE

1978 - 1979

- |          |    |  |
|----------|----|--|
| November | 1  | Dr. David S. Miller (MDIBL):<br>"Transport in teleost epithelial membranes"                              |
| November | 8  | Dr. John B. Pritchard (NIEHS):<br>"Toxic substances and cell membrane function"                          |
| November | 15 | Dr. Ronald G. Butler (MDIBL):<br>"Olfactory communication in beavers"                                    |
| November | 29 | Dr. Larry N. Reinking (MDIBL):<br>"Plasma aldosterone in a freshwater teleost"                           |
| December | 6  | Dr. Larry Renfro (University of Connecticut):<br>"Ca transport in flounder tubules"                      |
| December | 20 | Dr. Lewis Kinter (Harvard Medical School):<br>"Homeostatic mechanism in the diabetes insipidus rat"      |
| January  | 24 | Dr. Hans Heiniger (Jackson Laboratory):<br>"The role of cholesterol in lymphocyte function"              |
| January  | 31 | Dr. Bodil Schmidt-Nielsen (MDIBL):<br>"Physiology of the mammalian renal pelvis"                         |
| February | 21 | Dr. Larry Mobraaten (Jackson Laboratory):<br>"Recognition in the immune response"                        |
| February | 28 | Dr. Charles W. Holliday (MDIBL):<br>"Hemolymph volume control in crustaceans"                            |
| March    | 21 | Open House for faculty and students of College of the Atlantic, Bar Harbor                               |
| March    | 28 | Dr. Ronald G. Butler (MDIBL):<br>"The maintenance of feeding territories by brown and south polar skuas" |

## 1979 TUESDAY EVENING SEMINARS

Held at 8:00 p.m., Dahlgren Hall

- |                       |    |   |
|-----------------------|----|---|
| July                  | 10 | Dr. William H. Dantzler (University of Arizona)<br><u>Comparison of urate and PAH transport: Studies with isolated, perfused renal tubules</u>      |
| July                  | 17 | Dr. Peter Satir (Sponsored by Dr. Hays) (Albert Einstein College of Medicine)<br><u>The movement of cilia: Mechanisms and controls</u>              |
| July                  | 24 | Dr. Henry F. Edelhauser (Medical College of Wisconsin)<br><u>The metabolic and structural basis of corneal transparency: A comparative study</u>    |
| July                  | 31 | Dr. Arthur DuBois (John B. Pierce Foundation Laboratory, Yale)<br><u>How do fish swim?</u>  |
| August<br>(Wednesday) | 8  | Dr. James L. Boyer (Yale University)<br><u>Mechanisms of bile secretory function; or, Is the rectal gland really a liver?</u>                       |
| August                | 14 | Dr. Robert E. Forster (University of Pennsylvania)<br><u>How does the red blood cell deal with CO<sub>2</sub> and HCO<sub>3</sub><sup>-</sup> ?</u> |

- August 21 Dr. Samuel B. Horowitz (Michigan Cancer Foundation)  
Transport lessons from the amphibian oocyte
- August 23 Dr. Edward A. Dratz (University of California, Santa Cruz)  
Photoreceptor membrane structure

THURSDAY NOON SEMINARS

1979

- July 5, 12 Project Summaries
- July 19 Birgit Satir  
"Possible function of an intramembrane particle array as calcium channel"
- July 26 Avril Woodhead  
"Fish as animal models in cancer research"
- August 2 Mid-season Project Summaries
- August 10 Magnus Bundgaard  
"In search of capillary pores"
- August 16 Richard Hays  
"Autoradiographic studies of urea transport"
- August 23 John Forrest  
"Somatostatin: Possible role as a cybernin regulating water in ion transport"

MONDAY MORNING MEETINGS - 8:00 a.m.

on

Cellular Events and Transport

- July 23 A. Kleinzeller  
Cell volume control: What we would like to know
- July 30 M. Kushmerick  
Energetics of muscle contraction I
- August 6 M. Kushmerick  
Energetics of muscle contraction II
- August 13 D. Dawson  
Energetics of coupled NaCl transport
- August 17 J. Eveloff  
Rectal gland plasma membrane vesicles - NaCl transport
- August 24 M. Field  
pH and transport in flounder intestine

RESEARCH TITLES - 1979

Bend, John R., Ph.D., Acting Chief, Laboratory of Pharmacology, NIEHS

1. Epoxide metabolism and excretion in winter flounder
2. Reconstitution of the microsomal mixed-function oxidase system from selected marine species

Bissonnette, John M., M.D., Associate Professor of Obstetrics and Gynecology, University of Oregon Health Sciences Center

Isolation and purification of vesicles from basal-lateral membranes of flounder intestinal and renal tubule epithelium

Boyer, James L., M.D., Professor of Medicine; Director, Liver Study Unit, Department of Medicine, Yale University School of Medicine

Structure and functional correlations of the junctional complexes (tight junctions) in: (1) hepatocytes of the small skates, and (2) the rectal gland of the dogfish shark in salt and after fresh water adaptations

Callard, Gloria V., Ph.D., Associate, Obstetrics and Gynecology, Harvard Medical School, Laboratory of Human Reproduction and Reproductive Biology

Aromatization of androgen to estrogen in the vertebrate brain

Callard, Ian P., Ph.D., Professor of Biology, Boston University

Gonadal control mechanisms in elasmobranchs

Conrad, Gary W., Ph.D., Associate Professor, Division of Biology, Kansas State University

Control of cytokinesis and polar lobe formation in fertilized eggs of *Ilyanassa obsoleta*

Crawford, Richard B., Ph.D., Professor of Biology, Trinity College, Hartford

1. Aromatic amino acid metabolism in teleost embryos
2. Effects of xenobiotic compounds on development

Cserr, Helen F., Ph.D., Associate Professor of Physiology, Brown University

1. Anatomical and physiological studies of the convective flow of brain interstitial fluid in the little skate, *Raja erinacea*
2. Prostaglandin transport by isolated choroid plexus
3. Intracellular and CSF pH of brain: alterations in respiratory acidosis

Dawson, David C., Ph.D., Assistant Professor, Department of Physiology and Biophysics, University of Iowa

Characteristics of cellular and paracellular ion movements in teleost urinary bladder

DeVries, Arthur L., Ph.D., Associate Professor of Physiology, University of Illinois  
Renal handling of antifreeze peptides in coastal fishes of northern Maine

Doyle, William L., Ph.D., Professor Emeritus of Anatomy, University of Chicago  
Fine structure and saline secretion

Driedzic, William R., Ph.D., Assistant Professor, Biology Department, Mt. Allison University  
Relationship between contractility and energy metabolism in the isolated fish heart

Edelhauser, Henry R., Ph.D., Professor of Physiology and Ophthalmology, Medical College of Wisconsin  
Comparative corneal ultrastructure and glucose metabolism in marine teleosts and elasmobranchs

Epstein, Franklin H., M.D., Professor of Medicine, Beth Israel Hospital  
1. Structural and functional correlates of "freshwater turnoff" in *Anguilla rostrata*  
2. Activation of Na-K-ATPase by stimulation of secretion in the rectal gland

Evans, David H., Ph.D., Professor and Chairman, Department of Biology, University of Miami  
1. Cl efflux from *S. acanthias* "pups," effect of Cl-free sea water  
2. Role of the rectal gland in osmoregulation by *S. acanthias* "pups"  
3. Cl and urea fluxes across the skate (*R. erinacea*) egg case  
4. Vascular effects of epinephrine and alpha and beta blockers on the perfused isolated head of the long-horned sculpin (*Myoxocephalus octodecimspinosus*)

Fenstermacher, Joseph, Ph.D., Head, Membrane Transport Section, \*NCI (National Cancer Institute)  
Ventricular fluid absorption in *Squalus acanthias*

Field, Michael, M.D., Professor of Medicine and Physiology, University of Chicago  
Active ion transport in flounder intestine

Forrest, John N., M.D., Associate Professor of Medicine, Yale University  
1. Role of calcium in chloride secretion by the isolated perfused dogfish rectal gland  
2. Studies of junctional complexes in the isolated perfused rectal gland (with Dr. James Boyer)  
3. Cell volume regulation in the dogfish rectal gland (with Dr. Arnost Kleinzeller)

Forster, Roy P., Ph.D., Research Professor, Department of Biological Sciences  
1. Taurine transport in "skate" "hemi-atrium" preparation  
2. Relative permeabilities of the endocardial and epicardial faces of the skate atrium

Goldstein, Leon, Ph.D., Professor and Chairman, Department of Physiology and Biophysics, Brown University  
Nitrogen metabolism in fish

Guarino, Anthony M., Ph.D., Chief, Laboratory of Toxicology, NCI  
1. Mechanisms of heavy metal nephrotoxicity  
2. Xenobiotic distribution in the spiny dogfish shark

Hays, Richard M., M.D., Professor of Medicine, Director, Section

1. Autoradiographic study of urea and solute transport across epithelia
2. Morphologic study of fish gill

Hogben, C. Adrian, M.D., Professor, Department of Physiology and Biophysics, University of Iowa  
Role of histamine in spontaneous secretion of gastric mucosa

Hossler, Fred E., Ph.D., Associate Professor of Anatomy, Louisiana State University  
The mechanism of ion transport - correlation of Na, K-ATPase, ultrastructure, and ion flux during osmotic regulation

Karnaky, Karl J., Ph.D., Assistant Professor, Department of Anatomy, Temple University School of Medicine  
Mechanisms of chloride transport by the teleost opercular epithelium

Kent, Barbara, Ph.D., Associate Professor of Physiology, Mt. Sinai School of Medicine, also Director, Surgical Research Laboratory, Veteran's Administrative Medical Center

1. Control of respiratory exchange surface in gills of *S. acanthias*
2. Whole body vascular casting of dogfish and small marine teleosts
3. Intrauterine gas exchange characteristics in dogfish

Kinne, Rolf, M.D., Chief, Renal and Membrane Biochemistry, Max-Planck Institut fur Biophysik  
Sodium chloride transport by dogfish rectal gland

Kleinzeller, Arnost, M.D., Ph.D., D.Sc., Professor of Physiology, University of Pennsylvania School of Medicine

1. Cell volume control in the dogfish rectal gland (with J. Forrest)
2. Sugar transport in flounder intestine
3. Sugar transport in the intestine of *Fundulus* (with K. Karnaky)
4. Mannose transport in membrane vesicles of flounder kidney (with J. Pritchard)

Kushmerick, Martin J., M.D., Ph.D., Associate Professor of Physiology, Harvard Medical School  
ATPase and tension in single muscle fibers

Maren, Thomas H., M.D., Graduate Research Professor, Department of Pharmacology, University of Florida College of Medicine

1. Ion transport in the elasmobranch lens
2. Isolation of carbonic anhydrase, and chemical characterization, from teleost blood

Miller, David S., Ph.D., Research Scientist, MDIBL

1. Membrane toxicity theory and environmental pollutants
2. Environmental pollutants and membrane transport

Morad, Martin, Ph.D., Professor of Physiology, University of Pennsylvania  
Electro-mechanical studies in single layered heart of sea potato

Murdaugh, H. Victor, M.D., Professor of Medicine, University of South Carolina School of Medicine

1. Renal and rectal gland response to dilute sea water in *Squalus acanthias*  
(with J. Forrest)
2. Endocrine response of *Squalus acanthias* (with A. Siegel)

Opdyke, David F., Ph.D., Professor, Department of Physiology, CMDNJ - New Jersey Medical School

1. Mechanism of catecholamine release by angiotensin in dogfish
2. Studies on the effect of angiotensin antagonists on the angiotensin-mediated pressor response in dogfish
3. Demonstration of renin and/or angiotensin-like peptide in elasmobranchs
4. Physiological and pharmacological studies utilizing a new type of isolated dogfish heart preparation
5. Studies on the evolution of angiotensin receptors

Peakall, David B., Ph.D., Chief, Toxic Chemical Division, National Wildlife Research Center,  
Canadian Wildlife Service

1. Physiological effects of oil on seabirds
2. Effects of oil and dispersants on metabolic rates of seabirds

Rappaport, Raymond, Ph.D., Professor, Department of Biological Sciences, Union College

Experimental analysis of animal cell division mechanisms

Schmidt-Nielsen, Bodil, Ph.D., Dr. odont; D.D.S., Research Scientist, MDIBL

1. Function of the mammalian renal pelvis
2. Cellular volume regulation in the renal medulla of rodents
3. Extra and intracellular volume regulation in intertidal oligochaetes and nemerteans
4. Function of the urinary bladder of the little skate (*Raja erinacea*)

Scott, J.P., Ph.D., Regents Professor of Psychology and Director, Center for Research on Social  
Behavior, Bowling Green State University

Social behavior of the squid, *Loligo pealei*

Shuttleworth, Trevor John, Ph.D., Lecturer, Department of Biological Sciences, University of  
Exeter (England)

Mechanisms of ionic regulation in marine fish with particular reference to the  
functioning of the dogfish rectal gland and its control

Silva, Patricio, M.D., Chief, Renal Unit, Beth Israel Hospital, Assistant Professor of Medicine,  
Harvard Medical School

Mechanism of chloride transport in the rectal gland of *Squalus acanthias*

Stoff, Jeffrey S., M.D., Assistant Professor of Medicine, Beth Israel Hospital

Studies on cyclic AMP metabolism in the rectal gland of *Squalus acanthias*

Trier, Jerry S., M.D., Professor of Medicine, Harvard Medical School, Director, Gastroenterology Division, Peter Bent Brigham Hospital

Alimentary tract structure in *Pseudopleuronectes americanus* (Winter Flounder)

Wilde, Charles E. Jr., Ph.D., Professor of Zoology and Chairman of the Department, University of Rhode Island

1. Further studies on the ontogeny of the euryhaline state
2. Membrane localization of positional information in *Ilyanassa obsoleta*

Woodhead, Peter, Ph.D., Professor, Marine Sciences Center, SUNY, Stony Brook, New York

1. Reproductive strategy of spiny dogfish
2. Hormonal effects on fish behaviour/physiology

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