THE BIOLOGICAL BULLETIN
PUBLISHED BY THE MARINE BIOLOGICAL LABORATORY

THE MARINE BIOLOGICAL LABORATORY
Sixty-Fifth Report, for the Year 1962—Seventy-Fifth Year

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I. TRUSTEES

Gerard Swope, Jr., President of the Corporation, 570 Lexington Ave., New York City
A. K. Parpart, Vice President of the Corporation, Princeton University
Philip B. Armstrong, Director, State University of New York, Medical Center at Syracuse
C. Lloyd Clafl, Clerk of the Corporation, Randolph, Mass.
James H. Wickersham, Treasurer, 530 Fifth Ave., New York City

EMERITI

William R. Amerson, Marine Biological Laboratory
C. Lalor Burdick, The Lalor Foundation
W. C. Curtis, University of Missouri
Paul S. Galtsoff, Woods Hole, Massachusetts
E. B. Harvey, Woods Hole, Massachusetts
M. H. Jacobs, University of Pennsylvania School of Medicine
F. P. Knowlton, Syracuse University
Charles W. Metz, Woods Hole, Massachusetts
W. J. V. Osterhout, Rockefeller Institute
Charles Packard, Woods Hole, Massachusetts
A. C. Redfield, Woods Hole Oceanographic Institution
Lawrason Riggs, 74 Trinity Place, New York 6, N. Y.
A. H. Sturtevant, California Institute of Technology

To Serve Until 1966

F. A. Brown, Jr., Northwestern University
F. D. Carlson, Johns Hopkins University
Sears Crowell, Indiana University
W. D. McElroy, Johns Hopkins University
C. Ladd Prosser, University of Illinois
E. A. Scharrer, Albert Einstein College of Medicine
Albert Szent-Györgyi, Marine Biological Laboratory
Wm. Randolph Taylor, University of Michigan

To Serve Until 1965

Eric G. Ball, Harvard Medical School
D. W. Bronk, Rockefeller Institute
Mac V. Edds, Jr., Brown University
Rudolf Kempton, Vassar College
I. M. Klotz, Northwestern University
Arnold Lazarow, University of Minnesota Medical School
Morris Rockstein, Medical Research Building, University of Miami
George Wald, Harvard University

To Serve Until 1964

Arthur L. Colwin, Queens College
E. G. Butler, Princeton University
K. S. Cole, National Institutes of Health
S. Kuffler, Harvard Medical School
C. B. Metz, Oceanographic Institute, Florida State University
Roberts Rugh, College of Physicians and Surgeons, Columbia University
G. T. Scott, Oberlin College
E. Zwilling, Brandeis University

To Serve Until 1963

L. G. Barth, Columbia University
John B. Buck, National Institutes of Health
Aurin M. Chase, Princeton University
Seymour S. Cohen, University of Pennsylvania School of Medicine
Donald P. Costello, University of North Carolina
Teru Hayashi, Columbia University
Douglas A. Marsland, New York University, Washington Square College
H. Burr Steinbach, University of Chicago
TRUSTEES

STANDING COMMITTEES

EXECUTIVE COMMITTEE OF THE BOARD OF TRUSTEES

GERARD Swope, Jr., Chairman  I. M. Klotz, 1964
JAMES H. Wickersham, ex officio  KENNETH S. Cole, 1963
ARTHUR K. Parpart, ex officio  STEPHEN W. KUFFLER, 1963
PHILIP B. Armstrong, ex officio  ERIC G. Ball, 1965
MAC V. Edds, Jr., 1964  SEARS CROWELL, 1965

THE LIBRARY COMMITTEE

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SEYMOUR S. COHEN  MARTIN LUBIN
C. LADD PROSSER  KENYON TWEDELL

THE APPARATUS COMMITTEE

ALBERT I. LANSING, Chairman  DAVID POTTER
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ARNOLD LAZAROW  RALPH H. CHENEY

THE SUPPLY DEPARTMENT COMMITTEE

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SEARS CROWELL  WALTER HERDON
GEORGE SCOTT  W. J. ADELMAN

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BOSTWICK KETCHUM  EUGENE COPELAND
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THE BUILDINGS AND GROUNDS COMMITTEE

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THE RADIATION COMMITTEE

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C. C. SPEIDEL

THE RESEARCH SPACE COMMITTEE

PHILIP B. ARMSTRONG, Chairman  MAC V. EDDS, JR.
ARTHUR K. PARPARD  WILLIAM D. MCELROY
MARINE BIOLOGICAL LABORATORY

II. ACT OF INCORPORATION

Commonwealth of Massachusetts

Be It Known, That whereas Alpheus Hyatt, William Sanford Stevens, William T. Sedgwick, Edward G. Gardiner, Susan Minns, Charles Sedgwick Minot, Samuel Wells, William G. Farlow, Anna D. Phillips, and B. H. Van Vleck have associated themselves with the intention of forming a Corporation under the name of the Marine Biological Laboratory, for the purpose of establishing and maintaining a laboratory or station for scientific study and investigation, and a school for instruction in biology and natural history, and have complied with the provisions of the statutes of this Commonwealth in such case made and provided, as appears from the certificate of the President, Treasurer, and Trustees of said Corporation, duly approved by the Commissioner of Corporations, and recorded in this office;

Now, therefore, I, Henry B. Pierce, Secretary of the Commonwealth of Massachusetts, do hereby certify that said A. Hyatt, W. S. Stevens, W. T. Sedgwick, E. G. Gardiner, S. Minns, C. S. Minot, S. Wells, W. G. Farlow, A. D. Phillips, and B. H. Van Vleck, their associates and successors, are legally organized and established as, and are hereby made, an existing Corporation, under the name of the Marine Biological Laboratory, with the powers, rights, and privileges, and subject to the limitations, duties, and restrictions, which by law appertain thereto.

Witness my official signature hereunto subscribed, and the seal of the Commonwealth of Massachusetts hereunto affixed, this twentieth day of March, in the year of our Lord One Thousand Eight Hundred and Eighty-Eight.

[Seal]

Henry B. Pierce,
Secretary of the Commonwealth.

III. BY-LAWS OF THE CORPORATION OF THE MARINE BIOLOGICAL LABORATORY

I. The members of the Corporation shall consist of persons elected by the Board of Trustees.

II. The officers of the Corporation shall consist of a President, Vice President, Director, Treasurer, and Clerk.

III. The Annual Meeting of the members shall be held on the Friday following the second Tuesday in August in each year at the Laboratory in Woods Hole, Massachusetts, at 9:30 A.M., and at such meeting the members shall choose by ballot a Treasurer and a Clerk to serve one year, and eight Trustees to serve four years, and shall transact such other business as may properly come before the meeting. Special meetings of the members may be called by the Trustees to be held at such time and place as may be designated.

IV. Twenty-five members shall constitute a quorum at any meeting.

V. Any member in good standing may vote at any meeting, either in person or by proxy duly executed.

VI. Inasmuch as the time and place of the Annual Meeting of members are fixed by these By-laws, no notice of the Annual Meeting need be given. Notice of any special
BY-LAWS OF THE CORPORATION

meeting of members, however, shall be given by the Clerk by mailing notice of the time
and place and purpose of such meeting, at least fifteen (15) days before such meeting,
to each member at his or her address as shown on the records of the Corporation.

VII. The Annual Meeting of the Trustees shall be held promptly after the Annual
Meeting of the Corporation at the Laboratory in Woods Hole, Mass. Special meetings
of the Trustees shall be called by the President, or by any seven Trustees, to be held at
such time and place as may be designated, and the Secretary shall give notice thereof by
written or printed notice, mailed to each Trustee at his address as shown on the records
of the Corporation, at least one (1) week before the meeting. At such special meeting
only matters stated in the notice shall be considered. Seven Trustees of those eligible to
vote shall constitute a quorum for the transaction of business at any meeting.

VIII. There shall be three groups of Trustees:
(A) Thirty-two Trustees chosen by the Corporation, divided into four classes, each
to serve four years. After having served two consecutive terms of four years each,
Trustees are ineligible for re-election until a year has elapsed. In addition, there shall
be two groups of Trustees as follows:

(B) Trustees ex officio, who shall be the President and Vice President of the Corpora-
tion, the Director of the Laboratory, the Associate Director, the Treasurer, and the
Clerk:

(C) Trustees Emeriti, who shall be elected from present or former Trustees by the
Corporation. Any regular Trustee who has attained the age of seventy years shall con-
tinue to serve as Trustee until the next Annual Meeting of the Corporation, whereupon
his office as regular Trustee shall become vacant and be filled by election by the Corpora-
tion and he shall become eligible for election as Trustee Emeritus for life. The Trustees
ex officio and Emeriti shall have all the rights of the Trustees except that Trustees
Emeriti shall not have the right to vote.

The Trustees and officers shall hold their respective offices until their successors are
chosen and have qualified in their stead.

IX. The Trustees shall have the control and management of the affairs of the Corpora-
tion; they shall elect a President of the Corporation who shall also be Chairman of
the Board of Trustees and who shall be elected for a term of five years and shall serve
until his successor is selected and qualified; and shall also elect a Vice President of the
Corporation who shall also be the Vice Chairman of the Board of Trustees and who shall
be elected for a term of five years and shall serve until his successor is selected and
qualified; they shall appoint a Director of the Laboratory; and they may choose such
other officers and agents as they may think best; they may fix the compensation and define
the duties of all the officers and agents; and may remove them, or any of them, except
those chosen by the members, at any time; they may fill vacancies occurring in any
manner in their own number or in any of the offices. The Board of Trustees shall have
the power to choose an Executive Committee from their own number, and to delegate to
such Committee such of their own powers as they may deem expedient. They shall from
time to time elect members to the Corporation upon such terms and conditions as they
may think best.

X. The Associates of the Marine Biological Laboratory shall be an unincorporated
group of persons (including associations and corporations) interested in the Laboratory
and shall be organized and operated under the general supervision and authority of the
Trustees.
XI. The consent of every Trustee shall be necessary to dissolution of the Marine Biological Laboratory. In case of dissolution, the property shall be disposed of in such manner and upon such terms as shall be determined by the affirmative vote of two-thirds of the Board of Trustees.

XII. The account of the Treasurer shall be audited annually by a certified public accountant.

XIII. These By-laws may be altered at any meeting of the Trustees, provided that the notice of such meeting shall state that an alteration of the By-laws will be acted upon.

IV. REPORT OF THE DIRECTOR

To: THE TRUSTEES OF THE MARINE BIOLOGICAL LABORATORY

Gentlemen:

I submit herewith the report of the seventy-fifth session of the Marine Biological Laboratory.

1. Housing

   The Laboratory still faces a serious problem in providing housing for investigators, students and research assistants despite the building of thirty cottages on the Devil's Lane Tract and the purchase of houses in the immediate vicinity of the central campus. During the past winter a topographical survey of the unused part of the Devil's Lane Property has been completed and the prospective locations of access roads have been mapped. The Laboratory must take immediate steps to provide additional cottages to be available for occupancy in 1964.

2. Systematics-Ecology Program

   This program, under the direction of Dr. Melbourne R. Carriker, is now well under way. Plant modifications were made in a selected area of the Crane wing to house the research activities of the program. Quarters and service rooms for the George M. Gray Museum have been developed in the Stone Building. In addition to the Ford Foundation Grant, support for this program is being provided by grants from the National Science Foundation, the National Institutes of Health and the Office of Naval Research.

3. Comparative Physiology Training Program

   This program will be instituted in 1963 under the direction of Dr. C. Ladd Prosser. The staff will include Dr. Benjamin Zweifach and Dr. Lewis H. Kleinholz.

4. Personnel Changes

   Because of the pressure of other activities, particularly the Indian Ocean Survey, Dr. John H. Ryther found it necessary to resign as head of the training program in Marine Ecology, though he will continue to function as a member of the staff. Dr. W. R. Taylor will succeed Dr. Ryther as head of this program.
5. Biological Collecting

This past summer the Captain Bill III, Klimm, Master, was chartered as a collecting boat, particularly for squid and bottom fish. This proved a most successful venture. There was a constant and adequate supply of squid for the large number of investigators who use this form, and a variety of additional problems were made possible, by the specialized bottom fish which were obtained in numbers. Included were angler fish, sea robins, dogfish, sand-dabs, skates, torpedos, cod, sculpin, bluefish and sturgeon.

6. Sea Water Well

The Supply Department has experienced serious difficulty during the winter months in maintaining the live research material collected for shipment to various institutions in this country and abroad. In the past the water for these animals was drawn from the Eel Pond with serious losses of animals following heavy rains or snows. To overcome this a salt water well was sunk adjacent to the Supply Department Building. Sea water was reached at 103 feet. This water has the same salinity as Martha's Vineyard Sound water, maintains a constant temperature throughout the year at approximately 52° F. and, in spite of a low pH, most marine forms, both vertebrate and invertebrate, can be maintained over long periods of time in normal physiological condition. The Laboratory has engaged a consultant to work out methods for raising the pH to normal sea water values without too great an increase in the temperature of the water, the lower temperatures being desired for forms collected from the deeper waters.

7. Deaths

It is with sorrow we note the death of Lawrason Riggs on January 6, 1963. Lawrason Riggs served the Laboratory with distinction for nearly 40 years, first as Treasurer (1924–1942) and then as President of the Corporation (1942–1952). This included the periods of the depression and World War II when the Laboratory faced difficult financial and operational problems. That the Laboratory weathered this critical period as well as it did was due in no small measure to the interest and great common sense of Lawrason Riggs.

Respectfully submitted,

PHILIP B. ARMSTRONG,
Director

1. Memorials

GIOACCHINO FAILLA

by ROBERTS RUGH

A Corporation Member since 1940 and a Trustee of the Marine Biological Laboratory since 1948, Dr. Failla's life was snuffed out instantly in a head-on collision on the icy roads of Illinois near his laboratory on December 15th, 1961. This accident removed
from the modern nuclear world one of the world's leading experts on radiation dosimetry and protection and the man most responsible for radiological physics as a profession. It was a tragic loss of a man who, though retired from his administrative duties, retained the mental vigor and perspective so urgently needed in our atomic age.

Dr. Failla was born in Sicily in 1891, came to New York in 1906, won the Pulitzer Scholarship which put him through the Engineering School at Columbia where he then obtained his M.A. degree. After establishing himself as the physicist of Memorial Hospital, he obtained a leave of absence long enough to procure his D.Sc. degree at the University of Paris under Madame Curie. Early in this period, in 1916, he also became a citizen of the United States.

Memorial statements have been published in Dr. Failla's behalf in RADIOLoGY by Dr. Quimby, in the AMERICAN JOURNAL OF ROENTGENOLOGY, RADIUM THERAPY AND NUCLEAR MEDICINE by Dr. Rossie, in the BRITISH JOURNAL OF RADIOLOGY by Dr. Gray, and in RADIATION RESEARCH by Dr. Marinelli, all world-renowned radiological scientists, and all attesting to Dr. Failla's everlasting contributions to radiology, particularly in the area of radiological physics.

Dr. Failla, an honorary member of the world's most active radiological societies, received many awards and medals, and an honorary degree from the University of Rochester. He was on the first and most of the succeeding Committees on Radiation Units; Standardization and Protection Committees for both the National and International Commissions of Radiation Protection; on the wartime National Defense Committee and Radiological Instrument Panel of the Armed Forces Special Weapons Project; the Advisory Committee on Isotope Distribution, the Advisory Committee on Biology and Medicine of the U.S. AEC and the Genetic Committee; and on the National Academy of Science Committee on the Biological Effects of Atomic Radiation. He served as the Scientific Attaché at the Rome Embassy during the first World War, and was later Consultant to the U. S. Public Health Service, the Veterans Administration and on the main Commissions of both the International Commission for Radiation Protection and the International Commission on Radiological Units. He was the chief writer of the NCRP Handbook #59 which contains the basic philosophy of the most modern radiology on protection against radiation effects. His contributions in radiation physics are known around the world.

We, here at the Marine Biological Laboratory, who were fortunate to know him, will forever be in debt to Dr. Failla for his contributions in the field of radiobiology. Among his seventy published papers, ten dealt with the clinical applications of radiation and twenty-four with biological effects. Thus, he was truly a biophysicist, doing his research in the field of nuclear energy. One of his earliest papers, written in 1922 with Dr. Sugiuara, dealt with the long-term effects of radiation on mice and their non-irradiated progeny. He was most concerned about delivering effective radiation to malignancies without endangering the life of the patient, the doctor, or the technician, so that his early papers dealt with erythema and tissue susceptibility and with the fundamental effects of ionizing radiations on organisms, tissues, and cells. He formulated one of the first theories as to the biological effects of ionizing radiations, and during his last years, in collaboration with his wife, Patricia McClement Failla, analyzed the process of ageing particularly as it might be related to radiation and carcinogenesis.

Dr. Failla's many contributions in the field of radiological physics and biology will stand the test of time. He was never one to seek publicity, only the truth. Few were aware, however, that he carried to his grave some effects of his early daring in the handling of radium. His hands bore innumerable scars of radiation-cancer, but this in no way deterred his efforts. But Dr. Failla made two major contributions for which we here at the MBL will always benefit. The first grew out of his concern that the various disciplines, represented so well here, should not go the way of such specialization that they
become completely divorced from each other. He vigorously championed the interdependence of scientific effort and achievement and in 1952 he, more than anyone else, organized the Radiation Research Society which was designed specifically to guarantee inter-disciplinary cohesion. Its instrument is the journal, RADIATION RESEARCH, and its society membership now numbers well over 1000. This society includes scientists from more than biology and physics. It provides a cross-fertilization, as he put it, of genetics and medicine, physiology and morphology, psychology and ecology, all drawn together by the unifying concern with atomic energy. Life, to Dr. Failla, could not be understood by the dissociation of the various approaches to its study.

Dr. Failla's second major contribution of specific benefit to us here is the cesium-137 unit and the organization of the entire fourth floor of the new laboratory where some 60 scientists are this summer using ionizing radiations as a tool in research. The cesium unit has no duplicate anywhere; it was custom-made for the MBL. It is an example of Dr. Failla's artistry as well as his scientific genius. It is absolutely fool-proof, and can be used without the slightest hazard to anyone, and yet it can deliver very accurate doses of gamma radiation to biological research material for years to come, with a minimum of expense.

Dr. Failla's listed accomplishments cannot reveal the depth or breadth of the man. Few have had more friends, and few have lived to have their contributions to society more recognized, yet few have been more humble. He mingled with the greatest, was consulted by the most brilliant scientific minds, and yet he had time and sympathetic consideration for the rest of us. While he was trained as a physicist, I believe he would like to be remembered for his contributions in biology, not the least of which were made here at the Marine Biological Laboratory.

FRANZ SCHRADER
by DONALD E. LANCEFIELD

Franz Schrader was born in Magdeburg, Germany, March 11, 1891, and came to this country with his family at the age of 12.

As a boy he made his first insect collections on vacations in the Harz Mountains. His interest as a naturalist continued and grew while he lived on Staten Island. At this time he also became an expert sailor and ardent fisherman, interests which continued throughout his life.

He entered the School of Mines of Columbia University in 1910, but shifted to Columbia College after two years to follow his major interest in zoology. After his graduation in 1914, he spent two years of research with the U.S. Bureau of Fisheries, with an additional year as Chief Pathologist, following graduate study at Columbia. He received his Ph.D. under Professor E. B. Wilson in 1919. The following year he married Sally Hughes, who was also a student of Professor Wilson.

In 1920 he joined the faculty of Bryn Mawr College where he remained until 1930. At this time he returned to Columbia University as a Professor of Zoology and again enjoyed association with Professor Wilson, then Emeritus in residence. He served the Department well as chairman but disliked administrative work. He became Da Costa Professor of Zoology, 1950–1959, and Da Costa Professor Emeritus, 1959–1962. On retiring from Columbia he joined the faculty of Duke University as Guest Professor. He died on March 22, 1962, in Durham, North Carolina.

Schrader was a member of the National Academy of Science. He served as Vice-President of Section F of the AAAS in 1947, and as President of the American Society of Zoologists in 1952. He was a Trustee of the Marine Biological Laboratory from
1934 to 1951 and became a Life Member in 1959. He was a member of several other scientific societies.

Schrader gave generously of his time and energy for editorial services; serving on the Editorial Boards of CHROMOSOMA, BIOLOGICAL BULLETIN, JOURNAL OF MORMHORPOLOGY, COLUMBIA BIOLOGICAL MONOGRAPHS, and the JOURNAL OF BIOCHEMICAL AND BIOPHYSICAL CYTOLOGY.

His bibliography indicates the nature, extent, and significance of his work. From 1920–1961 he had over 60 publications, including a monograph, The Sex Chromosomes, and a book on Mitosis published in 1944 with a second edition in 1953.

His early work dealt with the biology and pathology of fishes, followed by chromosome cytology related to sex determination and parthenogenesis. Next came studies of mitosis and its problems. Later work was characterized by the use of cytochemical and cytophotometric methods and their applications to cytological problems and to evolution. For most of his career he was preeminent in the field of chromosome cytology in many of its significant aspects. I am certain that Professor E. B. Wilson, after his retirement, was highly pleased to have Schrader as his successor at Columbia.

He and his wife, Sally Hughes Schrader, both first rate naturalists, and collectors and outstanding cytologists, made several trips to the tropics where they obtained material used in their cytological studies. He also found great joy in his collecting in many eastern and southern states.

It is fair to judge a scientist partly by his academic progeny and their contributions. I will not name them but Franz Schrader was entitled to feel a great gratification from this source.

Many of you were aware that for many years Schrader had health problems, which made it necessary for him to husband his energy. His accomplishments are the more remarkable in view of this.

He had many cultural and intellectual interests in music and literature. He was a collector of fine oriental rugs and a connoisseur of European wines. His lifetime interest in salt water fishing was fulfilled during recent summers at Pasque Island.

The warmth of his friendship and wisdom of his counsel were more appreciated than can easily be expressed in words.

2. THE STAFF

EMBRYOLOGY

I. INSTRUCTORS

James D. Ebert, Director, Department of Embryology, Carnegie Institution of Washington, in charge of course

Allison L. Burnett, Associate Professor of Biology, Western Reserve University

Richard A. Cloney, Instructor in Zoology, University of Washington

Katsuma Dan, Professor of Biology, Tokyo Metropolitan University

Robert L. Dehaan, Staff Member, Department of Embryology, Carnegie Institution of Washington

A. A. Moscona, Professor of Zoology, University of Chicago

John W. Saunders, Jr., Professor of Biology, Marquette University

II. LABORATORY ASSISTANTS

John M. Arnold, Department of Zoology, University of Minnesota

Sidney B. Simpson, Jr., Department of Zoology, Tulane University
REPORT OF THE DIRECTOR

PHYSIOLOGY

I. Consultants

Merkel H. Jacobs, Professor of Physiology, University of Pennsylvania
Arthur K. Parfart, Professor of Biology, Princeton University
Albert Szent-Györgyi, Director, Institute for Muscle Research, Marine Biological Laboratory
W. D. McElroy, Director, McCollum-Pratt Institute, Johns Hopkins University

II. Instructors

J. Woodland Hastings, Associate Professor of Biochemistry, University of Illinois, in charge of course
Philip E. Hartman, Associate Professor of Biology, Johns Hopkins University
Vincent Massey, Sheffield University
Shinya Inoué, Professor of Cytology, Dartmouth College
K. E. van Holde, Associate Professor of Physical Chemistry, University of Illinois
Jerard Hurwitz, Associate Professor, New York University
H. O. Halvorson, Associate Professor, University of Wisconsin

III. Laboratory Assistant

A. Randolph Sweeney, Pomona College

BOTANY

I. Consultant

William Randolph Taylor, Professor of Botany, University of Michigan

II. Instructors

Richard C. Starr, Professor of Botany, Indiana University, in charge of course
Bohuslav Fott, Professor of Botany, Charles University, Prague
Walter R. Herndon, Professor of Botany, University of Tennessee
Robert Ross, British Museum (Natural History), London

III. Laboratory Assistants

William Darden, Department of Botany, Indiana University
Michael Wynne, Henry Shaw School of Botany, Washington University

INVERTEBRATE ZOOLOGY

I. Consultants

F. A. Brown, Jr., Morrison Professor of Biology, Northwestern University
Libbie H. Hyman, American Museum of Natural History
Alfred C. Redfield, Woods Hole Oceanographic Institution

II. Instructors

Clark P. Read, Professor of Biology, Rice University, in charge of course
John M. Anderson, Professor of Zoology, Cornell University
JAMES CASE, Associate Professor of Zoology, State University of Iowa
G. F. GWILLIAM, Associate Professor of Biology, Reed College
W. D. RUSSELL HUNTER, Lecturer in Zoology, University of Glasgow
ROGER MILKMAN, Associate Professor of Zoology, Syracuse University
RICHARD C. SANBORN, Professor of Zoology, Purdue University

III. Assistants

DAVID C. GRANT, Yale University
JAMES McDaniel, University of Oklahoma

ECOLOGY

I. Consultants

E. P. Odum, University of Georgia
B. H. Ketchum, Woods Hole Oceanographic Institution
E. T. MOUL, Rutgers University

II. Instructors

J. H. RYTER, Woods Hole Oceanographic Institution, in charge of course
W. R. TAYLOR, Department of Oceanography, Johns Hopkins University
H. L. SANDERS, Woods Hole Oceanographic Institution
R. L. MILLER, Department of Biology, University of Saskatchewan
O. KINNE, Department of Zoology, University of Toronto
PETER J. WANGERSKY, Bingham Oceanographic Laboratory, Yale University
JOHN D. PALMER, Division of Biology, University of Illinois

III. Laboratory Assistants

W. T. HALL, Fordham University
ROBERT REW, Marblehead, Massachusetts

The Laboratory Staff

HOMER P. SMITH, General Manager

Mrs. Deborah Lawrence Harlow, Librarian
Carl O. Schweidenback, Manager, Supply Department
Irvine L. Broadbent, Office Manager

Robert Kahler, Superintendent, Buildings and Grounds
Robert B. Mills, Manager, Department of Research Service

General Office

Mrs. Lila S. Myers
Mrs. VIGGIA M. Morehouse
Mrs. Vivien R. Brown
Mrs. Florence S. Butz

Mrs. Marion C. Chase
Mrs. Vivian I. Manson
Mrs. Ruth W. Mayo

Library

Jane Fessenden
Shirley A. Gutman

Mrs. Doris T. Ricker
Albert K. Neal
REPORT OF THE DIRECTOR

MAINTENANCE OF BUILDINGS AND GROUNDS

Robert Adams  Donald B. Lehy
Eldon P. Allen  Ralph H. Lewis
Bernard F. Cavanaugh  Russell F. Lewis
Manuel P. Dutra  Alan G. Lunn
Stanley C. Eldredge  Mrs. Ellen T. Nickelson
Gardner Gayton  James S. Thayer
Robert Gunning  Charles V. Tutin
Walter J. Jaskun  Robert H. Walker, Jr.
Mrs. Elizabeth Kuijl

DEPARTMENT OF RESEARCH SERVICE

Gail M. Cavanaugh  Seaver Harlow
Ruth Preller  Frank E. Sylvia
Lowell V. Martin

SUPPLY DEPARTMENT

Arno J. Bowden  Bruno F. Trappaso
Donald P. Burnham  John J. Valois
Robert O. Lehy  Jared L. Vincent
Robert M. Perry  Hallett S. Wagstaff
Mrs. Patricia A. Tavares

3. INVESTIGATORS; LALOR, LILLIE AND GRASS FELLOWS; STUDENTS

Independent Investigators, 1962

Adelman, William J., Jr., Physiologist, National Institutes of Health
Aljure, Emilio, Research Fellow, Columbia University
Allen, Robert D., Assistant Professor, Princeton University
Anderson, John M., Professor of Zoology, Cornell University
Armstrong, Clay M., Sr., Assistant Surgeon, National Institutes of Health
Armstrong, Philip B., Professor and Chairman, Department of Anatomy, State University of New York College of Medicine at Syracuse
Atwood, K. C., Professor and Head of Department of Microbiology, University of Illinois
Austin, C. R., Member of External Scientific Staff, Medical Research Council, England
Avery, John, Institute for Muscle Research, Marine Biological Laboratory
Bal, Arva Kumar, Research Associate, Brown University
Barth, L. G., Professor of Zoology, Columbia University
Bay, Zoltan, Research Associate, Institute for Muscle Research, Marine Biological Laboratory
Baylor, Martha B., Marine Biological Laboratory
Bennett, Michael V. L., Associate Professor of Neurology, Columbia University
Binstock, Leonard, Electronic Engineer, National Institutes of Health
Brinley, F. J., Jr., Assistant Professor of Physiology, Johns Hopkins Medical School
Brown, Frank A., Jr., Morrison Professor of Biology, Northwestern University
Bruns, Gail P., Research Fellow, Albert Einstein College of Medicine
Burbank, W. D., Professor of Biology, Emory University
Burch, Helen B., Associate Professor of Pharmacology, Washington University School of Medicine
Burke, Joseph A., Assistant Professor of Biology, Loyola College of Baltimore
Burnett, Allison L., Associate Professor of Biology, Western Reserve University
Carlson, Albert D., Assistant Professor of Biology, State University of New York, Long Island Center
CASE, JAMES, Associate Professor of Zoology, University of Iowa
CHART, ALFRED B., Professor of Biology, American University
CHEVEY, RALPH HOLT, Professor of Biology, Brooklyn College
CHILD, FRANK M., Assistant Professor of Zoology, University of Chicago
CLAFF, C. LLOYD, Research Associate, Harvard Medical School
CLARK, ELOISE E., Assistant Professor of Zoology, Columbia University
CLOYNE, RICHARD A., Instructor in Embryology, University of Washington
COPE, KENNETH S., Chief, Laboratory of Biophysics, NINDB, National Institutes of Health
COLLIER, JACK R., Marine Biological Laboratory
COLWIN, ARTHUR L., Professor of Biology, Queens College
COLWIN, LAURA HUNTER, Queens College
COOPERSTEIN, SHERWIN J., Associate Professor of Anatomy, Western Reserve University School of Medicine
COPELAND, EUGENE, Professor and Chairman of Zoology, Tulane University
COSTELLO, DONALD P., Kenan Professor of Zoology, University of North Carolina
CRAKE, ROBERT K., Professor and Chairman of Biochemistry, Chicago Medical School
CROWELL, SEARS, Associate Professor of Zoology, Indiana University
DAN, KATSUKA, Professor of Embryology, Tokyo Metropolitan University
DAVIS, FLOYD A., Fellow in Neurology, College of Physicians and Surgeons
DAVIS, R. D., Assistant Professor of Medicine, Albert Einstein College of Medicine
DEHAAN, ROBERT L., Research Staff Member, Carnegie Institution of Washington
DIAMOND, JACK, Research Fellow, Harvard Medical School
DRETSKIN, WOLF D., Assistant Professor of Neurology, College of Physicians and Surgeons
DODGE, FREDERICK A., Jr., Research Associate, Rockefeller Institute
DOLITTLE, RUSSELL F., Instructor of Biology, Amherst College
DOWNEN, ROBERT M., Assistant Professor of Medicine, Northwestern University
DUNHAM, PHILIP B., Research Fellow, Columbia University
EBERT, JAMES D., Director, Department of Embryology, Carnegie Institution of Washington
ECKERT, ROGER O., Assistant Professor of Zoology, Syracuse University
EGOSS, MAC V., Jr., Chairman and Professor of Biology, Brown University
ELIOTT, ALFRED M., Professor of Zoology, University of Michigan
FAILLA, PATRICIA M., Associate Biophysicist, Argonne National Laboratory
FISCHER, MITZY CANESSA, Investigator, Department of Medicine, Albert Einstein College of Medicine
FISCHER, SIEGEMUND, Research Associate, Albert Einstein College of Medicine
FITZPATRICK, THOMAS B., Professor of Dermatology, Harvard Medical School
FOOT, BOHUSLAV, Head of Botanical Institute, Charles University, Prague
FOX, STEPHEN, Assistant Professor, University of Michigan
FUORTE, MICHELANGELO, Chief, Neurophysiology Section, NINDB, National Institutes of Health
FURSHMAN, EDWIN J., Associate in Neurophysiology, Harvard Medical School
GAINER, HAROLD, Research Fellow, National Institutes of Health
GILBERT, DANIEL L., Physiologist, Laboratory of Biophysics, NINDB, National Institutes of Health
GIRARDIER, LUCIEN, Research Associate, Columbia University
GLADE, RICHARD W., Assistant Professor of Zoology, University of Vermont
GOLDRING, IRENE P., Research Assistant Professor in Surgery, Albert Einstein College of Medicine
GRANT, PHILIP, Assistant Professor of Pathobiology, Johns Hopkins University School of Hygiene
GROSCH, DANIEL S., Professor of Genetics, North Carolina State College
GROSS, PAUL R., Associate Professor of Biology, Brown University
GRUDEFEST, HARRY, Professor of Neurology, Columbia University
GWILLIAM, GILBERT F., Assistant Professor of Biology, Reed College
HAGINS, WILLIAM A., Physiologist, National Institutes of Health
HALLIVORSON, HARLYN O., Associate Professor of Bacteriology, University of Wisconsin
HARDING, CLIFFORD V., Associate Professor of Physiology, College of Physicians and Surgeons
HARTMAN, PHILIP E., Associate Professor of Biology, Johns Hopkins University
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HAYASHI, ETHEL BROWN, Investigator, Marine Biological Laboratory
HASTINGS, JOHN WOODLAND, Associate Professor of Biochemistry, University of Illinois
HAYASHI, TERU, Professor of Zoology, Columbia University
HEZEV, ANDREW F., Institute for Muscle Research, Marine Biological Laboratory
HENLEY, CATHERINE, Research Associate, University of North Carolina
HERNDON, WALTER, Professor and Head of Dept. of Botany, University of Tennessee
HERVET, JOHN P., Senior Electronic Engineer, Rockefeller Institute
HESSE, ANITA Y., Marine Biological Laboratory
HILL, ROBERT BENJAMIN, Instructor in Physiology, Dartmouth Medical School
Hirschfield, Henry R., Associate Professor of Biology, New York University
HOSKIN, FRANCIS C. G., Assistant Professor of Neurology, College of Physicians and Surgeons
HUBBARD, RUTH, Research Associate in Biology, Harvard University
HUMPHREYS, TOM D., Postdoctoral Fellow, Massachusetts Institute of Technology
HUNTER, W. D. RUSSELL, University Lecturer in Zoology, University of Glasgow
HURWITZ, JERARD, Associate Professor, New York University
INUI, SHINYA, Professor and Chairman of Cytology, Dartmouth Medical School
ISENBERG, IRVIN, Investigator, Institute for Muscle Research, Marine Biological Laboratory
JAMES, ROBERT K., Assistant Professor of Zoology, University of Minnesota
KAAN, HELEN W., Marine Biological Laboratory
KAMER, BENJAMIN, Investigator, Institute for Muscle Research, Marine Biological Laboratory
KAMIYA, NOBUSU, Professor of Biology, Osaka University, Japan
KANE, ROBERT E., Assistant Professor of Cytology, Dartmouth Medical School
KATZ, GEORGE, Research Associate, Columbia University
KAWASAKI, HIROYA, Department of Biochemistry, Columbia University
KEMPSON, RUDOLPH T., Chairman, Department of Zoology, Vassar College
KESSEL, JOHN, Professor of Biochemistry, Rutgers University
KESSEL, RICHARD G., Assistant Professor of Zoology, State University of Iowa
KIHARA, HIROYA, Research Associate, University of Wisconsin
KINNE, OTTO, Associate Professor of Zoology, University of Toronto
KRAJE, STEPHEN M., Associate in Medicine, Harvard Medical School
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KUSANO, KIYOSHI, Research Associate in Neurology, Columbia University
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LASTER, LEONARD, Senior Investigator, National Institutes of Health
LAUPHER, HANS, Assistant Professor of Biology, Johns Hopkins University
LAWLER, H. CLAIRE, Associate in Biochemistry, College of Physicians and Surgeons
LAZAROW, ARNOLD, Professor of Anatomy, University of Minnesota
LEIMAN, SIDNEY, Assistant Professor of Ophthalmology, University of Rochester
LESLIE, ROBERT B., Investigator, Institute for Muscle Research, Marine Biological Laboratory
LEVY, MILTON, Professor of Biochemistry, New York University College of Dentistry
LEWIS, HERMAN W., Chairman, Life Science Division, Michigan State University Oakland
LOCHEAD, JOHN H., Professor of Zoology, University of Vermont
LONDON, IRVING M., Professor of Medicine, Albert Einstein College of Medicine
LOESENSTRAIN, WERNER R., Associate Professor of Physiology, Columbia University
LOPEZ-MENDOZA, E., Research Fellow, Columbia University
LORMAN, L., Professor of Chemistry, Northwestern University
DE LORENZO, A. J., Director, Research Laboratories, Johns Hopkins University School of Medicine
LUCAS, WADE E., Associate Professor of Biophysics, Johns Hopkins University
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MASSEY, V., Senior Lecturer, University of Sheffield, England
MATTEYKO, G. M., Associate Professor of Biology, Washington Square College
McCANN, FRANCES V., Assistant Professor of Physiology, Dartmouth Medical School
McELROY, W. D., Director, McColm-Pratt Institute, Johns Hopkins University
METZ, CHARLES B., Associate Director, Oceanographic Institute, Florida State University
METZ, CHARLES W., Marine Biological Laboratory
MIDDLEBURG, WM. ROBERT, Institute for Muscle Research, Marine Biological Laboratory
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STUNKARD, HORACE W., Research Associate, American Museum of Natural History
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SUGENOR, DOUGLAS M., Professor of Biochemistry, University of Buffalo School of Medicine
SZABO, GEORGE, Associate in Anatomy, Harvard Medical School
SZENT-GYÖRGyi, ALBERT, Director, Institute for Muscle Research, Marine Biological Laboratory
SZENT-GYÖRGyi, ANDREW G., Investigator, Institute for Muscle Research, Marine Biological Laboratory
TAKAKI, ICHII, Neurophysiologist, National Institutes of Health
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TWEDELL, KENYON S., Assistant Professor of Biology, University of Notre Dame
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DEVILLAFRANCA, GEORGE W., Associate Professor of Zoology, Smith College
VILLEE, CLAUDE A., Jr., Associate Professor of Biological Chemistry, Harvard University Medical School
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WALD, GEORGE, Professor of Biology, Harvard University
WANGERSKY, PETER J., Research Associate, Bingham Oceanographic Laboratory, Yale University
WARRICK, LEONARD, Research Medical Officer, National Institutes of Health
WEBB, H. MARGUERITE, Associate Professor of Biological Sciences, Goucher College
WEISSMANN, GEORALD, Assistant Professor of Medicine, New York University
WEISSMAN, SAMUEL L., Investigator, Institute for Muscle Research, Marine Biological Laboratory
WERMANN, ROBERT, Professor of Psychiatry, Indiana University School of Medicine
WICTHERMAN, RALPH, Professor of Biology, Temple University
WIECINSKI, FLOYD J., Associate Professor of Biological Sciences, Drexel Institute of Technology
WILBER, CHARLES G., Professor of Biological Sciences, Kent State University
WILLEY, CHARLES H., Professor of Biology, New York University
WILSON, WALTER L., Associate Professor of Physiology, University of Vermont, College of Medicine
WINTERS, ROBERT W., Associate Professor of Pediatrics, College of Physicians and Surgeons
ZIMMERMAN, ARTHUR M., Assistant Professor of Pharmacology, State University of New York, Downstate Medical Center
ZWILLING, EDGAR, Professor of Biology, Brandeis University

Lalor Fellows, 1962

KAMIYA, N., Osaka University, Japan
LAUPER, HANS, Johns Hopkins University
NASATIR, MAIMON, Brown University
WINTERS, ROBERT W., College of Physicians and Surgeons
Lillie Fellow, 1962

Minganti, Antonio, University of Palermo, Italy

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Lopez-Mendoza, E., Columbia University
O’Brien, James H., University of Michigan
Mendelson, Martin, Columbia University

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Franzini, Clara, Harvard University
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Grabker, Robert, Kansas University
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Kilarski, Wincenty, Harvard University
Kirk, Betty I., University of Rochester
Kirk, Edward S., University of Rochester
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Leiberman, Paul, University of Vermont College of Medicine
Mangum, Charlotte P., Yale University
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Szebro, Richard, National Institutes of Health
Ulbricht, Werner, Duke University
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Wheeler, Maynard B., Columbia University
Yamashita, Eizo, Biological Laboratories, Harvard University
Zak, Radovan, Northwestern University

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Arnold, John M., University of Minnesota
Baird, Spencer L., Institute for Muscle Research, Marine Biological Laboratory
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Ehrenstein, Gerald, National Institutes of Health
Emmons, Louise H., Sarah Lawrence College
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Fitzjarrell, Austin T., Tulane University
Fontaine, Jeannette, University of Rochester School of Medicine and Dentistry
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Franklin, Jeffrey L., University of Maryland
Freeman, James Melvin, University of Illinois
Freeman, Alan R., Hahnemann Medical College
Ginsberg, Allen L., Brooklyn Veterans Administration Hospital
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HILLE, BERTIL, Rockefeller Institute
HOSTETLER, KARL, Western Reserve University School of Medicine
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IREDEL, JAMES, Western Reserve University
JOHNSON, LELAND G., Northwestern University
JONES, FRANCES E., Columbia University
KAPICA, SUZANNE, Russell Sage College
KAYSER, ELEANORE, McCollum-Pratt Institute, Johns Hopkins University
KAYSER, SIGRID ROSEMARY, McCollum-Pratt Institute, Johns Hopkins University
KENG, RACHEL, University of Pennsylvania
KAPICA, RICHARD, University of New York
KENG, YANG, LARRY N. G., College of Physicians and Surgeons
LAUBER, RITA, Emory University
LAUFFER, HENRY, Hahnemann Medical College
LAZAROW, PAUL B., University of Minnesota
LEFEVRE, RACHEL ELLEN, Mount Holyoke College
LEWIS, HAZEL, Institute for Muscle Research, Marine Biological Laboratory
LEWIS, HELEN S., Michigan State University
LILLIE, NELL D., Woods Hole
LIM, JAMES C., North Carolina State College
LINDALL, ARNOLD W., Jr., University of Minnesota
LINAS, ROGOLFO, University of Minnesota
LONG, JEAN, University of Vermont College of Medicine
MALMBERG, RIGMOR, Florida State University
MANCO, PATRICIA A., University of Tennessee
MARITATA, CINDY, University of Pennsylvania
MCDANIEL, JAMES SCOTT, University of Oklahoma
MCLAUGHLIN, JANE, Institute for Muscle Research, Marine Biological Laboratory
MCNAMARA, JOHN J., Harvard Medical School
MCNAMARA, THOMAS E., Johns Hopkins University
MEEN, HEATHER E., University of Toronto
METZ, RINDA, Florida State University
MILLER, DONALD W., Dartmouth Medical School
MILLS, SUSAN, Institute for Muscle Research, Marine Biological Laboratory
MINIHAN, KATHLEEN, University of Pennsylvania
MINUTOLI, FLORINDA, New York University
MUNDELL, ROBERT D., University of Pittsburgh
NUTT, JOAN, Northwestern University
NELSON, PETER L., Columbia University
OLIVO, RICHARD F., Columbia University
PARRY, WILLIAM HART, Indiana University
PEARCE, NATALIE G., Bennington College
PEARLSTEIN, ROBERT M., Institute for Muscle Research, Marine Biological Laboratory
PERRY, BARBARA, Institute for Muscle Research, Marine Biological Laboratory
PIATIGORSKY, JORAAM, Harvard University
PIDDINGTON, RONALD, University of Chicago
PHRATON, ROBERT, Brandeis University
PITTS, WILLIAM REID, Princeton University
PRICE, JUDITH P., Institute for Muscle Research, Marine Biological Laboratory
PRIOR, GWEN, Institute for Muscle Research, Marine Biological Laboratory
RAAB, JACOB L., University of Chicago
RAMPOSE, ALFRED, JR., University of Vermont College of Medicine
RAYBURN, WILLIAM R., Washington University
REW, ROBERT E., Marblehead, Massachusetts
RICHARDSON, CAROLYN E., Purdue University
RICHMOND, ARTHUR P., Boston University
ROBERTSON, C. W., Evansville, Indiana
REPORT OF THE DIRECTOR

ROSENBERG, Bruce M., Western Reserve Medical School
ROSENBERG, Sidney, New York University School of Medicine
ROSENBLUTH, Raja, Columbia University
RUNK, Ruth C., Institute for Muscle Research, Marine Biological Laboratory
SCHNEIDER, Richard Peter, Kent State University
SCHUKER, Eleanor, College of Physicians and Surgeons
SCHULZ, David J., Antioch College
SCHWARTZMAN, Nancy, Johns Hopkins University
SCOTT, Nancy J., University of Vermont
SCRUTTON, Michael C., Western Reserve University
SHAFFER, Ramadan, University of Illinois
SHAFER, Alexander, Tulane University
SCHAEFER, Sherwood B., Lafayette College
SHEPPARD, David E., Johns Hopkins University
SIBLEY, Leslie, State University of New York, Downstate Medical Center
SKEHAN, Philip J., Syracuse University
SIMPSON, Norwood N., National Institutes of Health
SIMMONS, Sidney B., Tulane University
SMITH, Stephen D., Tulane University
SPOON, Donald M., Emory University
SPURICH, James A., University of Illinois
STAHL, Ruth C., Johns Hopkins University
STEPHEN, Sue, Chicago Medical School
STRIGLIABOTTI, Janet, Jersey City State College
SUKEKA, Tamiko, University of Illinois
SWEENY, A. Randolph, Pomona College
SYRE, Nancy J., Carnegie Institution of Washington
SZENT-GYöRGYI, Eve, Institute for Muscle Research, Marine Biological Laboratory
SZENT-GYöRGYI, Gyula, Institute for Muscle Research, Marine Biological Laboratory
SZENT-GYöRGYI, Marta, Institute for Muscle Research, Marine Biological Laboratory
TAM, Sidly L., University of Chicago
ULRICH, Sara Ann, Chicago, Illinois
VEEDER, Carolyn, Swarthmore College
VERGER, C., University of Amsterdam
WALLSTROM, Natalie, Dartmouth Medical School
WANDER, Ted, Harvard University
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WYNNE, Michael J., Washington University

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BERNE, Robert M., Professor of Physiology, Western Reserve University School of Medicine
BORSOHN, Richard, Associate Professor of Chemistry, Columbia University
BUCK, John, Research Physiologist, National Institutes of Health
BUTLER, Elmer G., Professor of Biology, Princeton University
CARLSON, Francis D., Professor and Chairman, Department of Biophysics, Johns Hopkins University
CHASE, Aurin M., Professor of Biology, Princeton University
CLARK, Arnold M., Professor of Biological Sciences, University of Delaware
CLIFFORD, Sister Adele, Professor of Biology, College of Mount St. Joseph
COHEN, Seymour S., Professor of Biochemistry, University of Pennsylvania
DAVIS, Bernard D., Professor of Bacteriology, Harvard Medical School
EDER, Howard A., Professor of Medicine, Albert Einstein College of Medicine
EISEN, Herman N., Professor of Microbiology, Washington University School of Medicine
FAWCETT, Don W., Hersey Professor of Anatomy, Harvard Medical School
FORER, ARTHUR, Graduate Student, Dartmouth Medical School
FRIED, E. F. B., Professor, City College of New York
GABRIEL, MORDECAI L., Associate Professor of Biology, Brooklyn College
GAUGY, FRANCOIS, Assistant of Pathology, Laval University
GINSBERG, HAROLD S., Professor of Microbiology, University of Pennsylvania
GLASER, DONALD A., Visiting Professor of Biophysics, Massachusetts Institute of Technology
GREEN, JAMES W., Professor of Physiology, Rutgers University
GREEN, PAUL B., Associate Professor of Zoology, University of Pennsylvania
GUEREWICH, VLADIMIR, Clinical Associate Physician, New York Medical College
HANDELS, PHILIP, Professor of Biochemistry, Duke University
HODD, ROBERT, Research Associate in Pediatrics, Mount Sinai Hospital
ISSELBACHER, KURT J., Assistant Professor of Medicine, Harvard Medical School
JACOBS, M. H., Emeritus Professor, University of Pennsylvania
KARNOFSKY, MANFRED L., Associate Professor of Biological Chemistry, Harvard Medical School
KARUSH, FRED, Professor of Microbiology, University of Pennsylvania
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KLOTZ, IRVING M., Professor of Chemistry, Northwestern University
LAUFFER, MAX A., Professor of Biophysics, University of Pittsburgh
LEVINE, RACHMIEL, Professor of Medicine, New York Medical College
LINEAWEAVER, THOMAS H., Marine Biological Laboratory
LOWENFELD, IRENE E., Instructor in Ophthalmology, Columbia University
McDONALD, SISTER ELIZABETH SETON, Chairman, Dept. of Biology, College of Mount St. Joseph
NOVIKOFF, ALEX B., Research Professor, Albert Einstein College of Medicine
PETRIE, ASENAH, Research Associate in Psychiatry, Harvard University
RAY, PETER M., Associate Professor of Botany, University of Michigan
Roth, Jay S., Professor of Biochemistry, University of Connecticut
ROWLAND, LEWIS P., Assistant Professor of Neurology, College of Physicians and Surgeons
SAGER, RUTH, Research Associate, Columbia University
SCOTT, ALLAN, Professor of Biology, Colby College
SHEMIN, DAVID, Professor of Biochemistry, Columbia University
SINEX, FRANCIS M., Chairman, Biochemistry Department, Boston University School of Medicine
STETTEN, DEWITT, Associate Director in charge of Research, National Institutes of Health
STETTEN, MARJORIE R., Chemist, National Institutes of Health
STEINHARDT, JACINTO, Director, Operations Evaluation Group, Massachusetts Institute of Technology
WALSH, WALTER, Professor of Biochemistry, Rutgers University
WARREN, ROBERT C., Professor of Biochemistry, New York University School of Medicine
WEISS, LEON, Associate Professor of Anatomy, Johns Hopkins University School of Medicine
WHEELER, GEORGE E., Assistant Professor of Biology, Brooklyn College
WILSON, T. HASTINGS, Associate Professor of Physiology, Harvard Medical School
YNTEMA, CHESTER L., State University of New York, Syracuse
ZIMM, DONALD J., Chairman, Dept. of Zoology, University of Rhode Island
ZORZOLI, ANITA, Professor of Physiology, Vassar College

Students, 1962

All students listed completed formal course program, June 19 to July 28. Asterisk indicates students completing Post-Course research program, July 29 to September 1.

EMBRYOLOGY

ELIZABETH E. BALLENTINE, Vassar College
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MICHAEL F. COLLINS, Johns Hopkins University
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*STASKO, AVARS, University of Toronto
*LILA M. WILLIAMS, Yale University
JOSEPH YOUNG, Johns Hopkins University

INVERTEBRATE ZOOLOGY

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*STEPHEN C. BROWN, George Washington University
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LAURA CHUNOGOFF, New York University
*CHARLES DANIELS, Jr., Fairfield University
*FRED A. DIEHL, Western Reserve University
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ROGER DEAN FARLEY, State University of Iowa
JAMES S. FARRIS, University of Massachusetts
JAMES M. FREED, University of Illinois
ANN GALE, Rockefeller Institute
*WM. EINAR GALL, Hamilton College
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MARINE BIOLOGICAL LABORATORY

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George C. Gorman, Cornell University  
Faith H. Gray, Chatham College  
Lewis Greenwald, Syracuse University  
Carol Anne Grinager, Wilson College  
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*Lois Benson, New York State Department of Health  
*Richard Bugeln, Bucknell University  
*Brother Joseph Cain, University of Texas  
S. Chantawachat, University of Texas  
*Joanne Dowell, Dalhousie University  
*John H. Green, University of Louisville  
Louis A. Hanic, University of British Columbia  
*Daniel E. James, Indiana University  
*Margaret Lloyd, Bryn Mawr College  
*Rev. Alan Joseph McCarthy, Fordham University  
William G. Mere, Drew University  
Virginia M. Morzenti, University of Michigan  
John B. Palmer, Oberlin College  
*Russell Rhodes, University of Tennessee  
Michael J. Schneider, University of Tennessee  
Carolyn M. Silby, University of Wisconsin  
Joanne K. Sokol, City College of New York  
*Donald R. Tindall, University of Louisville  
James R. Whittington, Jr., East Carolina College

ECOLOGY

John H. Bushnell, Washington and Jefferson College  
Jeremy Chapman, Montana State University  
Eva A. Claus, New York University  
Richard T. Cronin, Fordham University  
Josephine Doherty, National Science Foundation  
Rev. George L. Drury, Boston College  
Brother J. M. Frenette, Seychelles College
REPORT OF THE DIRECTOR

Juan G. Gonzalez, University of Puerto Rico
Donald C. Gordon, Jr., Hamilton College
Ronald D. Harris, Dalhousie University
Laura Livingston, Goucher College
Emily K. Shirley, Vassar College
Paul E. Smith, State University of Iowa
Jon A. Spelling, Paul Smith's College
John H. Tietjen, University of Rhode Island

4. FELLOWSHIPS AND SCHOLARSHIPS, 1962

Bio Club Scholarship: Joanne K. Solem, Botany Course
Gary N. Calkins Memorial Scholarship: Stephen Brown, Invertebrate Zoology Course
Lucretia Crocker Scholarship: Russell Rhodes, Botany Course
Edwin Linton Memorial Endowment of the Washington and Jefferson College: John Bushnell, Ecology Course

5. TABULAR VIEW OF ATTENDANCE, 1958–1962

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<td>STUDENTS—Total</td>
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<td>Total Attendance</td>
<td>548</td>
<td>561</td>
<td>590</td>
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<td>Less persons represented as both investigators and students</td>
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</tbody>
</table>

6. INSTITUTIONS REPRESENTED 1962

Albert Einstein College of Medicine
American Museum of Natural History
American University
Amherst College
Massachusetts General Hospital
Massachusetts Institute of Technology
Massachusetts, University of
Miami, University of
| Aquacultural Research Corporation | Michigan, University of |
| Argonne National Laboratory       | Michigan State University Oakland |
| Arizona, University of            | Minnesota, University of |
| Boston College                    | Missouri, University of |
| Brandeis University               | Montana State University |
| Brooklyn College                  | Mount Holyoke College |
| Brown University                  | New York State University of Long Island |
| Brigham Young University          | New York State University at Brooklyn |
| Bucknell University               | New York State University Medical School at Syracuse |
| Buffalo, University of California Institute of Technology | New York University, Bellevue Medical Center |
| California, University of Carnegie Institution of Technology | New York University, School of Dentistry |
| Carnegie Institution of Washington Catholic University of Washington | New York University, Washington Square College |
| Chatham College                   | North Carolina State College |
| Chicago Medical School            | North Carolina, University of |
| Chicago, University of Cincinnati | Northwestern University |
| Cincinnati, University of         | Notre Dame University |
| City College of New York          | Oberlin College |
| Columbia University               | Ohio State University |
| Columbia University, College of Physicians & Surgeons | Oklahoma, University of |
| Cornell University                | Oregon, University of |
| Dartmouth College                 | Pennsylvania, University of |
| Drew University                   | Pennsylvania Medical School, University of |
| Drexel Institute of Technology    | Pittsburgh, University of |
| Duke University                   | Pomona College |
| East Carolina College             | Princeton University |
| Emory University                  | Purdue University |
| Fairfield University              | Queens College |
| Fels Research Institute           | Radcliffe College |
| Florida State University          | Reed College |
| Fordham University                | Rhode Island, University of |
| George Washington University      | Rochester, University of |
| Goucher College                   | Rockefeller Institute |
| Hahnemann Medical School          | Russell Sage College |
| Hamilton College                  | Rutgers University |
| Harvard University                | St. Louis University |
| Harvard University Medical School | Seton Hill College |
| Illinois, University of           | Smith College |
| Indiana University                | Stanford University |
| Institute for Muscle Research     | Syracuse University |
| Iowa State University             | Temple University |
| Jersey State College              | Tennessee, University of |
| Johns Hopkins University          | Texas, University of |
| Kansas University                 | Tulane University |
| Kansas State University           | Vassar College |
| Kent State University             | Vermont, University of Veterans Administration Hospital |
| Lafayette College                 | Virginia, University of |
| Sarah Lawrence College            | Washington and Jefferson College |
| Louisville, University of Loyola | Washington University Medical School |
| Loyola College                    | Washington University |
| Marquette University              | Western Reserve University |
| Maryland, University of Massachusetts Eye and Ear Infirmary | Wilson College |
| Yale University                   | Wisconsin, University of Woodstock College |
REPORT OF THE DIRECTOR

FOREIGN INSTITUTIONS REPRESENTED

Chulalongkorn University, Bangkok, Thailand
University of British Columbia, Vancouver, B. C.
Université Laval, Quebec
Université de Montréal, Quebec
University of São Paulo, Brazil
University of Alberta, Calgary, Alberta
University of Toronto, Ontario
Seychelles College, Seychelles Island, India
University of Puerto Rico, Puerto Rico
The Hebrew University, Jerusalem, Israel
University of Queensland, Queensland, Australia
Embassy of the Syrian Arab Republic, Syria
McMaster University, Hamilton, Ontario
Dalhousie University, Halifax, Nova Scotia
Cambridge University, Cambridge, England

Edinburgh University, Edinburgh, Scotland
Tokyo Metropolitan University, Tokyo, Japan
Charles University, Prague
University of Glasgow, Scotland
Osaka University, Japan
University of Sheffield, England
Inst. de Biologia, Mexico
University of Saskatchewan, Saskatoon, Saskatchewan
University of Palermo, Italy
Birmingham University, England
British Museum, London, England
University of Pisa, Italy
Hokkaido University, Japan
University of Ljubljana, Yugoslavia
State University, Torino, Italy
Fukushima Medical College, Japan

Supporting Institutions, Agencies and Individuals

Abbott Laboratories
National Institutes of Health
Associates of the Marine Biological Laboratory
National Science Foundation
Atomic Energy Commission
Office of Naval Research
CIBA Pharmaceutical Products, Inc.
Olin Mathieson Chemical Corporation,
Josephine B. Crane Foundation
Charitable Trust
Dr. William D. Curtis
The Rockefeller Foundation
Eli Lilly and Company
Sandoz Pharmaceutical Inc.
The Grass Foundation
Gerard Swope, Jr.
Hoffman-LaRoche Inc.
Mr. and Mrs. John Swope
The Lalor Foundation
The Upjohn Company
The Merck Company Foundation
Wallace Laboratories
James Wickersham

July 6
ALAN HODGKIN ....................... Conduction of impulses in nerve and muscle. I
July 9
ALAN HODGKIN ....................... Conduction of impulses in nerve and muscle. II
July 13
MAC V. EDDS, JR. ..................... Intercellular matrices as models for developmental analysis
July 20
SHIELDS WARREN ...................... Radiobiologic research and its role in radiation safety
July 27
CARROLL M. WILLIAMS ................ Insect metamorphosis and the management of genetic information
August 3
NOBURO KAMIYA ..................... Protoplasmic streaming
August 10
GEORGE W. BEADLE ................. Three-letter words in a four-letter language

August 17
SIR LINDOR BROWN ................. Memorial lecture to Otto Loewi

August 24
EDUARDO DE ROBERTIS .............. Ultrastructure and chemical organization of isolated nerve endings

8. Tuesday Evening Seminars, 1962

July 3  PETER RIESER  Amino acid transport in the human red cell: kinetics and mechanism
ROBERTS RUGH  Some embryonic effects of ionizing radiations
ERNST SCHARRER  Electron microscopy of neurosecretory cells in the preoptic nucleus of the toadfish (Opsanus tau)

July 10  ROGER MILKMAN  A common mechanism for temperature adaptation and crossvein deformation in Drosophila
PHILIP B. DUNHAM  Adaptation of Tetrahymena to a high NaCl environment: A further report
C. C. SPEIDEL AND R. H. CHENEY  Time-lapse motion pictures of zygote versus gamete irradiation (ultraviolet and x-ray) in Arbacia

July 17  JOHN B. MORRILL AND ELAINE N. DOW  Organ and ontogenetic patterns of multiple forms of hydrolytic enzymes in Limnea palustris
HERMAN W. LEWIS  Genetic control and regulation of dopa oxidase in Drosophila melanogaster
G. W. DEVILLAERANCA  The A and I bands in contracting Limulus muscle

July 24  ALBERTO MONROY AND M. L. VITTORELLI  On the utilization of $^{14}$C from glucose for amino acids and protein synthesis in the sea urchin embryo
DEWITT STETTEN, JR.  Reversible enzymatic reduction of insulin
ALEX B. NOVIKOFF  Golgi apparatus and lysosomes in vertebrate neurons

July 31  ALBERT SZENT-GYÖRGYI  Chemistry of the thymus gland
ANDREW HEGYELI  Chemistry of the thymus gland
BEN KAMINER  Water and contraction of glycerol-extracted muscle

August 7  REUBEN TORCH  Regeneration studies on a brackish-water ciliate, Tracheloraphis sp.
ABRAHAM SPECTOR  Lens amino peptidase
PAUL R. GROSS  "Messenger" RNA and the cell cycle in a fission yeast
LEONARD NELSON  "Actin" localization in sperm
REPORT OF THE DIRECTOR

August 14  M. A. Spirites  An effect of chlorpromazine on a sub-cellular and a cellular membrane
M. Rockstein  Alpha glycerolphosphate dehydrogenase in the flight muscle of insects and its possible role in the aging of flight ability
M. Lauffer  Water and the substructure of a virus

August 21  A. J. deLorenzo  Ultrastructure of nerve fibers and synaptic junctions in gustatory receptors
George Wald  Duplex vision in the crayfish
D. Watkins, S. J. Cooperstein and A. Lazarow  alters the permeability of islet cell membranes to mannitol


Life Members

Brodie, Mr. Donald M., 522 Fifth Avenue, New York 18, New York
Cole, Dr. Elbert C., 2 Chipman Park, Middlebury, Vermont
Cowdry, Dr. E. V., Washington University, St. Louis, Missouri
Crane, Mrs. W. Murray, Woods Hole, Massachusetts
Hess, Dr. Walter, 309 Aiken Street, Rock Hill, South Carolina
Knowlton, Dr. F. P., c/o Mr. G. L. Gravett, Jamestown RD #2, New York
Lewis, Dr. W. H., Johns Hopkins University, Baltimore, Maryland
Lowther, Dr. Florence Del., Barnard College, New York City, New York
Malone, Dr. E. F., 6610 North 11th Street, Philadelphia 26, Pennsylvania
Means, Dr. J. H., 15 Chestnut Street, Boston, Massachusetts
Medes, Dr. Grace, 303 Abington Avenue, Philadelphia 11, Pennsylvania
Moore, Dr. J. Percy, University of Pennsylvania, Philadelphia, Pennsylvania
Payne, Dr. Fernandus, Indiana University, Bloomington, Indiana
Plough, Dr. H. H., Amherst College, Amherst, Massachusetts
Porter, Dr. H. C., University of Pennsylvania, Philadelphia, Pennsylvania
Scott, Dr. Ernest L., Columbia University, New York City, New York
Schrader, Dr. Sally, Duke University, Durham, North Carolina
Turner, Dr. C. L., Northwestern University, Evanston, Illinois
Waite, Dr. F. G., 144 Locust Street, Dover, New Hampshire
Wallace, Dr. Louise B., 359 Lytton Avenue, Palo Alto, California
Warren, Dr. Herbert S., 2768 Egypt Road, Audubon, Pennsylvania

Regular Members

Abell, Dr. Richard G., 55 East 2nd Avenue, New York 28, New York
Adelman, Dr. William J., Department of Physiology, University of Maryland Medical School, Baltimore 1, Maryland
Addison, Dr. W. H. F., 286 East Sidney Avenue, Mount Vernon, New York
Adolph, Dr. Edward F., University of Rochester, School of Medicine and Dentistry, Rochester, New York
Albert, Dr. Alexander, Mayo Clinic, Rochester, Minnesota
ALLEN, Dr. M. Jean, Department of Biology, Wilson College, Chambersburg, Pennsylvania
ALLEN, Dr. Robert D., Department of Biology, Princeton University, Princeton, New Jersey
ALSCHER, Dr. Ruth, Department of Physiology, Manhattanville College, Purchase, New York
AMATNIEK, Dr. Ernest, 34 Horner Avenue, Hastings-on-Hudson, New York
AMBERSON, Dr. William R., Woods Hole, Massachusetts
ANDERSON, Dr. J. M., Department of Zoology, Cornell University, Ithaca, New York
ANDERSON, Dr. Robert S., Medical Laboratories, Army Chemical Center, Maryland (Send mail to Box 632, Edgewood, Maryland)
ARMSTRONG, Dr. Philip B., Department of Anatomy, State University of New York, College of Medicine, Syracuse 10, New York
ARNOLD, Dr. William A., Division of Biology, Oak Ridge National Laboratory, Oak Ridge, Tennessee
ATWOOD, Dr. Kimball C., 702 West Pennsylvania Avenue, Urbana, Illinois
AUSTIN, Dr. C. R., Physiological Laboratory, Downing Street, Cambridge, England
AUSTIN, Dr. Mary L., 506½ North Indiana Avenue, Bloomington, Indiana
AYERS, Dr. John C., Department of Zoology, University of Michigan, Ann Arbor, Michigan
BAITSELL, Dr. George A., Osborn Zoological Laboratories, Yale University, New Haven, Connecticut
BALL, Dr. Eric G., Department of Biological Chemistry, Harvard University Medical School, Boston 15, Massachusetts
BALLARD, Dr. William W., Department of Zoology, Dartmouth College, Hanover, New Hampshire
BALTUS, Dr. Elyane, Laboratoire de Morphologie Animale, 1850 Chaussée de Wavre, Bruxelles 16, Belgique
BANG, Dr. F. B., Department of Pathobiology, Johns Hopkins University School of Hygiene, Baltimore 5, Maryland
BARD, Dr. Phillip, Johns Hopkins Medical School, Baltimore 5, Maryland
BARTH, Dr. L. G., Department of Zoology, Columbia University, New York 27, New York
BARTH, Dr. Lucena, Department of Zoology, Barnard College, New York 27, New York
BARTLETT, Dr. James H., Department of Physics, University of Illinois, Urbana, Illinois
BAYLOR, Dr. E. A., Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
BAYLOR, Dr. Martha B., Marine Biological Laboratory, Woods Hole, Massachusetts
BEAMS, Dr. Harold W., Department of Zoology, State University of Iowa, Iowa City, Iowa
BECK, Dr. L. V., Department of Pharmacology, Indiana University, School of Experimental Medicine, Bloomington, Indiana
BEHRE, Dr. Elinor M., Black Mountain, North Carolina
REPORT OF THE DIRECTOR

Bennett, Dr. Michael V., Department of Neurology, College of Physicians & Surgeons, New York 32, New York
Bennett, Dr. Miriam F., Department of Biology, Sweet Briar College, Sweet Briar, Virginia
Berg, Dr. William E., Department of Zoology, University of California, Berkeley 4, California
Berman, Dr. Moses, Institute for Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda 14, Maryland
Bernheimer, Dr. Alan W., New York University College of Medicine, New York 16, New York
Bernstein, Dr. Maurice, Department of Anatomy, Wayne State University College of Medicine, Detroit 7, Michigan
Bertholf, Dr. Lloyd M., Illinois Wesleyan University, Bloomington, Illinois
Bevelander, Dr. Gerrit, Medical Center, University of Texas, Dental Branch, Houston, Texas
Bigelow, Dr. Henry B., Museum of Comparative Zoology, Harvard University, Cambridge 38, Massachusetts
Bishop, Dr. David W., Department of Embryology, Carnegie Institution of Washington, 115 West University Parkway, Baltimore 10, Maryland
Blanchard, Dr. K. C., Johns Hopkins Medical School, Baltimore 5, Maryland
Bloch, Dr. Robert, 518 South 42nd Street, Apt. C7, Philadelphia 4, Pennsylvania
Blum, Dr. Harold F., Department of Biology, Princeton University, Princeton, New Jersey
Bodansky, Dr. Oscar, Department of Biochemistry, Memorial Cancer Center, 444 East 68th Street, New York 21, New York
Bodian, Dr. David, Department of Anatomy, Johns Hopkins University, 709 North Wolfe Street, Baltimore 5, Maryland
Boell, Dr. Edgar J., Osborn Zoological Laboratories, Yale University, New Haven, Connecticut
Börttiger, Dr. Edward G., Department of Zoology, University of Connecticut, Storrs, Connecticut
Bold, Dr. Harold C., Department of Botany, University of Texas, Austin, Texas
Borei, Dr. Hans G., Department of Zoology, University of Pennsylvania, Philadelphia 4, Pennsylvania
Bowen, Dr. Vaughan T., Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
Bradley, Dr. Harold C., 2639 Durant Avenue, Berkeley 4, California
Bridgman, Dr. Anna J., Department of Biology, Agnes Scott College, Decatur, Georgia
Brinley, Dr. F. J. Jr., Department of Physiology, Johns Hopkins Medical School, Baltimore 5, Maryland
Bronk, Dr. Detlev W., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
Brooks, Dr. Matilda M., Department of Physiology, University of California, Berkeley 4, California
Brown, Dr. Dugald E. S., Department of Zoology, University of Michigan, Ann Arbor, Michigan
BROWN, DR. FRANK A., Jr., Department of Biological Sciences, Northwestern University, Evanston, Illinois
Brownell, Dr. Katherine A., Department of Physiology, Ohio State University, Columbus, Ohio
Buck, Dr. John B., Laboratory of Physical Biology, National Institutes of Health, Bethesda 14, Maryland
Bullock, Dr. T. H., Department of Zoology, University of California, Los Angeles 24, California
Burbank, Dr. William D., Emory University, Box 834, Atlanta 22, Georgia
Burdick, Dr. C. L. A., The Lalor Foundation, 4400 Lancaster Pike, Wilmington, Delaware
Burkenroad, Dr. M. D., c/o Lab. Nal. de Pesca, Apartado 3318, Estofeta #1, Olindania, Republic of Panama
Butler, Dr. E. G., Department of Biology, Princeton University, Princeton, New Jersey
Cameron, Dr. J. A., Baylor College of Dentistry, Dallas, Texas
Cantoni, Dr. Guylio, National Institutes of Health, Mental Health, Bethesda 14, Maryland
Carlson, Dr. Francis D., Department of Biophysics, Johns Hopkins University, Baltimore 18, Maryland
Carpenter, Dr. Russell L., Tufts University, Medford 55, Massachusetts
Carson, Miss Rachel, 11701 Berwick Road, Silver Spring, Maryland
Case, Dr. James, Department of Biology, University of California, Santa Barbara, University, California
Cattell, Dr. McKeen, Cornell University Medical College, 1300 York Avenue, New York 21, New York
Chaet, Dr. Alfred B., Department of Biology, American University, Washington 16, D. C.
Chambers, Dr. Edward, Department of Physiology, University of Miami Medical School, Coral Gables, Florida
Chang, Dr. Joseph J., Inst. f. physikal. Chemie an der Techn. Hochschule, Aachen, Germany
Chase, Dr. Aurin M., Department of Biology, Princeton University, Princeton, New Jersey
Cheney, Dr. Ralph H., Biological Laboratory, Brooklyn College, Brooklyn 10, New York
Claff, Dr. C. Lloyd, 5 Van Beal Road, Randolph, Massachusetts
Child, Dr. Frank M., Department of Zoology, University of Chicago, Chicago 37, Illinois
Clark, Dr. A. M., Department of Biological Sciences, University of Delaware, Newark, Delaware
Clark, Dr. Eloise E., Department of Zoology, Columbia University, New York 27, New York
Clark, Dr. E. R., 315 S. 41st Street, Philadelphia 4, Pennsylvania
Clark, Dr. Leonard B., Department of Biology, Union College, Schenectady, New York
CLARKE, DR. GEORGE L., Biological Laboratories, Harvard University, Cambridge 38, Massachusetts
CLELAND, DR. RALPH E., Department of Botany, Indiana University, Bloomington, Indiana
CLEMENT, DR. A. C., Department of Biology, Emory University, Atlanta 22, Georgia
COHEN, DR. SEYMOUR S., Department of Chemistry, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania
COLE, DR. KENNETH S., (NINDB), National Institutes of Health, Bethesda 14, Maryland
COLLETTE, DR. MARY E., 34 Weston Road, Wellesley 81, Massachusetts
COLLIER, DR. JACk R., Marine Biological Laboratory, Woods Hole, Massachusetts
COLTON, DR. H. S., Box 601, Flagstaff, Arizona
COLVIN, DR. ARTHUR L., Department of Biology, Queens College, Flushing, New York
COLVIN, DR. LAURA H., Department of Biology, Queens College, Flushing, New York
COOPER, DR. KENNETH W., Department of Cytology, Dartmouth Medical School, Hanover, New Hampshire
COOPERSTEIN, DR. SHERWIN J., Department of Anatomy, Western Reserve University Medical School, Cleveland, Ohio
COPeland, DR. D. E., 5820 Hurst Street, Apartment B, New Orleans 18, Louisiana
COPeland, DR. MANTON, Bowdoin College, Brunswick, Maine
CORNMAN, DR. IVOR, Hazleton Laboratories, Box 333, Falls Church, Virginia
COSTELLO, DR. DONALD P., Department of Zoology, University of North Carolina, Chapel Hill, North Carolina
COSTELLO, DR. HELEN MILLER, Department of Zoology, University of North Carolina, Chapel Hill, North Carolina
CRANE, MR. JOHN O., Woods Hole, Massachusetts
CRANE, DR. ROBERT K., Department of Biochemistry, Chicago Medical School, Chicago 12, Illinois
CROASDALE, DR. HANNAH T., Dartmouth College, Hanover, New Hampshire
CROUSE, DR. HELEN V., Department of Botany, Columbia University, New York 27, New York
CROWELL, DR. SEARS, Department of Zoology, Indiana University, Bloomington, Indiana
CSAPO, DR. ARPAd I., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
CURTIS, DR. MAYNIE R., Box 8215, University Branch, Coral Gables 46, Florida
CURTIS, DR. W. C., University of Missouri, Columbia, Missouri
DAN, DR. JEAN CLARK, Misaki Biological Station, Misaki, Japan
DAN, DR. KATSUMA, Misaki Biological Station, Misaki, Japan
DANIELI, DR. JAMES F., Department of Medicinal Chemistry, University of Buffalo School of Pharmacy, Buffalo 14, New York
DAVIS, DR. BERNARD D., Harvard Medical School, 25 Shattuck Street, Boston 15, Massachusetts
Dawson, Dr. A. B., Biological Laboratories, Harvard University, Cambridge 38, Massachusetts
Dawson, Dr. J. A., 129 Violet Avenue, Floral Park, Long Island, New York
Drane, Dr. Helen W., Albert Einstein College of Medicine, New York 61, New York
Diller, Dr. Irene C., Institute for Cancer Research, Fox Chase, Philadelphia 11, Pennsylvania
Diller, Dr. William F., 2417 Fairhill Avenue, Glenside, Pennsylvania
Dixon, Dr. Frank J., Head of Division of Experimental Pathology, Scripps Clinic and Research Foundation, 476 Prospect Street, La Jolla, California
Dodd, Dr. G. S., West Virginia University School of Medicine, Morgantown, West Virginia
Dolley, Dr. William L., Trevillans, Virginia
Doolittle, Dr. R. F., Department of Biology, Amherst College, Amherst, Massachusetts
Duryee, Dr. William R., George Washington University, 2300 K Street, N.W., Washington 7, D. C.
Eds, Dr. Mac V., Jr., Department of Biology, Brown University, Providence 12, Rhode Island
Edwards, Dr. Charles, Department of Physiology, University of Minnesota, Minneapolis 14, Minnesota
Eichel, Dr. Herbert J., Hahnemann Medical College, Philadelphia, Pennsylvania
Eisen, Dr. Herman, Department of Medicine, Washington University, St. Louis, Missouri
Elliott, Dr. Alfred M., Department of Zoology, University of Michigan, Ann Arbor, Michigan
Essner, Dr. Edward S., Department of Pathology, Albert Einstein College of Medicine, New York 61, New York
Evans, Dr. Titus C., State University of Iowa College of Medicine, Iowa City, Iowa
Fiala, Dr. P. M., Radiological Physics Division, Argonne National Laboratory, Argonne, Illinois
Faure-Fremiet, Dr. Emmanuel, Collège de France, Paris, France
Fawcett, Dr. D. W., Department of Anatomy, Harvard Medical School, Boston 15, Massachusetts
Ferguson, Dr. F. P., Div. General Medical Sciences, National Institutes of Health, Bethesda 14, Maryland
Ferguson, Dr. James K. W., Connought Laboratories, University of Toronto, Ontario
Figg, Dr. F. H. J., University of Maryland Medical School, Lombard and Green Streets, Baltimore 1, Maryland
Fingerman, Dr. Milton, Department of Zoology, Newcomb College, Tulane University, New Orleans 18, Louisiana
Fischer, Dr. Ernst, Department of Physiology, Medical College of Virginia, Richmond, Virginia
Fisher, Dr. Jeanne M., Department of Biochemistry, University of Toronto, Toronto, Canada
REPORT OF THE DIRECTOR

FISHER, Dr. KENNETH C., Department of Biology, University of Toronto, Toronto, Canada

FORBES, Dr. ALEXANDER, Biological Laboratories, Harvard University, Cambridge 38, Massachusetts

FRÄNKKEL, Dr. GOTTFRIED S., Department of Entomology, University of Illinois, Urbana, Illinois

FREYGANG, Dr. WALTER H., Jr., Box 516, Essex Fells, New Jersey

FRISCH, Dr. JOHN A., Canisius College, Buffalo, New York

FURSHAN, Dr. EDWIN J., Department of Neurophysiology, Harvard Medical School, Boston 15, Massachusetts

FURTH, Dr. JACOB, 99 Fort Washington Avenue, New York 32, New York

GABRIEL, Dr. MORDECAI, Department of Biology, Brooklyn College, Brooklyn 10, New York

GAFFRON, Dr. HANS, Department of Biology, Florida State University, Conradi Building, Tallahassee, Florida

GALL, Dr. JOSEPH G., Department of Zoology, University of Minnesota, Minneapolis 14, Minnesota

GALTSOFF, Dr. PAUL S., Woods Hole, Massachusetts

GILMAN, Dr. LAUREN C., Department of Zoology, University of Miami, Coral Gables, Florida

GINSBERG, Dr. HAROLD S., Department of Microbiology, University of Pennsylvania School of Medicine, Philadelphia 4, Pennsylvania

GOODCHILD, Dr. CHAUNCEY G., Department of Biology, Emory University, Atlanta 22, Georgia

GOODRICH, Dr. H. B., Department of Biology, Wesleyan University, Middletown, Connecticut

Gotschall, Dr. GERTRUDE Y., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York

GRAHAM, Dr. HERBERT, U. S. Fish and Wildlife Service, Woods Hole, Massachusetts

GRAND, Mr. C. G., Cancer Institute of Miami, 1155 N. W. 15th Street, Miami, Florida

GRANT, Dr. PHILIP, Department of Pathobiology, Johns Hopkins University School of Hygiene, Baltimore 5, Maryland

GRAY, Dr. IRVING E., Department of Zoology, Duke University, Durham, North Carolina

GREEN, Dr. JAMES W., Department of Physiology, Rutgers University, New Brunswick, New Jersey

GREEN, Dr. MAURICE, Department of Microbiology, St. Louis University Medical School, St. Louis, Missouri
GREGG, Dr. JAMES H., Department of Biological Sciences, University of Florida, Gainesville, Florida
GREGG, Dr. JOHN R., Department of Zoology, Duke University, Durham, North Carolina
GREIF, Dr. ROGER L., Department of Physiology, Cornell University Medical College, New York 21, New York
GRiffin, Dr. DONALD F., Biological Laboratories, Harvard University, Cambridge 38, Massachusetts
GROSCH, Dr. DANIEL S., Department of Genetics, Gardner Hall, North Carolina State College, Raleigh, North Carolina
GROSS, Dr. PAUL, Department of Biology, Brown University, Providence, Rhode Island
GRUNDFEST, Dr. HARRY, College of Physicians & Surgeons, Columbia University, New York 32, New York
GUDERNATSCb, Dr. FREDERICK, 41 Fifth Avenue, New York 3, New York
GUTTMAN, Dr. RITA, Department of Physiology, Brooklyn College, Brooklyn 10, New York
GWILLIAM, Dr. G. F., Department of Biology, Reed College, Portland 2, Oregon
Hajdu, Dr. Stephen, National Institutes of Health, Bethesda 14, Maryland
HALL, Dr. FRANK G., Department of Physiology, Duke University Medical School, Durham, North Carolina
HAMBURGER, Dr. VIKTOR, Department of Zoology, Washington University, St. Louis, Missouri
HAMILTON, Dr. HOWARD L., Department of Biology, University of Virginia, Charlottesville, Virginia
HANCE, Dr. ROBERT T., RR #3, 6609 Smith Road, Loveland, Ohio
HARDING, Dr. CLIFFORD V., Jr., 300 Knickerbocker Road, Tenafly, New Jersey
HARNLY, Dr. MORRIS H., Washington Square College, New York University, New York 3, New York
HARTLlNE, Dr. H. KEFFER, Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
HARTMAN, Dr. FRANK A., Ohio State University, Hamilton Hall, Columbus, Ohio
HARTMAN, Dr. P. E., Department of Biology, Johns Hopkins University, Baltimore 18, Maryland
HARVEY, Dr. ETHEL BROWNE, Marine Biological Laboratory, Woods Hole, Massachusetts
HASTINGS, Dr. J. WOODLAND, Division of Biochemistry, University of Illinois, Urbana, Illinois
HAUSCHKA, Dr. T. S., Roswell Park Memorial Institute, 666 Elm Street, Buffalo 3, New York
HAxO, Dr. FRANCIS T., Division of Marine Botany, Scripps Institution of Oceanography, University of California, La Jolla, California
HAYASHI, Dr. TERU, Department of Zoology, Columbia University, New York 27, New York
HAYDEN, Dr. MARGARET A., 34 Weston Road, Wellesley 81, Massachusetts
HAYWOOD, Dr. CHARLOTTE, P. O. Box 14, South Hadley, Massachusetts
HENDLEY, Dr. CHARLES D., 615 South Avenue, Highland Park, New Jersey
JENNER, Dr. CHARLES E., Department of Zoology, University of North Carolina, Chapel Hill, North Carolina
JOHNSON, Dr. FRANK H., Department of Biology, Princeton University, Princeton, New Jersey
JONES, Dr. E. RUFFIN, Jr., Department of Biological Sciences, University of Florida, Gainesville, Florida
JONES, Dr. RAYMOND F., Department of Biology, Princeton University, Princeton, New Jersey
JOSEPHSON, Dr. R. K., Department of Zoology, University of Minnesota, Minneapolis 14, Minnesota
KAAN, Dr. HELEN W., Marine Biological Laboratory, Woods Hole, Massachusetts
KARAT, Dr. E. A., Neurological Institute, College of Physicians and Surgeons, New York 32, New York
KAMINER, Dr. B., Institute for Muscle Research, Marine Biological Laboratory, Woods Hole, Massachusetts
KANE, Dr. ROBERT E., Department of Cytology, Dartmouth Medical School, Hanover, New Hampshire
KARUSH, Dr. FRED, Department of Microbiology, University of Pennsylvania School of Medicine, Philadelphia 4, Pennsylvania
KAUFMAN, Dr. B. P., Carnegie Institution, Cold Spring Harbor, Long Island, New York
KEMP, Dr. NORMAN E., Department of Zoology, University of Michigan, Ann Arbor, Michigan
KEMPTON, Dr. RUDOLF T., Department of Zoology, Vassar College, Poughkeepsie, New York
KEOSIAN, Dr. JOHN, Department of Biology, Rutgers University, Newark 2, New Jersey
KETCHUM, Dr. BOSTWICK H., Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
KEYNAN, Dr. ALEX, Institute for Biological Research, Ness-Ziona, Israel
KILLE, Dr. FRANK R., State Department of Education, Albany 1, New York
KIND, Dr. C. ALBERT, Department of Zoology, University of Connecticut, Storrs, Connecticut
KINDRED, Dr. J. E., University of Virginia, Charlottesville, Virginia
KING, Dr. ROBERT L., State University of Iowa, Iowa City, Iowa
KINGSBURY, Dr. JOHN M., Department of Botany, Cornell University, Ithaca, New York
KISCH, Dr. BRUNO, 71 Maple Street, Brooklyn 25, New York
KLEIN, Dr. MORTON, Department of Microbiology, Temple University, Philadelphia 22, Pennsylvania
KLEINHOLZ, Dr. LEWIS H., Department of Biology, Reed College, Portland 2, Oregon
KLOTZ, Dr. I. M., Department of Chemistry, Northwestern University, Evanston, Illinois
KOLIN, Dr. ALEXANDER, Department of Biophysics, California Medical School, Los Angeles 24, California
KORR, Dr. I. M., Department of Physiology, Kirksville College of Osteopathy, Kirksville, Missouri
KRAHL, Dr. M. E., Department of Physiology, University of Chicago, Chicago 37, Illinois
KRAINE, Dr. Stephen M., Massachusetts General Hospital, Boston 14, Massachusetts
KRAUSS, Dr. Robert, Department of Botany, University of Maryland, Baltimore, Maryland
KRAUSE, Dr. Wendell J. S., 303 East Chicago Avenue, Chicago, Illinois
KUFFLER, Dr. Stephen W., Department of Pharmacology, Harvard Medical School, Neurophysiological Laboratory, Boston 15, Massachusetts
KUNITZ, Dr. Moses, Rockefeller Institute, 66th Street and York Avenue, New York 21, New York

LAMY, Dr. Francois, Department of Anatomy, University of Pittsburgh School of Medicine, Pittsburgh 13, Pennsylvania
LANCEFIELD, Dr. D. E., Queens College, Flushing, New York
LANCEFIELD, Dr. Rebecca C., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
LANDIS, Dr. E. M., Harvard Medical School, Boston 15, Massachusetts
LANSING, Dr. Albert I., Department of Anatomy, University of Pittsburgh Medical School, Pittsburgh 13, Pennsylvania
LAUFFER, Dr. H., Department of Biology, Johns Hopkins University, Baltimore 18, Maryland
LAUFFER, Dr. Max A., Department of Biophysics, University of Pittsburgh, Pittsburgh, Pennsylvania
LAWLER, Dr. H. Claire, Department of Biochemistry and Neurology, College of Physicians and Surgeons, New York 32, New York
LAVIN, Dr. George I., 6200 Norvo Road, Baltimore 7, Maryland
LAZAROW, Dr. Arnold, Department of Anatomy, University of Minnesota Medical School, Minneapolis 14, Minnesota
LEDERBERG, Dr. Joshua, Department of Genetics, Stanford Medical School, Palo Alto, California
LEE, Dr. Richard E., Cornell University College of Medicine, New York 21, New York
LEFEVRE, Dr. Paul G., University of Louisville School of Medicine, Louisville, Kentucky
LEHMANN, Dr. Fritz, Zoologische Inst., University of Berne, Berne, Switzerland
LEVINE, Dr. Rachmiel, New York Medical College, Department of Medicine, 5th Avenue at 106th Street, New York 29, New York
LEVY, Dr. Milton, Department of Biochemistry, New York University School of Dentistry, New York 10, New York
LEVIN, Dr. Ralph A., Scripps Institution of Oceanography, La Jolla, California
LEWIS, Dr. Ivey F., 800 Rugby Road, Charlottesville, Virginia
LING, Dr. Gilbert, 307 Berkeley Road, Marion, Pennsylvania
LITTLE, Dr. E. P., 216 High Street, West Newton, Massachusetts
LLOYD, Dr. David P. C., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
LOCHHEAD, Dr. John H., Department of Zoology, University of Vermont, Burlington, Vermont
LOEB, Dr. R. F., 950 Park Avenue, New York 28, New York
Loewenstein, Dr. Werner R., Department of Physiology, College of Physicians and Surgeons, New York 32, New York
Loftfield, Dr. Robert B., Massachusetts General Hospital, Boston, Massachusetts
Lorand, Dr. Laszlo, Department of Chemistry, Northwestern University, Evanston, Illinois
deLorenzo, Dr. Anthony, Anatomical and Pathological Research Laboratories, Johns Hopkins Hospital, Baltimore 5, Maryland
Love, Dr. Warner E., 1043 Marlau Drive, Baltimore 12, Maryland
Lubin, Dr. Martin, Department of Pharmacology, Harvard Medical School, Boston 15, Massachusetts
Loftfield, Dr. Robert B., Massachusetts General Hospital, Boston, Massachusetts
Lorand, Dr. Laszlo, Department of Chemistry, Northwestern University, Evanston, Illinois
DeLorenzo, Dr. Anthony, Anatomical and Pathological Research Laboratories, Johns Hopkins Hospital, Baltimore 5, Maryland
Love, Dr. Warner E., 1043 Marlau Drive, Baltimore 12, Maryland
Lubin, Dr. Martin, Department of Pharmacology, Harvard Medical School, Boston 15, Massachusetts
Lynch, Dr. Clara J., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
Lynn, Dr. W. Gardner, Department of Biology, Catholic University of America, Washington 17, D. C.
MacDougall, Dr. Mary Stuart, Mt. Vernon Apts., 423 Clairmont Avenue, Decatur, Georgia
McCann, Dr. Frances, Department of Physiology, Dartmouth Medical School, Hanover, New Hampshire
McCouch, Dr. Margaret Sumwalt, University of Pennsylvania Medical School, Philadelphia 4, Pennsylvania
McDonald, Sister Elizabeth Seton, Department of Biology, College of Mt. St. Joseph, Mt. St. Joseph, Ohio
McDonald, Dr. Margaret H., Carnegie Institution of Washington, Cold Spring Harbor, Long Island, New York
McElroy, Dr. William D., Department of Biology, Johns Hopkins University, Baltimore 18, Maryland
Maas, Dr. Werner K., New York University College of Medicine, New York City, New York
Magruder, Dr. Samuel R., Department of Anatomy, Tufts Medical School, 136 Harrison Avenue, Boston, Massachusetts
Manwell, Dr. Reginald D., Department of Zoology, Syracuse University, Syracuse 10, New York
Marshak, Dr. Alfred, Department of Radiology, Jefferson Medical College, Philadelphia 7, Pennsylvania
Martin, Dr. Earl A., 15 Wright Road, Rockville Center, New York
Mathews, Dr. Samuel A., Thompson Biological Laboratory, Williams College, Williamstown, Massachusetts
Mayor, Dr. James, 8 Gracewood Park, Cambridge 38, Massachusetts
Mazia, Dr. Daniel, Department of Zoology, University of California, Berkeley 4, California
Meinkoth, Dr. Norman, Department of Biology, Swarthmore College, Swarthmore, Pennsylvania
Metz, Dr. C. B., Oceanographic Institute, Florida State University, Tallahassee, Florida
Metz, Dr. Charles W., Box 714, Woods Hole, Massachusetts
REPORT OF THE DIRECTOR

MIDDLEBROOK, Dr. Robert, Institute for Muscle Research, Marine Biological Laboratory, Woods Hole, Massachusetts
Milkman, Dr. Roger D., Department of Zoology, Syracuse University, Syracuse 10, New York
Miller, Dr. J. A., Jr., Department of Anatomy, Tulane University Medical School, New Orleans 18, Louisiana
Milne, Dr. Lorus J., Department of Zoology, University of New Hampshire, Durham, New Hampshire
Moe, Mr. Henry A., Guggenheim Memorial Foundation, 551 Fifth Avenue, New York 17, New York
Monroy, Dr. Alberto, Institute of Comparative Anatomy, University of Palermo, Italy
Moore, Dr. George M., Department of Zoology, University of New Hampshire, Durham, New Hampshire
Moore, Dr. John A., Department of Zoology, Columbia University, New York 27, New York
Moore, Dr. John W., Department of Physiology, Duke University Medical Center, Durham, North Carolina
Moore, Dr. R. O., Department of Biochemistry, Ohio State University, Columbus 10, Ohio
Moran, Dr. Joseph, Department of Biology, Russell Sage College, Troy, New York
Morrill, Dr. John B., Jr., Department of Biology, Wesleyan University, Middletown, Connecticut
Moscona, Dr. A. A., Department of Zoology, University of Chicago, Chicago 37, Illinois
Mount, Dr. E. T., Department of Botany, Rutgers University, New Brunswick, New Jersey
Mountain, Mrs. J. D., Charles Road, Mt. Kisco, New York
Mullins, Dr. Lorin J., Department of Biophysics, University of Maryland School of Medicine, Baltimore 1, Maryland
Musacchia, Dr. Xavier J., Department of Biology, St. Louis University, St. Louis 4, Missouri
Nabrit, Dr. S. M., President, Texas Southern University, 3201 Wheeler Avenue, Houston 4, Texas
Nace, Dr. Paul Foley, Department of Biology, Hamilton College, McMaster University, Hamilton, Ontario, Canada
Nachmanson, Dr. David, Columbia University, College of Physicians and Surgeons, New York 32, New York
Navez, Dr. Albert E., 206 Churchill's Lane, Milton 86, Massachusetts
Nelson, Dr. Leonard, Department of Physiology, Emory University, Atlanta 22, Georgia
Neubath, Dr. H., Department of Biochemistry, University of Washington, Seattle 5, Washington
Nicol, Dr. Paul A., Block Oak Lodge, RR #2, Bloomington, Indiana
Niu, Dr. Man-Chiang, Department of Biology, Temple University, Philadelphia 22, Pennsylvania
Novikoff, Dr. Alex B., Department of Pathology, Albert Einstein College of Medicine, New York 61, New York
Ochoa, Dr. Severo, New York University College of Medicine, New York 16, New York
Odum, Dr. Eugene, Department of Zoology, University of Georgia, Athens, Georgia
Oppenheimer, Dr. Jane M., Department of Biology, Bryn Mawr College, Bryn Mawr, Pennsylvania
Osterhout, Dr. Marion Irwin, Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
Packard, Dr. Charles, Woods Hole, Massachusetts
Page, Dr. Irvine H., Cleveland Clinic, Cleveland, Ohio
Parpart, Dr. Arthur K., Department of Biology, Princeton University, Princeton, New Jersey
Passano, Dr. Leonard M., Osborne Zoological Laboratories, Yale University, New Haven, Connecticut
Patten, Dr. Bradley M., University of Michigan, School of Medicine, Ann Arbor, Michigan
Perkins, Dr. John F., Jr., Department of Physiology, University of Chicago, Chicago 37, Illinois
Pierson, Dr. Philip, Chief, Special Dental Research Program, VA Hospital, Brooklyn 9, New York
Pettitbone, Dr. Marian H., Department of Zoology, University of New Hampshire, Durham, New Hampshire
Phillott, Mr. Delbert E., 496 Palmer Avenue, Falmouth, Massachusetts
Pick, Dr. Joseph, Department of Anatomy, New York University, Bellevue Medical Center, New York 16, New York
Pierce, Dr. Madeleine E., Department of Zoology, Vassar College, Poughkeepsie, New York
Pollister, Dr. A. W., Department of Zoology, Columbia University, New York 27, New York
Pond, Dr. Samuel E., 53 Alexander Street, Manchester, Connecticut
Potter, Dr. David, Department of Neurophysiology, Harvard Medical School, Boston 15, Massachusetts
Proctor, Dr. Nathaniel, Department of Biology, Morgan State College, Baltimore 12, Maryland
Prosser, Dr. C. Ladd, Department of Physiology, Burritt Hall, University of Illinois, Urbana, Illinois
Provasoli, Dr. Luigi, Haskins Laboratories, 305 E. 43rd Street, New York 17, New York
Ramsey, Dr. Robert W., Medical College of Virginia, Richmond, Virginia
Rankin, Dr. John S., Department of Zoology, University of Connecticut, Storrs, Connecticut
Ranzi, Dr. Silvio, Department of Zoology, University of Milan, Milan, Italy
REPORT OF THE DIRECTOR

RAPPORT, Dr. M., Department of Biochemistry, Albert Einstein College of Medicine, New York 61, New York
RATNER, Dr. Sarah, Public Health Research Institute of the City of New York, Foot of East 15th Street, New York 9, New York
RAY, Dr. Charles, Jr., Department of Biology, Emory University, Atlanta 22, Georgia
READ, Dr. Clark P., Department of Biology, Rice University, Houston, Texas
REBHUN, Dr. Lionel I., Department of Biology, Princeton University, Princeton, New Jersey
RECHNAGEL, Dr. R. O., Department of Physiology, Western Reserve University, Cleveland, Ohio
REDFIELD, Dr. Alfred, Woods Hole, Massachusetts
RENN, Dr. Charles E., 509 Ames Hall, Johns Hopkins University, Baltimore 18, Maryland
REUBEN, Dr. John P., Department of Neurology, College of Physicians and Surgeons, New York 32, New York
REZNikOFF, Dr. Paul, Cornell University Medical College, 1300 York Avenue, New York 16, New York
RICH, Dr. Alexander, Department of Biology, Massachusetts Institute of Technology, Cambridge, Massachusetts
RICHARDS, Dr. A., 2950 E. Mabel Street, Tucson, Arizona
RICHARDS, Dr. A. Glenn, Department of Entomology, University of Minnesota, St. Paul 1, Minnesota
RICHARDS, Dr. Oscar W., American Optical Company Research Center, Southbridge, Massachusetts
ROCKSTEIN, Dr. Morris, Medical Research Building, 1600 N. W. 10th Avenue, Miami, Florida
ROGICK, Dr. Mary D., College of New Rochelle, New Rochelle, New York
ROMER, Dr. Alfred S., Harvard University, Museum of Comparative Zoology, Cambridge 38, Massachusetts
RONKIN, Dr. Raphael R., Department of Physiology, University of Delaware, Newark, Delaware
ROOT, Dr. R. W., Department of Biology, College of the City of New York, New York City, New York
ROOT, Dr. W. S., Department of Physiology, Columbia University, College of Physicians & Surgeons, New York 32, New York
ROSE, Dr. S. Meryl, Department of Biology, Tulane University, New Orleans 18, Louisiana
ROSENBERG, Dr. Evelyn K., Department of Pathology, New York University Bellevue Medical Center, New York 16, New York
ROSENBLUTH, Miss Raja, Department of Zoology, Columbia University, New York 27, New York
ROSENTHAL, Dr. Theodore B., Department of Anatomy, University of Pittsburgh Medical School, Pittsburgh 13, Pennsylvania
ROSLANSKY, Dr. John, Department of Zoology, University of Illinois, Urbana, Illinois
Roth, Dr. Jay S., Department of Zoology and Entomology, University of Connecticut, Storrs, Connecticut
Rothenberg, Dr. M. A., Scientific Director, Dugway Proving Ground, Dugway, Utah
Rugh, Dr. Roberts, Radiological Research Laboratory, College of Physicians & Surgeons, New York 32, New York
Runnström, Dr. John, Wenner-Grens Institute, Stockholm, Sweden
Rutman, Dr. Robert J., General Laboratory Building, 215 S. 34th Street, Philadelphia, Pennsylvania
Ryther, Dr. John H., Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
Sager, Dr. R., Department of Zoology, Columbia University, New York 27, New York
Sanborn, Dr. Richard C., Department of Biological Sciences, Purdue University, Lafayette, Indiana
Sandeen, Dr. Muriel I., Department of Zoology, Duke University, Durham, North Carolina
Saunders, Dr. John W., Department of Biology, Marquette University, Milwaukee 3, Wisconsin
Saunders, Mr. Lawrence, West Washington Square, Philadelphia 5, Pennsylvania
Schachman, Dr. Howard K., Department of Biochemistry, University of California, Berkeley 4, California
Scharrer, Dr. Ernst, Department of Anatomy, Albert Einstein College of Medicine, New York 61, New York
Schlesinger, Dr. R. Walter, Department of Microbiology, St. Louis University School of Medicine, 1402 South Grand Boulevard, St. Louis 4, Missouri
Schmid, Dr. L. H., Christ Hospital, Cincinnati, Ohio
Schmitt, Dr. Francis O., Department of Biology, Massachusetts Institute of Technology, Cambridge, Massachusetts
Schmitt, Dr. O. H., Department of Physics, University of Minnesota, Minneapolis 14, Minnesota
Schneiderman, Dr. Howard A., Department of Biology, Western Reserve University, Cleveland, Ohio
Scholander, Dr. P. F., Scripps Institution of Oceanography, La Jolla, California
Schotté, Dr. Oscar E., Department of Biology, Amherst College, Amherst, Massachusetts
Schramm, Dr. J. R., Department of Botany, Indiana University, Bloomington, Indiana
Scott, Dr. Allan C., Colby College, Waterville, Maine
Scott, Dr. D. B. McNair, 15 General Laboratory Bldg., University of Pennsylvania, Philadelphia 4, Pennsylvania
Scott, Sister Florence Marie, Seton Hill College, Greensburg, Pennsylvania
Scott, Dr. George T., Department of Biology, Oberlin College, Oberlin, Ohio
Sears, Dr. Mary, Glendon Road, Woods Hole, Massachusetts
Seliger, Dr. Howard H., McCollum-Pratt Institute, Johns Hopkins University, Baltimore, Maryland
Senft, Dr. Alfred W., Woods Hole, Massachusetts
SEVERINGHAUS, Dr. Aura E., 375 W. 250th Street, New York 71, New York
SHANES, Dr. Abraham, Department of Pharmacology, University of Pennsylvania
School of Medicine, Philadelphia 4, Pennsylvania
SHAFFER, Dr. Herbert, 6025 N. 13th Street, Philadelphia 41, Pennsylvania
SHAVER, Dr. John R., Department of Zoology, Michigan State University, East
Lansing, Michigan
SHELDLOFSKY, Dr. Theodore, Rockefeller Institute, 66th Street and York Avenue,
New York 21, New York
SHERMAN, Dr. I. W., Division of Life Sciences, University of California, Riverside,
California
SICHEL, Dr. Ferdinand J. M., University of Vermont, Burlington, Vermont
SICHEL, Mrs. F. J. M., Department of Biology, Trinity College, Burlington, Ver-
mont
SILVA, Dr. Paul, Department of Botany, University of California, Berkeley 4,
California
SLIFER, Dr. Eleanor H., Department of Zoology, State University of Iowa, Iowa
City, Iowa
SMELSER, Dr. George K., Department of Anatomy, Columbia University, New
York 32, New York
SMITH, Dr. Dietrich C., Department of Physiology, University of Maryland
School of Medicine, Baltimore, Maryland
SMITH, Mr. Homer P., General Manager, Marine Biological Laboratory, Woods
Hole, Massachusetts
SMITH, Mr. Paul Ferris, Woods Hole, Massachusetts
SMITH, Dr. Ralph I., Department of Zoology, University of California, Berkeley
4, California
SONNEBORN, Dr. T. M., Department of Zoology, Indiana University, Bloomington,
Indiana
SONNENBLICK, Dr. B. P., Rutgers University, 40 Rector Street, Newark 2, New
Jersey
SPECTOR, Dr. A., Howe Laboratories, Harvard Medical School, Boston 15, Massa-
chusetts
SPEIDEL, Dr. Carl C., Department of Anatomy, University of Virginia, University,
Virginia
SPIEGEL, Dr. Melvin, Department of Zoology, Dartmouth College, Hanover, New
Hampshire
SPRATT, Dr. Nelson T., Department of Zoology, University of Minnesota, Minne-
apolis 14, Minnesota
SPYROPOULOS, Dr. C. S., Bldg. 9—Rm. 140, National Institutes of Health, Bethesda
14, Maryland
STARR, Dr. Richard C., Department of Botany, Indiana University, Bloomington,
Indiana
STEINBACH, Dr. H. Burr, Department of Zoology, University of Chicago, Chicago
37, Illinois
STEINBERG, Dr. Malcolm S., Department of Biology, Johns Hopkins University,
Baltimore 18, Maryland
STEINHARDT, Dr. Jacinto, Director of Operations Evaluation Group, Massachusetts Institute of Technology, Cambridge, Massachusetts

STEPHENS, Dr. Grover C., Department of Zoology, University of Minnesota, Minneapolis 14, Minnesota

STETTEN, Dr. DeWitt, Director in Charge of Research, NIAMD, National Institutes of Health, Bethesda 14, Maryland

STETTEN, Dr. Marjorie R., NIAMD, National Institutes of Health, Bethesda 14, Maryland

STEWART, Dr. Dorothy, Rockford College, Rockford, Illinois

STOKEY, Dr. Alma G., Department of Botany, Mount Holyoke College, South Hadley, Massachusetts

STONE, Dr. William, Jr., Ophthalmic Plastics Laboratory, Massachusetts Eye and Ear Infirmary, Boston, Massachusetts

STRAUS, Dr. W. L., Jr., Department of Anatomy, Johns Hopkins University Medical School, Baltimore 5, Maryland

STREHLER, Dr. Bernard L., 4115 Westview Road, Baltimore 18, Maryland

STRITTMATTER, Dr. Philipp, Department of Biological Chemistry, Washington University Medical School, St. Louis, Missouri

STUNKARD, Dr. Horace W., American Museum of Natural History, Central Park West at 79th Street, New York 24, New York

STURTEVANT, Dr. Alfred H., California Institute of Technology, Pasadena 4, California

SUDAK, Dr. Frederick N., Department of Physiology, Albert Einstein College of Medicine, New York 61, New York

SULKIN, Dr. S. Edward, Department of Bacteriology, University of Texas, southwestern Medical School, Dallas, Texas

Swope, Mr. Gerard, Jr., 570 Lexington Avenue, New York 22, New York

Szent Györgyi, Dr. Albert, Institute for Muscle Research, Marine Biological Laboratory, Woods Hole, Massachusetts

Szent Györgyi, Dr. Andrew G., Institute for Muscle Research, Marine Biological Laboratory, Woods Hole, Massachusetts

Tasaki, Dr. Ichiji, Laboratory of Neurophysiology, NIH, Bethesda 14, Maryland

TASHIRO, Dr. Siiro, University of Cincinnati Medical College, Cincinnati, Ohio

Taylor, Dr. Robert E., Laboratory of Neurophysiology, NIH, Bethesda 14, Maryland

Taylor, Dr. Wm. Randolph, Department of Botany, University of Michigan, Ann Arbor, Michigan

Taylor, Dr. W. Rowland, Department of Oceanography, Johns Hopkins University, Baltimore 18, Maryland

Tewinkel, Dr. Lois E., Department of Zoology, Smith College, Northampton, Massachusetts

Tobias, Dr. Julian, Department of Physiology, University of Chicago, Chicago, Illinois

Tracy, Dr. Henry C., 469 Highland, Apt #7, Memphis 11, Tennessee

Trager, Dr. William, Rockefeller Institute, 66th Street and York Avenue, New York 21, New York
REPORT OF THE DIRECTOR

TRAVIS, Dr. D. M., Department of Pharmacology, University of Florida, Gainesville, Florida.

TRINKAUS, Dr. J. Philip, Department of Zoology, Osborn Zoological Laboratories, Yale University, New Haven, Connecticut.

TROLL, Dr. Walter, Department of Industrial Medicine, New York University College of Medicine, New York 16, New York.

TWEDELL, Dr. Kenyon S., Department of Biology, University of Notre Dame, Notre Dame, Indiana.

TYLER, Dr. Albert, Division of Biology, California Institute of Technology, Pasadena 4, California.

URETZ, Dr. Robert B., Department of Biophysics, University of Chicago, Chicago, Illinois.

de VILLA FRANCA, Dr. George W., Department of Zoology, Smith College, Northampton, Massachusetts.

VILIEE, Dr. Claude A., Department of Biological Chemistry, Harvard Medical School, Boston 15, Massachusetts.

VINCENT, Dr. Walter S., Department of Anatomy, University of Pittsburgh, Pittsburgh 13, Pennsylvania.

WAINTO, Dr. W. W., Bureau of Biological Research, Rutgers University, New Brunswick, New Jersey.

WALD, Dr. George, Biological Laboratories, Harvard University, Cambridge, Massachusetts.

WARNER, Dr. Robert C., Department of Chemistry, New York University College of Medicine, New York 16, New York.

WARREN, Dr. L., Research Medical Officer, National Institutes of Health, Bethesda 14, Maryland.

WATERMAN, Dr. T. H., Department of Zoology, 272 Gibbs Research Laboratory, Yale University, New Haven, Connecticut.

WEBB, Dr. Marguerite, Department of Physiology and Bacteriology, Goucher College, Towson, Baltimore, Maryland.

WEISS, Dr. Paul A., Laboratory of Developmental Biology, Rockefeller Institute, 66th Street and York Avenue, New York 21, New York.

WENRICH, Dr. D. H., Department of Zoology, University of Pennsylvania, Philadelphia 4, Pennsylvania.

WERNER, Dr. Robert, Institute of Psychiatric Research, Indiana University Medical Center, 1100 W. Michigan Street, Indianapolis 7, Indiana.

WHEEDEON, Dr. A. D., 21 Lawncrest, Danbury, Connecticut.

WHITAKER, Dr. Douglas M., Rockefeller Institute, 66th Street and York Avenue, New York 21, New York.

WHITE, Dr. E. Grace, 1312 Edgar Avenue, Chambersburg, Pennsylvania.

WHITING, Dr. Anna R., Department of Zoology, University of Pennsylvania, Philadelphia 4, Pennsylvania.

WHITING, Dr. Phineas, Department of Zoology, University of Pennsylvania, Philadelphia 4, Pennsylvania.

WICKERSHAM, Mr. James H., 530 Fifth Avenue, New York 36, New York.

WICHTERMAN, Dr. Ralph, Department of Biology, Temple University, Philadelphia 22, Pennsylvania.
Wieman, Dr. H. L., Box 485, Falmouth, Massachusetts
Wiercinski, Dr. Floyd J., Department of Biological Sciences, Drexel Institute of Technology, 32nd and Chestnut Streets, Philadelphia 4, Pennsylvania
Wigley, Dr. Roland L., U. S. Fish and Wildlife Service, Woods Hole, Massachusetts
Wild, Dr. C. G., Dean of Graduate School and Professor of Biological Sciences, Kent State University, Kent, Ohio
William, Dr. B. H., Department of Biology, Johns Hopkins University, Baltimore 18, Maryland
Wilson, Dr. J. Walter, Department of Biology, Brown University, Providence 12, Rhode Island
Wilson, Dr. Walter L., Department of Physiology, University of Vermont College of Medicine, Burlington, Vermont
Witschi, Dr. Emil, Department of Zoology, State University of Iowa, Iowa City, Iowa
Wittenberg, Dr. Jonathan B., Department of Physiology and Biochemistry, Albert Einstein College of Medicine, New York 61, New York
Wright, Dr. Paul A., Spaulding Bldg., Department of Zoology, University of New Hampshire, Durham, New Hampshire
Wrinch, Dr. Dorothy, Department of Physics, Smith College, Northampton, Massachusetts
Yntema, Dr. C. L., Department of Anatomy, State University of New York College of Medicine, Syracuse 10, New York
Young, Dr. D. B., Main Street, North Hanover, Massachusetts
Zimmerman, Dr. A. M., Department of Pharmacology, State University of New York, Downstate Medical Center, Brooklyn 3, New York
Zinn, Dr. Donald J., Department of Zoology, University of Rhode Island, Kingston, Rhode Island
Zirkle, Dr. Raymond E., Department of Radiobiology, University of Chicago, Chicago 37, Illinois
Zorzoli, Dr. Anita, Department of Physiology, Vassar College, Poughkeepsie, New York
Zweifach, Dr. Benjamin, New York University Medical Center, New York 16, New York
Zwillin, Dr. Edgar, Department of Biology, Brandeis University, Waltham 54, Massachusetts

**Associate Members**

Aldrich, Miss Amey Owen
Alton, Mrs. Benjamin
Andres, Mrs. William
Armstrong, Mrs. Philip B.
Bacon, Mr. and Mrs. Robert
Bacon, Dr. Catherine L.
Ball, Mrs. Eric G.
Barbour, Mr. and Mrs. Lucius H.
Barker, Mr. and Mrs. James R.
Barrows, Mrs. Albert

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Bartow, Mrs. Francis D.
Bartow, Mrs. Philip K.
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Bradley, Dr. and Mrs. Charles
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Calkins, Mr. and Mrs. G. Nathan, Jr.
Calkins, Mr. Samuel W.
Carlton, Mr. Winslow
Carey, Miss Cornelia
Claff, Mrs. C. Lloyd
Clark, Dr. and Mrs. Alfred Hull
Clark, Mrs. Leroy
Clark, Mr. and Mrs. W. Van Alan
Clowes, Mr. Allen W.
Clowes, Mrs. G. H. A.
Clowes, Dr. and Mrs. George H. A., Jr.
Colton, Mrs. H. Seymour
Conklin, Miss Isabel
Cowdry, Dr. and Mrs. E. V.
Crane, Mrs. Bruce
Crane, Mr. John
Crane, Miss Louise
Crane, Mr. Stephen
Crane, Mrs. W. Carey
Crane, Mrs. W. Murray
Crowell, Mr. and Mrs. Prince S.
Crossley, Miss Dorothy
Crossley, Mr. and Mrs. Archibald M.
Curtis, Dr. and Mrs. William D.
Daniels, Mr. and Mrs. F. H.
Day, Mr. and Mrs. Pomeroy
Draper, Mrs. Mary C.
Dreyer, Mr. and Mrs. F. A.
DuBois, Dr. Arthur B.
Egloff, Dr. and Mrs. Frank
Elsmith, Mrs. Dorothy
Enders, Mrs. Frederick
Ewing, Mr. and Mrs. Frederic
Ewing, Mr. William
Fay, Mr. and Mrs. Henry H.
Ferguson, Mrs. James J.
Fisher, Mrs. B. C.
Francis, Mr. Lewis H., Jr.
Frost, Mrs. Frank J.
Gaiser, Dr. and Mrs. David W.
Galtsoff, Mrs. Eugenia
Garrey, Dr. and Mrs. Walter E.
Gifford, Mr. and Mrs. Walter E.
Gifford, Mr. and Mrs. John A.
Gifford, Mr. and Mrs. Prosser
Gifford, Mrs. William
Gilchrist, Mr. and Mrs. John M.
Gildea, Dr. and Mrs. E. F.
Green, Miss Gladys M.
Greer, Mrs. Margaret Jewett
Greer, Mrs. William Hershey, Jr.
Gulesian, Mrs. Paul J.
Haigh, Mrs. R. H.
Hamlen, Mr. and Mrs. J. Monroe
Harrell, Mr. and Mrs. Joel E.
Harrington, Mr. and Mrs. Robert D.
Harvey, Dr. Ethel Browne
Harvey, Dr. and Mrs. Richard
Harrington, Mrs. A. W.
Hervey, Mrs. John P.
Hirschfeld, Mrs. Nathan B.
Hopkins, Mrs. Ralph H.
Houston, Mr. and Mrs. Howard E.
Janney, Mrs. Mary D.
Jewett, Mr. and Mrs. G. F., Jr.
Johlin, Mrs. Jacob M.
Keith, Mrs. Harold C.
King, Mrs. Franklin
Koller, Dr. and Mrs. Lewis R.
Lawrence, Mr. and Mrs. Thomas E.
Lemann, Mrs. Lucy Benjamin
Lineaweaver, Mr. Thomas H., III
Lobb, Mr. and Mrs. John
Loeb, Dr. and Mrs. Robert F.
Marsland, Dr. and Mrs. Douglas A.
Marvin, Mrs. Walter Taylor
Mast, Mrs. S. O.
Mather, Mr. Frank J., III
McCusker, Mrs. Paul T.
McElroy, Dr. and Mrs. W. D.
McKelvy, Mr. John E.
Meigs, Dr. and Mrs. J. Wister
Mitchell, Mrs. James McC.
Mitchell, Mrs. Philip
Minter, Mrs. Thomas Jason
Mosser, Mrs. Benjamin D.
Motley, Mrs. Thomas
Newton, Miss Helen K.
Nichols, Mrs. George
Nims, Mrs. E. D.
The Aaron E. Norman Fund, Inc.
Packard, Mrs. Charles
V. REPORT OF THE INSTRUCTION COMMITTEE ON EDUCATIONAL POLICY

A year ago, in connection with certain questions raised in the Trustees' Meeting, the Instruction Committee was asked to re-examine the whole teaching policy at the MBL. In complying with this directive, the Committee views its role as primarily that of reporting on the present state of our courses in relation to various questions of quality of appropriateness that have been raised, rather than that of recommending a set of standards.

The Committee has not given undue weight to tradition, feeling that even founding fathers can hardly be expected to devise policy that will remain continuously appropriate with the passage of time. Nevertheless it may be of interest to summarize some past opinions on instruction policy. Paraphrasing from several of Director C. O. Whitman's reports in the early years of the century, from Director F. R. Lillie's report of 1921 (Biol. Bull., 42: 304–309, 1922), from the report of E. G. Conklin's nine-man Policy Committee of 1938 (Biol. Bull., 77: 15–27, 1939), and from Lillie's book of 1944, we find the following as rather consistently recurring principles, policies and implications:

1. That all policies of the Laboratory are subservient to the research progress of the individual investigators.
2. That instruction at the MBL must go hand in hand with research because "it is the business of the Laboratory to produce investigators as well as investigation." In agreement with this principle it is stated that (a) admission preference
should be given to students heading for professional careers in biology, and (b) the courses need not all be at the same level, some being more appropriate as basic background, and others as an introduction to research.

3. That subjects of courses should be fundamental and general rather than systematic and more special. We take this to mean that instruction should be confined to major subdivisions of the field of Biology.

4. Courses must be offered here to greater advantage than elsewhere, not as duplication of college or university courses. The use of marine material is several times mentioned in connection with the uniqueness of MBL courses, though never in connection with research at the MBL.

5. Instruction can be overdone. There should be a strict limit on the number of students and on the courses (traditionally four or five).

An additional general policy is of indirect significance, namely, that the Laboratory has no set program of research, but aims only to be in the forefront of the advance of biological sciences as represented in the research interests of the investigators. Implicit in this, we believe, are the expectations (a) that the courses be kept up-to-date as regards research progress in particular fields, and (b) that it is possible that the emphasis or orientation of a particular course could undergo even a major shift in the course of time.

One other point of historical interest: Between the lines of the 1921 report we perhaps detect evidence that the chemical Young Turks and the biological Old Guard were even then squaring off, for we read, “The fundamental problems trace back to the cell and are based ultimately on physics and chemistry; they thus require some of the special equipment of both of these fields.”

Since the present Committee has no quarrel with any of the statements just reviewed, we turn next to the question of how our present courses measure up to these possible criteria:

1. “An MBL course should be in some sense unique.” We have three comments:

   (a) A very important but easily overlooked fact is that all MBL courses have been, are and will be unique in that they give the students an opportunity to be part of a unique research establishment and bring them in contact with a unique aggregation of research scientists.

   (b) Not all courses need achieve uniqueness in the same way. The Zoology and Botany courses properly emphasize the opportunity to study living marine organisms in a research environment. The Physiology Course from its inception, and the Embryology Course in recent years, have derived their prominence more from the opportunity they offer to work simultaneously under several first-line specialists in currently active research fields.

   (c) The preeminence of our Zoology Course over the years has given it a special kind of uniqueness in that as the study of invertebrates has been crowded out of college curricula, our course has become an accepted part of the training of biology majors in certain schools.

2. “An MBL course shall have as its primary objective the training of research scientists.” We have two comments:
(a) We do not feel that this principle should be so rigid as necessarily to exclude the occasional exceptionally talented teacher who is prepared to take full advantage of an MBL course.

(b) We do not feel that all courses need be taught at the research level. We feel that a comprehensive basic background is the most important contribution that can be made by our courses in Zoology and Botany, whereas in Physiology, Ecology and Embryology a more eclectic approach, involving concentration on a few frontiers in modern science and the acquisition of specialized technical skills, may be the primary objective.

3. "Use marine material." We have two comments:

(a) We feel that the MBL has a responsibility in furthering the acquisition of knowledge in marine biology, not because this has been the Laboratory's tradition, or because of the edict of some past committee, but because there is a great need in this field and because we are uniquely equipped to serve it.

(b) On the other hand, a too rigid adherence to this principle would bring us into direct conflict with the even more fundamental policy of following where research leads us. Our Embryology course may in fact exemplify just such a change in emphasis in that its original concentration on studies of marine eggs and embryos—cleavage, cell lineage, morphogenesis—was a happy wedding of the appropriate use of our local material and interest in investigations that were then in the forefront of current embryological research, whereas present-day interest has shifted to other materials and problems. In other words, we should be satisfied, if it is necessary to preserve the emphasis of topical research, if marine material is brought into the Laboratory work wherever it is possible to use it to advantage, and into lecture in proportion to its background importance and its use in current research.

4. Finally, we append the following miscellaneous observations:

(a) We reaffirm the principle that content and conduct of all courses shall be the exclusive responsibility of the teaching staff and that neither Instruction Committee, Trustees nor Director should attempt to influence a course directly except at the time a new head is selected.

(b) In spite of principles, it may be necessary to compromise. For example, in spite of the apparent a priori desirability of staffing the Zoology course with specialists in marine invertebrates, it is in practice impossible—and has apparently always been so—if we insist also on research distinction in experimental science.

(c) It seems worthwhile to list criteria which we feel are not relevant in judging MBL courses. First, the popularity of the lectures. Many things contribute to this phenomenon, none of them crucial to whether a course is proper to be taught at the MBL. It would be quite possible to jam the auditorium with bird watchers if a bang-up course in ornithology were given here for several years.

A second meretricious criterion is student adjustment. It is common experience that students like to turn knobs and do not like to look through the microscope but this ought not to influence the orientation of a course into undue emphasis on experimentation at the expense of the more demanding discipline of meticulous
observation and the acquisition of a firm foundation of basic background information.

In general summary, then, we feel that the quality of MBL instruction is good and the orientation of the courses satisfactory. We feel that it is more important to have courses of which we can be proud than one that "covers" this or that specific aspect of biology. It is, in fact, impossible to define a field of biology rigorously, or for a course to encompass all its aspects, and there has always been at the MBL a wide spectrum of opinion as to what should be taught, if anything, how it should be taught and who should teach it. We feel that these signs of discontent are healthy, and that as long as the same course can, for example, be criticized simultaneously by different individuals for containing too little and too much physiology, the Laboratory is not making serious mistakes.

Now, we want to turn briefly to one other matter rather ambiguously related to instruction, namely, Training Grants. Insofar as such programs have been incorporated into our Physiology, Embryology, Zoology and Ecology courses they appear to be having a clearly beneficial effect, certainly so far as physical facilities go, and it is hoped that the day does not come when we have to face the question of whether we could still run courses under our own steam. However, money being the root of all evil, the Committee urges particular caution in assuming such obligations in the future, lest an imbalance between instruction and individual research at the MBL be created. All proposals involving an increase in the number of students, increase in the number of courses, the setting up of specialized training courses, etc., should be scrutinized carefully with the following points in mind:

1. Does the proposal hamper in any way the investigative activity of the Laboratory in relation to space, equipment, facilities, personnel or living quarters?
2. Does the proposal really advance the science of biology in any fundamental sense or is it training a particular technique or method?

   JOHN B. BUCK, Chairman
   A. LAZAROW
   T. HAYASHI
   B. KETCHUM
   J. W. GREEN

VI. REPORT OF THE LIBRARIAN

In 1962, the Library received 1790 current journals, 57 new titles having been added during the year. Of the total, the Marine Biological Laboratory subscribed to 554, received 654 in exchange for the Biological Bulletin and 193 as gifts. The Woods Hole Oceanographic Institution subscribed to 123, received 205 in exchange and 61 as gifts.

The Laboratory purchased 98 books, received 107 complimentary copies (15 from the authors and 92 from the publishers) and accepted 34 miscellaneous gifts. The Institution purchased 42 books and received 10 gifts. The number of books accessioned totalled 291.

Through purchase, exchange and gift the Laboratory completed 16 journal sets and partially completed 18. The Institution completed three sets and partially completed four. A total of 4648 reprints were added to the collection, of which 2817 were of current issue.
The Library now contains 80,257 bound volumes, 950 having been sent to the bindery in 1962. The reprint collection numbers 223,700.

The photocopying machine has enabled the Library to lower the number of volumes sent out on interlibrary loan. There were 278 volumes sent out in 1962 compared to 553 in 1961, and 106 were borrowed from other libraries.

Acknowledgment is herewith made to Drs. W. D. Russell Hunter, J. A. Hartmann, Roberts Rugh and to the estate of Dr. Otto Loewi for presentations made during the year.

The Montgomery Memorial Fund has now been totally expended and it has enabled the Library to purchase 55 books and two journal sets which have greatly enriched the zoological literature.

The Falmouth Hospital plans on subscribing to certain medical journals which are not now in this Library, and permission has been given to store them here for reference. Thus, each year there is a decided increase in the use of our facilities.

Respectfully submitted,

DEBORAH L. HARLOW,
Librarian

VII. REPORT OF THE TREASURER

The market value of the General Endowment Fund and the Library Fund at December 31, 1962, amounted to $1,994,709 as against book value of $1,242,771. This compares with values of $2,025,139 and $1,193,853, respectively, at the end of the preceding year. The average yield on the securities was 3.75% of the market value and 6.01% of book value. The total uninvested principal in the above accounts as of December 31, 1962 was $641.03. Classification of the Securities held in the Endowment Funds appears in the Auditor’s report.

The market value of the pooled securities as of December 31, 1962 was $333,243 with uninvested principal cash of $818.83, the market value at December 31, 1961 being $373,641. The book value of the securities in this account was $302,453 on December 31, 1962, compared with $293,068 a year earlier. The average yield on market value was 3.53% and 4.13% of book value.

The proportionate interest in the Pool Fund Account of the various Funds as of December 31, 1962 is as follows:

Pension Funds .................................................. 28.462%
General Laboratory Investment ............................ 50.515
Other:
Bio Club Scholarship Fund ................................ 1.447
Rev. Arsenius Boyer Scholarship Fund .................... 1.771
Gary N. Calkins Fund ..................................... 1.657
Allen R. Memhard Fund .................................. 0.321
F. R. Lillie Memorial Fund ................................. 5.583
Lucretia Crocker Fund .................................. 6.044
E. G. Conklin Fund .................................... 1.022
Jewett Memorial Fund .................................. 0.538
M. H. Jacobs Scholarship Fund .......................... 0.729
Anonymous Gift ........................................ 1.911
Donations from the MBL Associates for 1962 were $5,305.00 as compared with $4,330 for 1961. Unrestricted gifts from foundations, societies and companies amounted to $34,519.

During the year we administered the following Grants:

<table>
<thead>
<tr>
<th>Investigators</th>
<th>Training</th>
<th>MBL—Institutional</th>
</tr>
</thead>
<tbody>
<tr>
<td>8—NIH</td>
<td>6—NIH</td>
<td>2—NIH</td>
</tr>
<tr>
<td>5—NSF</td>
<td>1—NSF</td>
<td>3—NSF</td>
</tr>
<tr>
<td>1—Ford</td>
<td></td>
<td>2—ONR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1—AEC</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

The amounts of grants vary in accordance with the investigator’s project of research. An amount of 15% and 20%, based on amount expended, is allowed the Laboratory as overhead, which amounted to $43,405.

The Lillie Fellowship Fund with a market value of $98,498 and a book value of $92,400 as well as the investment in the General Biological Supply House with a book value of $12,700, is carried in the Balance Sheet, item “Other Investments.”

The General Biological Supply House fiscal year ended June 30, 1962, and had a profit after taxes of $302,657 as compared to $302,851 in 1961 and $314,034 in 1960 and $303,300 in 1959.

Following is a statement of the auditors:

To the Trustees of the Marine Biological Laboratory, Woods Hole, Massachusetts:

We have examined the balance sheets of the Marine Biological Laboratory as of December 31, 1962 and 1961, the related statements of operation expenditures, income and current fund for the years then ended, and statement of funds for the year ended December 31, 1962. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the account records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying financial statements present fairly the assets, liabilities and funds of the Marine Biological Laboratory at December 31, 1962, and the results of its operations for the year then ended on a consistent basis.

Boston, Massachusetts
March 18, 1963

Lybrand, Ross Bros. & Montgomery

James H. Wickersham,

Treasurer
### Balance Sheets

December 31, 1962 and 1961

#### Investments

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investments held by Trustee:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Securities, at cost (approximate market quotation 1962—$1,995,000)</td>
<td>$1,242,771</td>
<td>$1,193,853</td>
</tr>
<tr>
<td>Cash</td>
<td>641</td>
<td>1,932</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investments of other endowment and unrestricted funds:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pooled investments, at cost (approximate market quotation, 1962—$353,000) less $5,728 temporary investment of current fund cash</td>
<td>296,725</td>
<td>287,340</td>
</tr>
<tr>
<td>Other investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>15,135</td>
<td>12,764</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$1,694,980</td>
<td>$1,634,476</td>
</tr>
</tbody>
</table>

#### Plant Assets

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land, buildings, Library and equipment (note)</td>
<td>4,900,749</td>
<td>4,795,960</td>
</tr>
<tr>
<td>Less allowance for depreciation (note)</td>
<td>1,247,149</td>
<td>1,189,121</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction in progress</td>
<td>3,653,600</td>
<td>3,606,839</td>
</tr>
<tr>
<td>U. S. Government obligations, at cost:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000 Treasury certificates, due 5/15/62</td>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>$3,653,600</td>
<td>$3,656,944</td>
</tr>
</tbody>
</table>

#### Current Assets

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>118,732</td>
<td>65,623</td>
</tr>
<tr>
<td>Temporary investment in pooled securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U. S. Treasury bills, due prior to 2/15/63, at cost</td>
<td>5,728</td>
<td>5,728</td>
</tr>
<tr>
<td>Inventories of specimens and Bulletins</td>
<td>19,006</td>
<td>6,870</td>
</tr>
<tr>
<td>Prepaid insurance and other</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$ 511,721</td>
<td>$ 171,223</td>
</tr>
</tbody>
</table>
REPORT OF THE TREASURER

MARINE BIOLOGICAL LABORATORY

Balance Sheets

December 31, 1962 and 1961

Endowment Funds

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endowment funds given in trust for benefit of the Marine Biological Laboratory</td>
<td>$1,243,412</td>
<td>$1,195,785</td>
</tr>
<tr>
<td>Endowment funds for awards and scholarships:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal</td>
<td>126,302</td>
<td>126,302</td>
</tr>
<tr>
<td>Unexpended income</td>
<td>11,353</td>
<td>9,600</td>
</tr>
<tr>
<td></td>
<td>137,655</td>
<td>135,902</td>
</tr>
<tr>
<td>Unrestricted funds functioning as endowment</td>
<td>206,378</td>
<td>206,378</td>
</tr>
<tr>
<td>Retirement fund</td>
<td>94,048</td>
<td>81,790</td>
</tr>
<tr>
<td>Pooled investments—accumulated gain</td>
<td>13,487</td>
<td>14,621</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>$1,694,980</strong></td>
<td><strong>$1,634,476</strong></td>
</tr>
</tbody>
</table>

Plant Liability and Funds

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds expended for plant, less retirements</td>
<td>4,900,749</td>
<td>4,796,065</td>
</tr>
<tr>
<td>Less allowance for depreciation charged thereto</td>
<td>1,247,149</td>
<td>1,189,121</td>
</tr>
<tr>
<td></td>
<td>3,653,600</td>
<td>3,606,944</td>
</tr>
<tr>
<td>Unexpended plant funds</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,656,944</td>
</tr>
<tr>
<td></td>
<td><strong>$3,653,600</strong></td>
<td><strong>$3,656,944</strong></td>
</tr>
</tbody>
</table>

Current Liabilities and Funds

<table>
<thead>
<tr>
<th></th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts payable</td>
<td>43,253</td>
<td>30,337</td>
</tr>
<tr>
<td>Unexpended grants—research</td>
<td>344,437</td>
<td>52,837</td>
</tr>
<tr>
<td>Unexpended balances of gifts for designated purposes</td>
<td>9,461</td>
<td>8,878</td>
</tr>
<tr>
<td>Current fund</td>
<td>114,570</td>
<td>79,171</td>
</tr>
<tr>
<td></td>
<td><strong>$ 511,721</strong></td>
<td><strong>$ 171,223</strong></td>
</tr>
</tbody>
</table>

Note—The Laboratory has since January 1, 1916 provided for reduction of book amounts of plant assets and funds invested in plant at annual rates ranging from 1% to 5% of the original costs of the assets.
MARINE BIOLOGICAL LABORATORY

MARINE BIOLOGICAL LABORATORY

STATEMENTS OF OPERATING EXPENDITURES, INCOME AND CURRENT FUND

Years Ended December 31, 1962 and 1961

Operating Expenditures

<table>
<thead>
<tr>
<th>Description</th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and accessory services</td>
<td>$237,580</td>
<td>$192,973</td>
</tr>
<tr>
<td>Instruction</td>
<td>142,394</td>
<td>158,780</td>
</tr>
<tr>
<td>Library and publications (including book purchases—1962,</td>
<td>72,514</td>
<td>67,189</td>
</tr>
<tr>
<td>$24,287; 1961, $20,561)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct costs on research grants</td>
<td>378,163</td>
<td>177,938</td>
</tr>
<tr>
<td>Direct costs on institution support grants</td>
<td>98,043</td>
<td>75,220</td>
</tr>
<tr>
<td></td>
<td>928,694</td>
<td>672,100</td>
</tr>
<tr>
<td>Administration and general</td>
<td>92,124</td>
<td>83,366</td>
</tr>
<tr>
<td>Plant operation and maintenance</td>
<td>102,632</td>
<td>118,993</td>
</tr>
<tr>
<td>Dormitories and dining</td>
<td>155,234</td>
<td>160,838</td>
</tr>
<tr>
<td>Additions to plant from current income</td>
<td>22,088</td>
<td>27,210</td>
</tr>
<tr>
<td></td>
<td>1,300,772</td>
<td>1,062,507</td>
</tr>
<tr>
<td>Less depreciation included in plant operation and</td>
<td>65,061</td>
<td>48,419</td>
</tr>
<tr>
<td>dormitories and dining above but charged to plant funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,235,711</td>
<td>1,014,088</td>
</tr>
</tbody>
</table>

Income

<table>
<thead>
<tr>
<th>Description</th>
<th>1962</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research fees</td>
<td>99,314</td>
<td>102,081</td>
</tr>
<tr>
<td>Accessory services (including sales of biological specimens—1962,</td>
<td>90,247</td>
<td>86,790</td>
</tr>
<tr>
<td>$29,898; 1961, $43,045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction fees</td>
<td>27,439</td>
<td>27,730</td>
</tr>
<tr>
<td>Library fees, Bulletins, subscriptions and other</td>
<td>41,314</td>
<td>39,575</td>
</tr>
<tr>
<td>Dormitories and dining income</td>
<td>125,176</td>
<td>123,231</td>
</tr>
<tr>
<td>Grants for support of institutional activities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction and training</td>
<td>127,988</td>
<td>148,078</td>
</tr>
<tr>
<td>Support Services</td>
<td>98,043</td>
<td>14,420</td>
</tr>
<tr>
<td>General</td>
<td>79,500</td>
<td>99,750</td>
</tr>
<tr>
<td>Reimbursements and allowances for indirect costs on specific research grants</td>
<td>421,568</td>
<td>195,716</td>
</tr>
<tr>
<td>Gifts used for current expenses</td>
<td>39,824</td>
<td>40,468</td>
</tr>
<tr>
<td>Investment income used for current expenses</td>
<td>120,697</td>
<td>110,333</td>
</tr>
<tr>
<td></td>
<td>1,271,110</td>
<td>988,172</td>
</tr>
<tr>
<td>Excess current income (operating expenditures)</td>
<td>35,399</td>
<td>(25,916)</td>
</tr>
<tr>
<td>Current fund balance January 1</td>
<td>79,171</td>
<td>105,087</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current fund balance December 31</td>
<td>$114,570</td>
<td>$79,171</td>
</tr>
</tbody>
</table>
## REPORT OF THE TREASURER

### MARINE BIOLOGICAL LABORATORY

### Statement of Funds

Year Ended December 31, 1962

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Invested funds</td>
<td>$1,634,476</td>
<td>$66,633</td>
<td>$128,216</td>
<td>$119,710</td>
</tr>
<tr>
<td>Unexpended plant funds</td>
<td>$50,000</td>
<td>23,803</td>
<td>749</td>
<td>74,552</td>
</tr>
<tr>
<td>Unexpended research grants</td>
<td>$52,837</td>
<td>1,025,149</td>
<td>733,549</td>
<td>$344,437</td>
</tr>
<tr>
<td>Unexpended gifts for designated purposes</td>
<td>$8,878</td>
<td>43,837</td>
<td>39,824</td>
<td>3,431</td>
</tr>
<tr>
<td>Current fund</td>
<td>$79,171</td>
<td>35,399(1)</td>
<td></td>
<td>$114,570</td>
</tr>
</tbody>
</table>

- **$1,194,822**
- **$128,965**
- **$893,083**
- **$92,618**

### Additional Expenses:

- **Gifts**
- **Grants for research, training and support**
- **Net gain on sales of securities**
- ** Appropriated from current income and other**
- **(1) Excess current income over expenditures**

Expended for:
- **Construction of new building and houses**
- **Scholarship awards**
- **Payments to pensioners**
- **Other**

- 74,522
- 3,538
- 11,097
- 3,431

- **$92,618**
**MARINE BIOLOGICAL LABORATORY**

**MARINE BIOLOGICAL LABORATORY**

**SUMMARY OF INVESTMENTS**

**December 31, 1962**

<table>
<thead>
<tr>
<th>Securities held by Trustee:</th>
<th>Cost</th>
<th>% of Total</th>
<th>Market Quotations</th>
<th>% of Total</th>
<th>Investment Income 1962</th>
</tr>
</thead>
<tbody>
<tr>
<td>General endowment fund:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U. S. Government securities</td>
<td>$35,055</td>
<td>3.4%</td>
<td>$35,536</td>
<td>2.1%</td>
<td>$1,652</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>537,808</td>
<td>51.8%</td>
<td>531,566</td>
<td>32.0%</td>
<td>21,814</td>
</tr>
<tr>
<td>Preferred stocks</td>
<td>118,027</td>
<td>11.4%</td>
<td>112,125</td>
<td>6.7%</td>
<td>4,149</td>
</tr>
<tr>
<td>Common stocks</td>
<td>346,612</td>
<td>33.4%</td>
<td>985,279</td>
<td>59.2%</td>
<td>35,038</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,037,502</td>
<td>100.0%</td>
<td>$1,664,506</td>
<td>100.0%</td>
<td>$62,653</td>
</tr>
<tr>
<td>General Educational Board endowment fund:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U. S. Government securities</td>
<td>$31,020</td>
<td>15.1%</td>
<td>31,475</td>
<td>9.5%</td>
<td>1,491</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>76,769</td>
<td>37.4%</td>
<td>77,688</td>
<td>23.5%</td>
<td>3,540</td>
</tr>
<tr>
<td>Preferred stocks</td>
<td>37,245</td>
<td>18.1%</td>
<td>36,820</td>
<td>11.2%</td>
<td>1,385</td>
</tr>
<tr>
<td>Common stocks</td>
<td>60,235</td>
<td>29.4%</td>
<td>184,220</td>
<td>55.8%</td>
<td>5,683</td>
</tr>
<tr>
<td><strong>Total securities held by Trustee</strong></td>
<td>$205,269</td>
<td>100.0%</td>
<td>$330,203</td>
<td>100.0%</td>
<td>$12,099</td>
</tr>
<tr>
<td>Investments of other endowment and unrestricted funds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pooled investments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U. S. Government securities</td>
<td>22,465</td>
<td>7.4%</td>
<td>22,455</td>
<td>6.3%</td>
<td>508</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>133,611</td>
<td>44.2%</td>
<td>135,812</td>
<td>38.5%</td>
<td>6,178</td>
</tr>
<tr>
<td>Common stocks</td>
<td>146,377</td>
<td>48.4%</td>
<td>194,976</td>
<td>55.2%</td>
<td>5,794</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$302,453</td>
<td>100.0%</td>
<td>$353,243</td>
<td>100.0%</td>
<td>$12,480</td>
</tr>
<tr>
<td>Other investments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U. S. Government securities</td>
<td>7,000</td>
<td></td>
<td></td>
<td></td>
<td>350</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>47,842</td>
<td></td>
<td></td>
<td></td>
<td>1,999</td>
</tr>
<tr>
<td>Preferred stocks</td>
<td>3,728</td>
<td></td>
<td></td>
<td></td>
<td>130</td>
</tr>
<tr>
<td>Common stocks</td>
<td>46,530</td>
<td></td>
<td></td>
<td></td>
<td>39,369</td>
</tr>
<tr>
<td>Real estate</td>
<td>34,577</td>
<td></td>
<td></td>
<td></td>
<td>41,648</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$139,677</td>
<td></td>
<td></td>
<td></td>
<td>$41,848</td>
</tr>
<tr>
<td>Total investments of other endowment and unrestricted funds</td>
<td>$442,130</td>
<td></td>
<td></td>
<td></td>
<td>$54,328</td>
</tr>
</tbody>
</table>

Total investment income ....... $129,080
Custodian's fees charged thereto ....... (631)
Income of current funds temporarily invested in pooled securities ....... (233)
Investment income distributed to funds ....... $128,246

Current investment:

| U. S. Treasury bills, due prior to 2/15/63 | $248,253 | $250,000 | $754 |