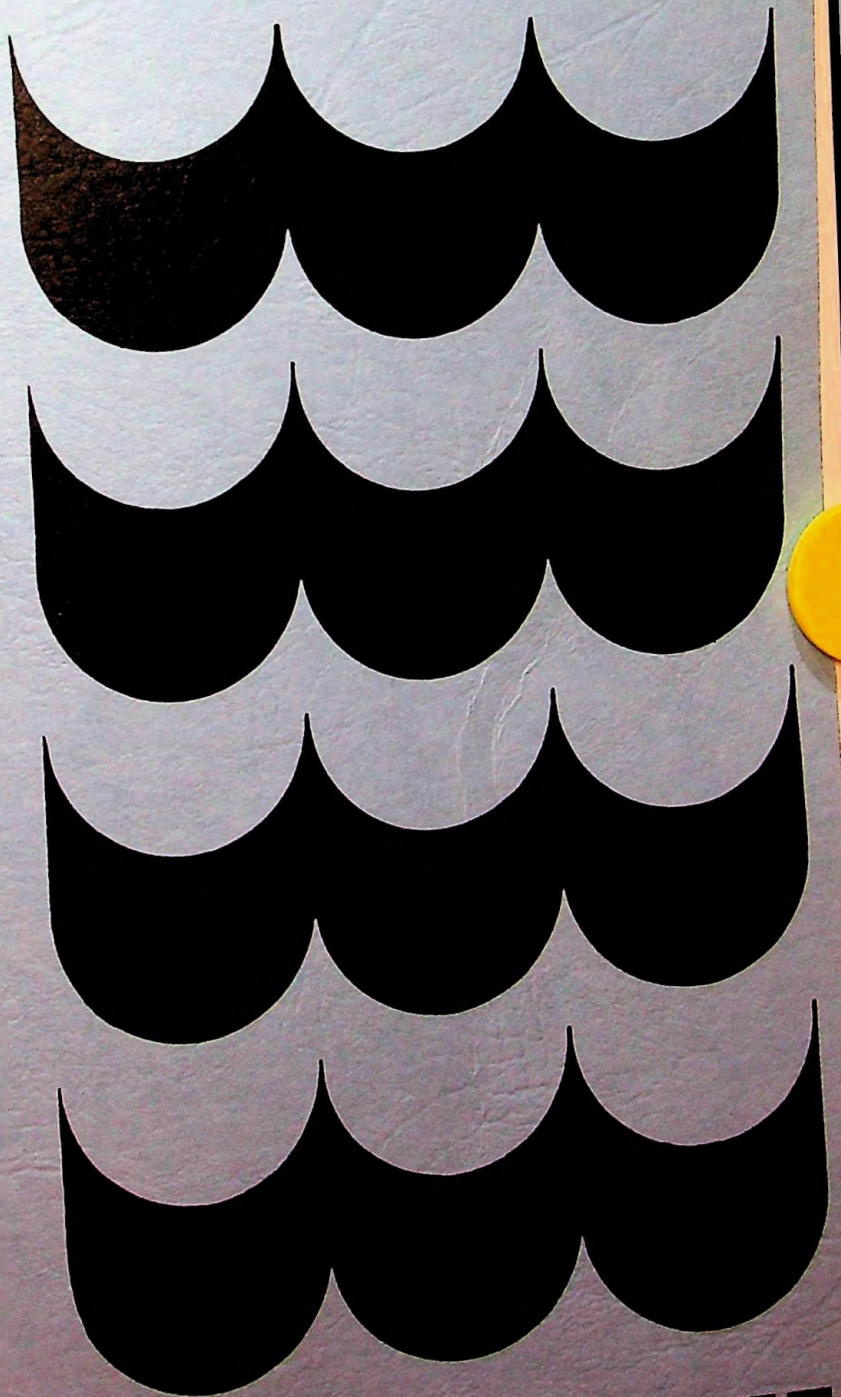
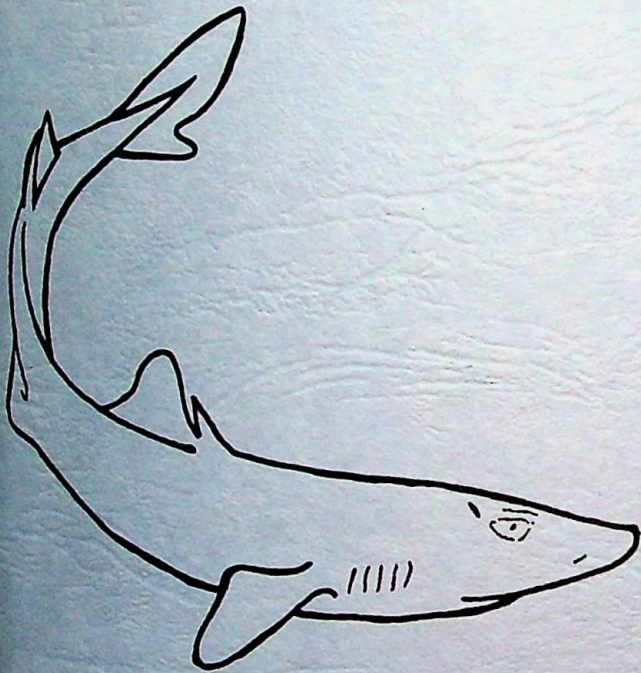


THE BULLETIN
Volume 15
Mount Desert Island
Biological Laboratory
Salsbury Cove, Maine



1975

VOLUME 15
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THE BULLETIN
THE MOUNT DESERT ISLAND
BIOLOGICAL LABORATORY
SALSBURY COVE, MAINE



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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 basic laboratory space for 31 research groups. Certain specialized equipment is available. During 1974 there were 124 scientific personnel representing 54 institutions both here and abroad. There were 62 professional scientists and 62 students, technicians and staff in the 1974 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. Effective September, 1971 the Laboratory established year-round programs with two investigator groups. These year-round programs are supported by grants from Federal agencies.

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 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 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 359 members of the Corporation. 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. Porter, 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).

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, and to the 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 island 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. 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 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 building of frame construction located along the shore that are provided with electricity, gas, sinks and lab benches. Facilities are as follows:

(1) **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 fresh and salt water. Water troughs, aquaria, and larger tanks are located along the north wall outside. Refrigerators are located in entry way at each end of the building.

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

(3) **Marshall Laboratory.** Marshall is a new year-round facility containing four laboratories each capable of accommodating 3 to 5 persons, a common instrument room, an enclosed desk, and a full basement. Running sea water is available on the deck and in the basement.

(4) **The Kidney Shed.** The Kidney Shed is a single large laboratory. It can accommodate two small research groups.

(5) **Hegner Laboratory.** Hegner contains 9 laboratory rooms each accommodating 1 to 2 persons. Most are provided with salt and fresh water. Specimen tanks are located outside the building.

(6) **Karnofsky Laboratory.** Karnofsky was constructed in 1970, contains 4 large laboratories that can each accommodate 3 to 5 people. This building has been winterized and is now a year-round facility.

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

(8) **Instrument Shed.** This 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. It connects directly to the Kidney Shed.

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

(10) **Shop.** The shop contains power and hand tools for woodworking; the stockroom as a few chemicals and analytical balances.

(11) **Balance Room.** This cement floor room is at the upper level of the shop building. It contains several analytical balances and one semi-micro balance.

(12) **Office and Library.** A separate building was constructed in 1955 as the Director's Summer Office. A business office for administrative staff and records was constructed on the second floor on shop in 1973.

(13) **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 and 35mm slides.

(14) **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 donations.

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

(16) **The Oakes.** This summer cottage has been used to house 6 to 8 male assistants.

(17) **Bow End.** This is a house and connecting barn used to house 8 to 10 male assistants. It is partially winterized.

(18) **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.

(19) **Collecting Boats.** A 32' gasoline powered collecting boat, the Squalus, is provided with a circulating water tank for the transportation of specimens. Arrangement can be made with local fisherman 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 the Laboratory. The cottages are rented by the season, or occasionally for shorter periods. Occupants must supply their own blankets, linen, silver, some kitchen utensils, and pay for gas used. The rent includes water, electricity, and garbage disposal. Rent was \$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 or in laboratory dormitories. Most of these people take their meals in the Laboratory Dining Hall. The weekly charge for meals is based on self-sustaining nonprofit operations.

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 their 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, several 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. Salsbury Cove is an old fishing and farming community on the northern shore of the island near the main road for Bar Harbor to Ellsworth. It has one general store and Post Office. 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 these projects have benefited from the National Science Foundation grants to the laboratory. Current support under grant GB 8662 is gratefully acknowledged.

Applications

Fees for research space vary according to the demand made on the facilities. They range from \$200 to \$1100 depending on the space assigned, the number of workers, and the duration of assignment. Special arrangements may be made for facilities beyond the summer season (June 15-September 15) and for a portion of the summer season. 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.

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

Applications and inquiries should be addressed to the Laboratory Director.

Mount desert Island Biological Laboratory
Salsbury Cove, Maine 04672

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Jose Zadunaisky	New York University Medical Center
Laura Zadunaisky	New York University

Seminars

Evening Seminars

Most evening seminars are held at 8:00 p.m.
in Dahlgren Hall, Salsbury Cove, Maine.

- July 8 D.M. Ross
Professor of Zoology, University of Alberta
Behavioral Interactions in Symbioses Between Crabs and Sea Anemones
- July 15 Stanley G. Schultz
Professor of Physiology, University of Pittsburgh
Sodium Transport and the Electrophysiology of Mammalian Intestine
- July 22 David E. Goldman
Professor of Physiology and Biophysics, Medical College of Pennsylvania
Electrogenicity of Sodium Pumps
- July 29 John C. Harshberger
Director, Registry of Tumors in Lower Animals
National Museum of Natural History, Smithsonian Institute
Cancer Research on Invertebrate and Cold-blooded Vertebrate Animals
- August 6 John N. Forrest, Jr.
Department of Medicine, Yale University
Rectal Gland Physiology
- August 12 Philip P. Cohen
Professor of Physiological Chemistry, University of Wisconsin
Biochemical Differentiation during Amphibian Metamorphosis
- August 19 Claude Lenfant
Director, Division of Lung Diseases, National Heart and Lung Institute
Respiratory Adaptation in Lower Vertebrates

Informal Thursday Noon Seminars

Based on work done at Mount Desert Island Biological Laboratory,
or work relating directly thereto.

Two 20-minute presentations, or one 40-minute talk.

- July 24 Dr. Jack Myers
Electrolyte Loading in Dogfish
- July 31 Dr. David Opdyke
Angiotensin I Converting Enzyme in the Dogfish: An Evolutionary Enigma
Drs. Roy Forster and Leon Goldstein
Intracellular Osmoregulation in Elasmobranchs
- August 7 Dr. David Miller
The Biochemical Basis for DDE-Induced Eggshell Thinning
- August 14 Dr. Jose Zadunaisky
The Transport of Sugars and Electrolytes
- August 21 Dr. Michael Field
Chloride Transport in the Small Intestine of Mammals and Teleosts

Project Titles

- Bend, John R.; Fouts, James R.; James, Margaret O. and Pohl, Roberta J.
Epoxide metabolism by marine species.
- Bend, John R.; Fouts, James R.
Pharmacokinetics of single radiolabeled constituents of crude or refined petroleum in marine species.
- Bend, John R.; Fouts, James R.; Philpot, Richard M. and Pohl, Roberta J.
Study of polycyclic hydrocarbon and dioxin induction of the hepatic and renal mixed-function oxidase systems of the little skate and winter flounder.
- Bradley, Stanley E.
Comparative neutral-ionic solute in tissues and excreta.
- Conrad, Gary W. and Pakstis, Gail.
Control of polar lobe formation and extracellular matrix biosynthesis by embryos of *Ilyanassa obsoleta*.
- Crawford, Richard B.
Relationship of plasma membrane changes to other fertilization-induced events in the Echinoderm egg.
- Crawford, Richard B. and Guarino, Anthony M.
Effects of xenobiotics on development of the embryo of *Fundulus heteroclitus*.
- Cseri, Helen F.; Critz, Carl; Ashby, John; Bundgaard, Magnus and Murray, Marion.
Permeability of the hagfish and skate blood-brain barrier to electron opaque markers.
- Dinsmore, Charles E.
A comparative analysis of tail regeneration following autonomy or amputation in the urodele, *Plethodon cinereus*.
- Doyle, William L.
Fine structure and osmoregulation.
- Fenstermacher, Joseph D.; Owens, Ernest S.; Eichenholz, Phillip; Rappaport, Jean, and Guarino, Elizabeth.
The distribution of polar materials from cerebrospinal fluid to brain tissue and blood.
- Field, Michael and Smith, Philip L.
Chloride transport across flounder intestinal mucosa: relationship to sodium transport and effect of cyclic AMP.
- Fleischner, Gerald M.; Jansen, Peter and Fleischner, Cindy.
Mechanism of bile excretion.
- Colton, Sabin, and Schmidt-Nielsen, Bodil.
Lipids of marine invertebrates.
- Epstein, Franklin, H.; Epstein, Ann; Epstein, Sara; Spokes, Kate; Stevens, Arthur and Silva, Patricio.
Factors influencing the adaptation of salt water teleosts to fresh water.
- Forster, Roy P.; Danforth, John W. and Logan, Lewis P.
Intracellular osmoregulation in elasmobranchs.
- Goldstein, Leon; Boyd, Thomas and McElroy, Anne.
Role of amino acids in intracellular osmoregulation in elasmobranchs.
- Guarino, A.M.; Fenstermacher, P.; Rittmaster, R.; Sutermeister, K. and English, B.
Pharmacokinetics of antineoplastic agents and other xenobiotics in the hepatic, renal and CNS compartments of the dogfish shark.
- Hays, Richard M.; Danovitch, Gavriel; Fine, Leon; Franki, Nicholas; Bogar, Anne. and Hays, David.
Control of water, calcium and phosphate excretion in the dogfish.
- Hays, Richard M.; Danovitch, Gavriel; Fine, Leon; Franki, Nicholas; Bogar, Anne L. and Hays, David.
The effect of phloretin on the movement of urea across the flounder renal tubule.
- Hogben, C. Adrian M.
Electrical transients of dogfish gastric mucosa.
- Hogben, C. Adrian M.; Hogben, Anne and Hays, Laurie.
Interaction of H₂ inhibitors with secretagogues.
- Kent, Barbara B.; Peirce C.E. II; Eid, Francois and Bryan-Brown, Adrian.
Dogfish gill gas exchange relationships.
- Kent, Barbara B.; Peirce, C.E. II; Eid, Francois and Bryan-Brown, Adrian.
Relationship between oxygen consumption and cardiac output in *Squalus acanthias*.
- Kent, Barbara B.; Peirce, C.E. II; Eid, Francois and Bryan-Brown, Adrian.
Oxygen dissociation curves.
- Kidder, George W. III.
Hyperbaric experiments: a test for oxygen sufficiency in *Squalus acanthias* gastric mucosa in vitro.
- Kinne, Rold; Eveloff, Jill; Miller, David; Karnaky, Karl Jr.; Maier, Rudolf; and Kinter, William.
Isolation and transport function of flounder kidney plasma membranes.

- Karnaky, Karl Jr.; Shoemaker, David; Church, Harold.
Function and morphology of teleost chloride cells.
- Kleinzeller, Arnost; Dubyak, George and Mullin James.
The specificity of the transport systems for galactose in flounder renal tubules.
- Dubyak, George and Kleinzeller, Arnost.
The effect of phlorizin on the transport and phosphorylation of sugars in flounder renal tubules.
- Mullin, James; Rappaport, Jean; Fenstermacher, Joseph D.; Patlak, Clifford and Kleinzeller, Arnost.
Transport of glucose the the choroid plexus of the dogfish.
- Malzin, Richard L.; Chruchill, Paul C.; Churchill, Monique and Resnick R.
Renal tubular effects of angiotensin II and desoxycorticosterone acetate.
- Maren, Thomas H. and Swenson, Erik-R.
Comparative study of the Bohr effect: relation between hemoglobin and carbonic anhydrase in red cells.
- Miller, Ralph, and Kent, Barbara B.
Histoloty of teleost pancreas.
- Morad, Martin; Cleemam, Lars; Goldman, Yale; Mayer, Douglas; Weiss, James and Colton, Kimberly.
Transmembrane electrical activity of the single cell layered heart of the sea potato.
- Morad, Martin; Goldman, Yale.
Instantaneous current-voltage relations during the frog ventricular myocardial action potential.
- Morad, Martin; Cleemanm, Lars; Goldman, Yale; Mayer, Douglas.
Mechanical properties of the sea potato heart.
- Murray, Marion and Cserr, Helen.
Axonal transport and endoneurial flow in skate and fundulus olfactory nerves.
- Murray, Marion and Bundgaard, Magnus.
Barrier to electron opaque tracers in cyclostomes.
- Murray, Marion.
Scanning electron microscopic comparison of ventricular and capillary walls in lamprey and hagfish.
- Myers, J.D.; Murdaugh, H.V.Jr.; Rea, Vifran; Kraus, Kathy and Mrudaugh, Anne W.
Cation excretion in dogfish.
- Myers, J.D.; Murdaugh, H.V.Jr.; Rea, Vifran; Kraus, Kathy and Murdaugh, Anne W. and Siegel, Abraham.
Endocrine response to altered salinity by dogfish.
- Murdaugh, H.V.Jr.; Myers, J.D.; Rea, Vifran; Kraus, Kathy; Murdaugh, Anne W.
Effects of altered salinity on rectal gland function.
- Opdyke, David F. and Holcombe, Randall.
Measurement of blood blow resistance in isolated dogfish gut.
- Opdyke, David F. and Holcombe, Randall.
demonstration of the presence of an angiotensin converting enzyme in dogfish.
- Miller, David; Seymour, Allyn; Shoemaker, David; and Peakall, David.
Effects of environmental pollutants on transport mechanisms.
- Rappaport, Raymond.
Length-tension relationship in the active cleavage furrow.
- Reimold, Robert J.; Gallagher, John L.; Linthurst, Robert A.; Plumley, Gerald; Wolf, Paul and Adams, Patrick.
Production of minor plant species and their substrate selective properties.
- Schmidt-Nielsen, Bodil and Sheline, Jonathan.
Effect of selenium on methyn mercury accumulation in tissues of *Fundulus heteroclitus*.
- Schmidt-Nielsen, Bodil; Lacy, Eric R.; Patel, Yogendra and Patel, Pravina.
Studies of renal lymphatics and pelvic extension.
- Schmidt-Nielsen, Bodil; Lacy, Emir and Patel, Yogendra J.
Studies of extracellular and intracellular fluids in brackish water salt gland.
- Silva, Patricio; Stoff, Jeffrey S.; Stevens, Arthur; Forrest, John N.; Spokes, Kate and Epstein, Franklin.
The control of rectal gland secretion.
- Zadunaisky, Jose A.; Fischer, Frank H.; Garretson, Leonard and Zadunaisky, Laura J.
Transport phenomena in ocular tissues in marine animals.

Reports List

- 1 Renal Effects of DOCA (Desoxycorticosterone Acetate) in *Squalus acanthias*
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- 2 The Length Tension Relation in the Single Cell Layered
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- 3 Control of Polar Lobe Formation and Connective Tissue
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- 4 An Investigation of Orotic Acid as a Precursor of L-As-
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- 5 Inhibition of Mammalian L-Asparagine Synthetase by
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- 6 Effects of Xenobiotic Compounds on Development of
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- 7 Solute Excretion in *Squalus acanthias* During Adapta-
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Bogar, Anne and Hays, Richard M.
- 8 Chloride Cells in *Anguilla* after Partial Adaptation to
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Doyle, William L.
- 9 The Chloride Cell in *Squalus* Gill
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- 10 Fine Structure of the Stimulated Rectal Gland of *Squa-
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