THE BULLETIN

Mount Desert Island
Biological Laboratory
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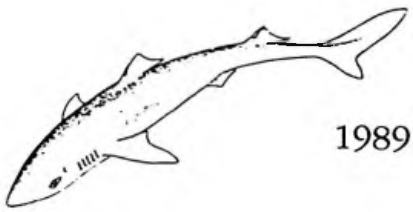

1989

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INTRODUCTION

The Mount Desert Island Biological Laboratory is an independent nonprofit biological station. It is located on the north shore of Mount Desert Island, which lies in the Gulf of Maine about 120 miles northeast of Portland near the mouth of the Bay of Fundy. The island, well known for its Acadia National Park, provides a variety of habitats including shallow and deep saltwater, a broad intertidal zone, saltwater and freshwater marshes, freshwater lakes and streams, forests and meadows.

The Laboratory is the largest cold water research facility in the Eastern United States, and its unique site provides an outstanding environment for studying the physiology of marine and freshwater fauna. During 1988 the scientific personnel included 47 principal investigators, 27 associates and 65 assistants/technicians, representing 54 institutions and 23 states and 6 from Europe.

In 1985 the Laboratory established a toxicology research center under the Marine and Freshwater Biomedical Sciences Specialized Center of Research Program (MFBS SCOR) sponsored by the National Institute of Environmental Health Sciences. Studies at the Center focus on the toxic effects of heavy metals and other environmental contaminants on membrane transport systems. During the summer of 1988 24 investigators worked on this research as well as their own research programs. The Laboratory has been awarded continuing funding for the toxicology center through 1993.

ACKNOWLEDGMENTS

The Mount Desert Island Biological Laboratory is indebted to the National Institutes of Health for substantial support. Contributions to operating costs have greatly improved the efficiency of research activities. The individual research projects which have been served at the Laboratory are variously funded by private and government agencies, and all of these projects have benefited from the NSF and NIH grants to the Laboratory.

We are also indebted to the Lucille P. Markey Charitable Trust for its support of scientific instrumentation and research fellowships for young investigators.

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1988 SEMINARS

Morning Transport

July 11 "Na-K-2Cl Co-transport: Kinetics and Mechanism." Thomas J. McManus, Ph.D., Duke University Medical Center

July 18 "Cyclic AMP and the Cytoskeleton: Do They Interact to Regulate Ion Transport?" John W. Mills, Ph.D., Dartmouth Medical School

July 25 "Sorbitol Metabolism in Collecting Duct Cells." Rolf Kinne, M.D., Ph.D., Max-Planck-Institut fuer Systemphysiologie

August 1 "Gating and Regulation of Ionic Channels." Martin Morad, Ph.D., University of Pennsylvania

August 8 "The Multiple Drug Resistance System: A Sunrise Sonata." Irwin M. Arias, M.D., Tufts University

August 15 "The Na-K-ATPase Pump and Its Genetic Expression." Edward J. Benz, Jr., M.D., Yale University School of Medicine

August 22 "Acid-Base Effects on Intestinal Transport." Alan N. Charney, M.D., New York University Medical Center

August 29 "Ionic Channels and Co-Transporters in Glial Cells." Professor Richard Orkand, University of Puerto Rico

Noon

July 8 "Molecular Biology and Transport." Alison I. Morrison, Ph.D., Max-Planck-Institut fuer Systemphysiologie

July 15 "Fish Neurohypophysis: Still a Mystery to the Physiologist?" Brahim Lahlou, Ph.D., University of Nice, France

July 22 "Propionate Induced Cell Swelling and K^+ Accumulation." George M. Feldman, Ph.D., Hospital of the University of Pennsylvania

"Cl Transport in a High Resistance MDCK Cell Line." Kurt Amsler, Ph.D., Mt. Sinai School of Medicine

July 29 "6 Minute Research Summaries by 10 MDIBL Investigators."

August 5 "6 Minute Research Summaries by 10 MDIBL Investigators."

August 12 "Seawater - Freshwater Adaptations in Fish: A Role for Acid-Base Regulation?" James B. Claiborne, Ph.D., Georgia Southern College

"Urea Transport Through Epithelia." Bodil Schmidt-Nielsen, Ph.D., The Mount Desert Island Biological Laboratory

August 19 "Influence of Biotransformation on Bioavailability of Dietary Carcinogens in Lobster and Flounder." Margaret O. James, Ph.D., University of Florida; Kevin Kleinow, D.V.M., Ph.D., School of

Veterinary Medicine, Louisiana State University; Anne E. McElroy, Ph.D., University of Massachusetts/Boston, Harbor Campus

"Retinal Horizontal Cells and Carbonic Anhydrase?" Paul J. Linser, Ph.D., The Whitney Marine Laboratory, University of Florida

August 26 "Mechanisms of Activation of Na-K ATPase in the Rectal Gland." Stephanie Lear, M.D., Beth Israel Hospital and Harvard Medical School

"Ion Occlusion by the Na Pump." Bliss Forbush III, Ph.D., Yale University School of Medicine

Evening

July 6 "Somatostatin: From Molecule to Man." Seymour Reichlin, M.D., Ph.D., Tufts University School of Medicine and New England Medical Center

July 13 "Thyroid Hormone Regulation of Na/K/ATPase." F. Ismail-Beigi, M.D., Ph.D., Columbia University College of Physicians and Surgeons

July 20 "Mucopolysaccharidosis Type VII: From Mouse Model to Treatment in Man." Edward H. Birkenmeier, M.D., The Jackson Laboratory

July 27 "Mechanism and Regulation of Renal Potassium Transport." Gerhard H. Giebisch, M.D., Yale University School of Medicine

August 3 "Dynamics in Ecology and Physiology: Strange Bedfellows? Strange Attractors!" Donald A. McCrimmon, Ph.D., The Mount Desert Island Biological Laboratory

August 10 "The Biochemistry and Pharmacology of Atrial Peptides and Related Substances." Philip Needleman, Ph.D., Washington University Medical School

August 17 THE SEVENTH ANNUAL WILLIAM B. KINTER MEMORIAL LECTURE. "The Cell Membrane: A Target for Mercurials." Aser Rothstein, Ph.D., The Hospital for Sick Children and University of Toronto, School of Medicine, Toronto, Canada

August 24 "The Fish Gill and Its Potential." Professor William Potts, University of Lancaster, England

Special Seminars

July 25 "Regulated Gene Expression During Spermatogenic Development." Martti Parvinen, M.D., Ph.D., University of Turku, Finland - Joint sponsorship Dr. Edward Birkenmeier, Staff Scientist at The Jackson Laboratory and Drs. Ian and Gloria Callard, Staff Scientists, MDIBL

August 19 "Science in the News: Perspectives of a Medical Editor." Arnold S. Relman, M.D. Editor, New England Journal of Medicine and Professor of Medicine, Harvard Medical School

1988 PUBLICATIONS

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Stokes, J.B. Passive NaCl transport in the flounder urinary bladder: predominance of a cellular pathway. Am. J. Physiol. 255 (Renal Fluid Electrolyte Physiol. 24):F229-F236, 1988.

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Ziyadeh, F.N., G.M. Feldman, G.W. Booz, A. Kleinzeller. Taurine and cell volume maintenance in the shark rectal gland: Cellular fluxes and kinetics. Biochim. Biophys. Acta 943:43-52, 1988.

ABSTRACT TITLES

A TRIBUTE TO ROY P. FORSTER AT THE DEDICATION OF THE FORSTER LABORATORY MOUNT DESERT ISLAND BIOLOGICAL LABORATORY, AUGUST 1, 1988

Thomas H. Maren
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This ceremony is to honor Roy Forster our long-time friend and colleague of many decades, who has made most significant contributions both to renal physiology and to the life, if not the very existence of this laboratory. We shall hear more of this from Leon Goldstein, Professor of Physiology at Brown University, who Roy adopted here at their first meeting in 1957.

Roy Philip Forster was born in 1911 in Wisconsin. He now lives in retirement in Hanover, New Hampshire, after having spent the past 50 years in his home in Hanover and at Salsbury Cove, Maine.

Roy did his undergraduate work at Marquette University and obtained his doctorate in Zoology at the University of Wisconsin. As Leon Goldstein will amplify in a few moments, Roy sought out James Shannon at the 1937 Federation meeting in Chicago. Most of you know Shannon, the renal physiologist, became the great leader of the National Institute of Health. Shannon's choice of Roy as a colleague in Salsbury Cove presaged his unerring genius for seeing the seed of greatness early in the lives of scientists.

Shortly thereafter, Roy was called to the Biology Department at Dartmouth, to which he devoted three quarters of his full and brilliant professional life as a teacher. The other quarter, of course, was his research career here at Salsbury Cove. He continues to have a lasting influence on both organizations.

We will hear more of this from Leon Goldstein, but Leon himself is a part of Roy's triumphs. I can easily imagine Roy saying of Leon Goldstein, as Humphrey Davy said of Faraday, "he is my greatest discovery."

Leon Goldstein
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Roy Forster first came to work at the Laboratory in 1937 at the invitation of James A. Shannon. Much of Roy's Ph.D. thesis on the renal handling of uric acid in bird had been pre-empted by the work of Shannon and his colleagues in Homer Smith's lab at N.Y.U. Roy had met Shannon at the Federation meetings that year, told Shannon his problem and Shannon invited him to visit his lab at MDIBL the following summer so that he could update Roy on renal physiology in Salsbury Cove and N.Y.U., the two major centers of the renal world at that time.

In his first day at MDIBL Roy was working with Shannon when Homer Smith and E.K. Marshall unexpectedly walked into the lab. In Roy's words: "For me it was like being in the same room with the Father, Son and Holy Ghost. I had no idea that either was in Salsbury Cove, and to this day I have not forgotten the feeling of giddiness that was brought on by the surprise visitation of these deities" (Forster, R.P., J. Exp. Zool. 199:299, 1977).

Roy Forster the Scientist

Roy worked for 46 years (1938-1984) as a P.I. at MDIBL and published over a hundred papers on work done at the Laboratory. He is best known for his discovery that isolated tubules derived from the flounder kidney can survive and remain physiologically intact in a modified Ringer's solution. He and his junior colleague John Taggart used this preparation to demonstrate the link between cellular metabolism and membrane transport processes; it was one of the earliest demonstrations of this crucial connection.

Forster's work at MDIBL attracted a parade of distinguished scientists and students who went on to distinguish themselves in science and medicine. During the period of 1939-1960 scientists and students working in Forster's lab at MDIBL included: Dorothy and Joseph Needham, William Blake, Alan Friedlich, Otto Meyerhoff, John Taggart, David Schachter, Bodil Schmidt-Nielsen, Fredrik Berglund, Ivar Sperber, Dennis Thron, Ernest Foulkes, Suk Ki Hong, William Lotspeich, Richard Malvin, Barbara Rennick and Leon Goldstein.

Roy's work on the isolated renal tubule had a great influence on the subsequent studies of William Kinter and Maurice Burg. Burg extended Roy's technique to characterize salt and water transport in the different segments of the mammalian nephron. Roy also made several significant contributions in other areas of renal physiology such as, for example, the demonstration of the active transport of urea by the frog kidney, the regulation of renal blood flow during diving, the active secretion of Ca, Mg, and PO_4 by fish renal tubules.

In 1957 Roy and I began a collaborative study of the link between nitrogen metabolism and osmoregulation that continued uninterrupted for over 25 years. No matter what the problem his approach was always the same. His scientific bible was Claude Bernard's "Introduction to Experimental Medicine" and we followed its tenets religiously in going from observation to hypothesis to experimental test and then onto rejection, acceptance or modification of the hypothesis. Roy always forced us to keep in mind "what is the question" and that a fact without an associated idea is not very useful.

Roy Forster the Director/President

Roy loved and still cherishes the Laboratory. He has great faith in the value of a marine biological station both as a biological resource and as a community for the free exchange of ideas. As Director (1940-47) he helped to save the Laboratory from extinction following WW II. After the war the Lab was nearly broke. Roy made personal calls on wealthy individuals around the Northeast and raised $3,000, a giant sum in those days before the establishment of NIH and NSF grant programs. The money was sufficient to replace the old dock, which had been demolished by a winter storm, and get the Lab back on it's feet.

As President (1964-70) Roy guided the Lab through one of its eras of modernization. He led by example and set a high standard for the Lab to follow both scientifically and personally. He still maintains an active interest in the Laboratory.

Roy Forster the Man

Grace, style, good-looks and humor are "key words" that characterize Roy. When he was at the Laboratory he was a favorite at cocktail parties; he would cheer-up a room with his presence. Many of us still remember his "high-teas" when he would prepare goosefish chowder for the entire Laboratory personnel and personally serve it up on the porch of his laboratory.

Roy has a great sense of humor and loves satire. His annual conversion of the mail shed on July 15 into an altar to St. Swithin and request for donations to pacify the saint and thereby ensure good weather for the summer still bring smiles to the faces of those who remember the celebrations.

Roy loved to have students working in his lab and they were always adoring and dedicated to him, often returning after many years to discuss their lives and careers. My own life was profoundly affected by him.

I speak for all the Laboratory in expressing thanks to Roy for everything that he has done for MDIBL.