THE MARINE BIOLOGICAL LABORATORY

EIGHTY-FOURTH REPORT, FOR THE YEAR 1981—NINETY-FOURTH YEAR

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KINNARD, MRS. L. RICHARD
KIVY, DR. AND MRS. PETER
KOHN, DR. AND MRS. HENRY I.
KOLLER, DR. AND MRS. LEWIS R.
KUFFLER, MRS. STEPHEN W.
LADERMAN, MR. AND MRS. EZRA
LASH, DR. AND MRS. JAMES
LASTER, DR. AND MRS. LEONARD
LAUFER, DR. AND MRS. HANS
LAVIGNE, MARGARET M.
LAWRENCE, MR. FREDDIECK V.
LAWRENCE, MRS. WILLIAM
LAZAROW, MRS. ARNOLD
LEATHERBEE, MR. JOHN A.
LEEMANN, MRS. LUCY B.
LENHER, MR. AND MRS. SAMUEL
LEVINE, DR. AND MRS. RACHMIEL
LEWIS, MR. JOHN T.
LITTLE, MRS. ELBERT
LOEB, MRS. ROBERT F.
LOVELL, MR. AND MRS. HOLLIS R.
LOWE, DR. AND MRS. CHARLES W.
LOWENBERG, MRS. JOSEPH
MACKEN, MR. AND MRS. WILLIAM K.
MACLEISH, MRS. MARGARET
MACNARY, MR. B. GLENN
MACNICHOL, DR. AND MRS. EDWARD F., JR.
MAHER, MISS ANNE CAMILLE
MARKS, DR. AND MRS. PAUL A.
MARS, MR. AND MRS. DOUGLAS
MARTYNA, MR. AND MRS. JOSEPH
MARVIN, DR. DOROTHY H.
MASEW, DR. AND MRS. MORTON
MASTROIANNI, DR. AND MRS. L., JR.
MATHER, MR. AND MRS. FRANK J., III
MATTHIESSEN, MR. AND MRS. G. C.
MCCUSKER, MR. AND MRS. PAUL T.
MECOIL, MRS. NELLA W.
MCLANE, MRS. T. THORNE
MEIGS, MR. AND MRS. ARTHUR
MEIGS, DR. AND MRS. J. WISTER
MELILLO, DR. AND MRS. JERRY
MELLON, RICHARD KING, FOUNDATION
MELLON, MR. AND MRS. RICHARD P.
MENKE, DR. W. J.
METZ, MRS. CHARLES B.
MEYERS, MR. AND MRS. RICHARD
MILLER, DR. DANIEL A.
MIXTER, MR. AND MRS. W. J., JR.
MONTGOMERY, DR. AND MRS. CHARLES H.
MONTGOMERY, MR. AND MRS. RAYMOND P.
MORSE, MR. AND MRS. CHARLES L., JR.
MORSE, MR. AND MRS. RICHARD S.
MOUL, MRS. EDWIN T.
NEWTON, C. H., BUILDERS, INC.
NICHOLLS, MRS. GEORGE
NICKERSON, MR. AND MRS. FRANK L.
NORMAN, MR. AND MRS. ANDREW E.
NORMAN FOUNDATION
O'HERON, MR. AND MRS. JONATHAN
O'SULLIVAN, DR. RENEE BENNETT
ORNTINS, MR. ARMAND
PALMER, MRS. DOUGLAS W.
PAPPAS, DR. AND MRS. GEORGE D.
PARK, MRS. FRANKLIN A.
PARK, MR. AND MRS. MALCOLM S.
PARMENTIER, MRS. CAROLYN L.
PARMENTIER, MR. GEORGE L.
PENDELTON, DR. AND MRS. MURRAY E.
PENDERGRASS, MRS. CLAUDIA
PENNINGTON, MISS ANNE H.
PERKINS, MR. AND MRS. COURTLAND D.
PERSON, DR. AND MRS. PHILIP
PETERSON, MR. AND MRS. E. GUNNAR
PETERSON, MR. AND MRS. E. JOEL
PETERSON, MR. RAYMOND W.
PHILIPPE, MR. AND MRS. PIERRE
PORTER, DR. AND MRS. KEITH R.
PROSSER, MRS. C. LADD
PUTNAM, MR. ALLAN RAY
PUTNAM, MRS. SAMUEL A., III
PYNE, MRS. RUTH
RAYMOND, DR. AND MRS. SAMUEL
READ, MS. LEE
REDFIELD, DR. AND MRS. ALFRED C.
RENEK, MR. AND MRS. MORRIS
REYNOLDS, DR. AND MRS. GEORGE
REYNOLDS, MRS. BARTOW
REZNICKOFF, DR. AND MRS. PAUL
RICCA, DR. AND MRS. RENATO A.
RIGG'S, MR. AND MRS. LAWRASSON, III
RIINS, MR. AND MRS. JOHN R.
ROBB, MRS. ALISON A.
ROBERTSON, MRS. C. STUART
ROBERTSON, DR. AND MRS. C. W.
ROBINSON, DR. AND MRS. DENIS M.
ROGERS, MRS. JULIAN
ROOT, MRS. WALTER S.
ROSS, DR. VIRGINIA
ROWSE, MRS. WILLIAM S.
RUBIN, DR. JOSEPH
RUGH, MRS. ROBERTS
RUSSELL, MR. AND MRS. RICHARD D.
RYDER, MR. AND MRS. FRANCIS C.
SAUNDERS, DR. AND MRS. JOHN W.
SAUNDERS, MRS. LAWRENCE  
SAYYER, MR. AND MRS. JOHN E.  
SCHLESINGER, MRS. R. WALTER  
SCOTT, MRS. GEORGE T.  
SCOTT, MRS. NORMAN E.  
SEARS, MR. AND MRS. HAROLD B.  
SEGAL, DR. AND MRS. SHELDON J.  
SHAPIRO, MRS. HARRIET.  
SHEMIN, DR. AND MRS. DAVID  
SHEPRO, DR. AND MRS. DAVID  
SMITH, MRS. HOMER P.  
SMITH, MR. VANDORN C.  
SNIER, MR. ELIOT  
SPECHT, MRS. HEINZ  
SPIEGEL, DR. AND MRS. MELVIN  
STEELE, MRS. M. EVELYN  
STEINBACH, MRS. H. B.  
STETTEN, DR. AND MRS. DEWITT, JR.  
STRACHER, DR. AND MRS. ALFRED  
STUNKARD, DR. HORACE  
STUTTERVANT, MRS. A. H.  
SWANSON, DR. AND MRS. CARL P.  
SWOPE, MR. AND MRS. GERARD L.  
SWOPE, MRS. GERARD, JR.  
TAYLOR, MARJORIE G.  
TITIE, MR. AND MRS. EMIL D., JR.  
TODD, MR. AND MRS. GORDON F.  
TOLKAN, MR. AND MRS. NORMAN N.  
TOMPINS, MRS. B. A.  
TRAGER, MRS. WILLIAM  
TROLL, DR. AND MRS. WALTER  
TULLY, MR. AND MRS. GORDON F.  
VALOIS, MR. AND MRS. JOHN  
VAN BRUNT, MR. AND MRS. A. H., JR.  
VEEDER, MRS. RONALD A.  
WAITE, MR. AND MRS. CHARLES E.  
WAKSMAN, DR. AND MRS. BYRON H.  
WARE, MR. AND MRS. J. LINDSAY  
WARREN, MRS. SHIELDS  
WATT, MR. AND MRS. JOHN B.  
WEISBERG, MR. AND MRS. ALFRED M.  
WHEATLEY, DR. MARJORIE A.  
WHEELER, DR. AND MRS. PAUL S.  
WHEELER, DR. AND MRS. RALPH E.  
WHITNEY, MR. AND MRS. GEOFFREY G., JR.  
WICHTERMAN, DR. AND MRS. RALPH  
WICKERSHAM, MR. AND MRS. A. A. TILNEY  
WICKERSHAM, MRS. JAMES H., JR.  
WILHELM, DR. HAZEL S.  
WITMER, DR. AND MRS. ENOS E.  
WOLFSONH, MR. AND MRS. WOLFE  
WOODWELL, MRS. GEORGE  
YNTEMA, MRS. CHESTER L.  
ZINN, DR. AND MRS. DONALD J.  
ZIPP, DR. ELIZABETH  
ZWILLING, MRS. EDGAR

III. CERTIFICATE OF ORGANIZATION
(On File in the Office of the Secretary of the Commonwealth)

No. 3170

We, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, and William T. Sedgwick, Edward G. Gardner, Susan Mims and Charles Sedgwick Minot being a majority of the Trustees of the Marine Biological Laboratory in compliance with the requirements of the fourth section of chapter one hundred and fifteen of the Public Statutes do hereby certify that the following is a true copy of the agreement of association to constitute said Corporation, with the names of the subscribers thereto:-

We, whose names are hereto subscribed, do, by this agreement, associate ourselves with the intention to constitute a Corporation according to the provisions of the one hundred and fifteenth chapter of the Public Statutes of the Commonwealth of Massachusetts, and the Acts in amendment thereof and in addition thereto.

The name by which the Corporation shall be known is THE MARINE BIOLOGICAL LABORATORY.

The purpose for which the Corporation is constituted is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.
CERTIFICATE OF ORGANIZATION

The place within which the Corporation is established or located is the city of Boston within said Commonwealth.

The amount of its capital stock is none.

In Witness Whereof, we have hereunto set our hands, this twenty seventh day of February in the year eighteen hundred and eighty-eight, Alpheus Hyatt, Samuel Mills, William T. Sedgwick, Edward G. Gardiner, Charles Sedgwick Minot, William G. Farlow, William Stanford Stevens, Anna D. Phillips, Susan Mims, B. H. Van Vleck.

That the first meeting of the subscribers to said agreement was held on the thirteenth day of March in the year eighteen hundred and eighty-eight.

In Witness Whereof, we have hereunto signed our names, this thirteenth day of March in the year eighteen hundred and eighty-eight, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, Edward G. Gardiner, William T. Sedgwick, Susan Mims, Charles Sedgwick Minot.

(Approved on March 20, 1888 as follows:

I hereby certify that it appears upon an examination of the within written certificate and the records of the corporation duly submitted to my inspection, that the requirements of sections one, two and three of chapter one hundred and fifteen, and sections eighteen, twenty and twenty-one of chapter one hundred and six, of the Public Statutes, have been complied with and I hereby approve said certificate this twentieth day of March A.D. eighteen hundred and eighty-eight.

CHARLES ENDICOTT
Commissioner of Corporations)

IV. ARTICLES OF AMENDMENT

(On File in the Office of the Secretary of the Commonwealth)

We, James D. Ebert, President, and David Shepro, Clerk of the Marine Biological Laboratory, located at Woods Hole, Massachusetts 02543, do hereby certify that the following amendment to the Articles of Organization of the Corporation was duly adopted at a meeting held on August 15, 1975, as adjourned to August 29, 1975, by vote of 444 members, being at least two-thirds of its members legally qualified to vote in the meetings of the corporation:

VOTED: That the Certificate of Organization of this corporation be and it hereby is amended by the addition of the following provisions:

"No Officer, Trustee or Corporate Member of the corporation shall be personally liable for the payment or satisfaction of any obligation or liabilities incurred as a result of, or otherwise in connection with, any commitments, agreements, activities or affairs of the corporation.

"Except as otherwise specifically provided by the Bylaws of the corporation, meetings of the Corporate Members of the corporation may be held anywhere in the United States.
"The Trustees of the corporation may make, amend or repeal the Bylaws of the corporation in whole or in part, except with respect to any provisions thereof which shall by law, this Certificate or the Bylaws of the corporation, require action by the Corporate Members."

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 180, Section 7 of the General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

In Witness whereof and Under the Penalties of Perjury, we have hereto signed our names this 2nd day of September, in the year 1975, James D. Ebert, President; David Shepro, Clerk.

(Approved on October 24, 1975, as follows:

I hereby approve the within articles of amendment and, the filing fee in the amount of $10 having been paid, said articles are deemed to have been filed with me this 24th day of October, 1975.

PAUL GUZZI
Secretary of the Commonwealth)

V. BYLAWS OF THE CORPORATION OF THE MARINE BIOLOGICAL LABORATORY
(Revised August 11, 1978)

1. (A) The name of the Corporation shall be The Marine Biological Laboratory. The Corporation's purpose shall be to establish and maintain a laboratory or station for scientific study and investigation, and a school for instruction in biology and natural history.

(B) Marine Biological Laboratory admits students without regard to race, color, sex, national and ethnic origin to all the rights, privileges, programs and activities generally accorded or made available to students in its courses. It does not discriminate on the basis of race, color, sex, national and ethnic origin in employment, administration of its educational policies, admissions policies, scholarship and other programs.

II. (A) The members of the Corporation ("Members") shall consist of persons elected by the Board of Trustees, upon such terms and conditions and in accordance with such procedures, not inconsistent with law or these Bylaws, as may be determined by said Board of Trustees. Except as provided below, any Member may vote at any meeting, either in person or by proxy executed no more than six months prior to the date of such meeting. Members shall serve until their death or resignation unless earlier removed, with or without cause, by the affirmative vote of two-thirds of the Trustees then in office. Any member who has attained the age of seventy years or has retired from his home institution shall automatically be designated a Life Member provided he signifies his wish to retain his membership. Life Members shall not have the right to vote and shall not be assessed for dues.

(B) 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.

III. The officers of the Corporation shall consist of a Chairman of the Board of Trustees, President, Director, Treasurer and Clerk, elected or appointed by the Trustees as set forth in Article IX.
IV. 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. Subject to the provisions of Article VIII(2), at such meeting the Members shall choose by ballot six 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 Chairman or Trustees to be held at such time and place as may be designated.

V. Twenty five Members shall constitute a quorum at any meeting. Except as otherwise required by law or these Bylaws, the affirmative vote of a majority of the Members voting in person or by proxy at a meeting attended by a quorum (present in person or by proxy) shall constitute action on behalf of the Members.

VI. (A) Inasmuch as the time and place of the Annual Meeting of Members are fixed by these Bylaws, no notice of the Annual Meeting need be given. Notice of any special 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 15 days before such meeting, to each Member at his or her address as shown on the records of the Corporation.

(B) Any meeting of the Members may be adjourned to any other time and place by the vote of a majority of those Members present or represented at the meeting, whether or not such Members constitute a quorum. It shall not be necessary to notify any Member of any adjournment.

VII. The Annual Meeting of the Trustees shall be held promptly after the Annual Meeting of the Corporation at the Laboratory in Woods Hole, Massachusetts. Special meetings of the Trustees shall be called by the Chairman, the President, or by any seven Trustees, to be held at such time and place as may be designated. Notice of Trustees’ meetings may be given orally, by telephone, telegraph or in writing; and notice given in time to enable the Trustees to attend, or in any case notice sent by mail or telegraph to a Trustee’s usual or last known place or residence, at least one week before the meeting shall be sufficient. Notice of a meeting need not be given to any Trustee if a written waiver of notice, executed by him before or after the meeting is filed with the records of the meeting, or if he shall attend the meeting without protesting prior thereto or at its commencement the lack of notice to him.

VIII. (A) There shall be four groups of Trustees:

(1) Trustees (the “Corporate Trustees”) elected by the Members according to such procedures, not inconsistent with these Bylaws, as the Trustees shall have determined. Except as provided below, such Trustees shall be divided into four classes of six, one class to be elected each year to serve for a term of four years. Such classes shall be designated by the year of expiration of their respective terms.

(2) Trustees (“Board Trustees”) elected by the Trustees then in office according to such procedures, not inconsistent with these Bylaws, as the Trustees shall have determined. Except as provided below, such Board Trustees shall be divided into four classes of three, one class to be elected each year to serve for a term of four years. Such classes shall be designated by the year of expiration of their respective terms. It is contemplated that, unless otherwise determined by the Trustees for good reason, Board Trustees shall be individuals who have not been considered for election as Corporate Trustees.

(3) Trustees ex officio, who shall be the Chairman, the President, the Director, the Treasurer, and the Clerk.

(4) Trustees emeriti who shall include any Member who has attained the age of seventy years (or the age of sixty five and has retired from his home institution) and who has served a full elected term as a regular Trustee, provided he signifies his wish to serve the Laboratory in that capacity. Any Trustee who qualifies for emeritus status shall continue to serve as a
regular Trustee until the next Annual Meeting whereupon his office as regular Trustee shall become vacant and be filled by election by the Members or by the Board, as the case may be. 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.

(B) The aggregate number of Corporate Trustees and Board Trustees elected in any year (excluding Trustees elected to fill vacancies which do not result from expiration of a term) shall not exceed nine. The number of Board Trustees so elected shall not exceed three and unless otherwise determined by vote of the Trustees, the number of Corporate Trustees so elected shall not exceed six.

(C) The Trustees and Officers shall hold their respective offices until their successors are chosen in their stead.

(D) Any Trustee may be removed from office at any time with or without cause, by vote of a majority of the Members entitled to vote in the election of Trustees; or for cause, by vote of two-thirds of the Trustees then in office. A Trustee may be removed for cause only if notice of such action shall have been given to all of the Trustees or Members entitled to vote, as the case may be, prior to the meeting at which such action is to be taken and if the Trustee so to be removed shall have been given reasonable notice and opportunity to be heard before the body proposing to remove him.

(E) Any vacancy in the number of Corporate Trustees, however arising, may be filled by the Trustees then in office unless and until filled by the Members at the next Annual Meeting. Any vacancy in the number of Board Trustees may be filled by the Trustees.

(F) A Corporate Trustee or a Board Trustee who has served an initial term of at least 2 years duration shall be eligible for re-election to a second term, but shall be ineligible for re-election to any subsequent term until two years have elapsed after he last served as Trustee.

IX. (A) The Trustees shall have the control and management of the affairs of the Corporation. They shall elect a Chairman of the Board of Trustees who shall be elected annually and shall serve until his successor is selected and qualified and who shall also preside at meetings of the Corporation. They shall elect a President of the Corporation who shall also be the Vice Chairman of the Board of Trustees and Vice Chairman of meetings of the Corporation, and who shall be elected annually and shall serve until his successor is selected and qualified. They shall annually elect a Treasurer who shall serve until his successor is selected and qualified. They shall elect a Clerk (a resident of Massachusetts) who shall serve for a term of 4 years. Eligibility for re-election shall be in accordance with the content of Article VIII (F) as applied to Corporate or Board Trustees. They shall elect Board Trustees as described in Article VIII (B). They shall appoint a Director of the Laboratory for a term not to exceed five years, provided the term shall not exceed one year if the candidate has attained the age of 65 years prior to the date of the appointment. 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 of the Corporation and may remove them at any time. They may fill vacancies occurring in any of the offices. The Board of Trustees shall have the power to choose an Executive Committee from their own number as provided in Article X, and to delegate to such Committee such of their own powers as they may deem expedient in addition to those powers conferred by Article X. They shall from time to time elect Members to the Corporation upon such terms and conditions as they shall have determined, not inconsistent with law or these Bylaws.

(B) The Board of Trustees shall also have the power, by vote of a majority of the Trustees then in Office, to elect an Investment Committee and any other committee and, by like vote, to delegate thereto some or all of their powers except those which by law, the Articles of Organization or these Bylaws they are prohibited from delegating. The members of any such committee shall have such tenure and duties as the Trustees shall determine; provided that the Investment Committee, which shall oversee the management of the Corporation’s endowment funds and marketable securities, shall include the Chairman of the Board of Trustees, the Treasurer of the Corporation, and the Chairman of the Corporation’s Budget Committee, as ex officio members, together with such Trustees as may be required for not
BYLAWS

less than two-thirds of the Investment Committee to consist of Trustees. Except as otherwise provided by these Bylaws or determined by the Trustees, any such committee may make rules for the conduct of its business; but, unless otherwise provided by the Trustees or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided by these Bylaws for the Trustees.

X. (A) The Executive Committee is hereby designated to consist of not more than ten members, including the ex officio Members (Chairman of the Board of Trustees, President, Director and Treasurer); and six additional Trustees, two of whom shall be elected by the Board of Trustees each year, to serve for a three-year term.

(B) The Chairman of the Board of Trustees shall act as Chairman of the Executive Committee, and the President as Vice Chairman. A majority of the members of the Executive Committee shall constitute a quorum and the affirmative vote of a majority of those voting at any meeting at which a quorum is present shall constitute action on behalf of the Executive Committee. The Executive Committee shall meet at such times and places and upon such notice and appoint such sub-committees as the Committee shall determine.

(C) The Executive Committee shall have and may exercise all the powers of the Board during the intervals between meetings of the Board of Trustees except those powers specifically withheld from time to time by vote of the Board or by law. The Executive Committee may also appoint such committees, including persons who are not Trustees, as it may from time to time approve to make recommendations with respect to matters to be acted upon by the Executive Committee or the Board of Trustees.

(D) The Executive Committee shall keep appropriate minutes of its meetings and its action shall be reported to the Board of Trustees.

(E) The elected Members of the Executive Committee shall constitute as a standing Committee for the Nomination of Officers, responsible for making nominations, at each Annual Meeting of the Corporation, and of the Board of Trustees, for candidates to fill each office as the respective terms of office expire (Chairman of the Board, President, Director, Treasurer, and Clerk).

XI. A majority of the Trustees, the Executive Committee, or any other committee elected by the Trustees shall constitute a quorum; and a lesser number than a quorum may adjourn any meeting from time to time without further notice. At any meeting of the Trustees, the Executive Committee, or any other committee elected by the Trustees, the vote of a majority of those present, or such different vote as may be specified by law, the Articles of Organization or these Bylaws, shall be sufficient to take any action.

XII. Any action required or permitted to be taken at any meeting of the Trustees, the Executive Committee or any other committee elected by the Trustees as referred to under Article IX may be taken without a meeting if all of the Trustees or members of such committee, as the case may be, consent to the action in writing and such written consents are filed with the records of meetings. The Trustees or members of the Executive Committee or any other committee appointed by the Trustees may also participate in meeting by means of conference telephone, or otherwise take action in such a manner as may from time to time be permitted by law.

XIII. 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 then in office.

XIV. These Bylaws may be amended by the affirmative vote of the Members at any meeting, provided that notice of the substance of the proposed amendment is stated in the
notice of such meeting. As authorized by the Articles of Organization, the Trustees, by a majority of their number then in office, may also make, amend, or repeal these Bylaws, in whole or in part, except with respect to (a) the provisions of these Bylaws governing (i) the removal of Trustees and (ii) the amendment of these Bylaws and (b) any provisions of these Bylaws which by law, the Articles of Organization or these Bylaws, requires action by the Members.

No later than the time of giving notice of the meeting of Members next following the making, amending or repealing by the Trustees of any Bylaw, notice thereof stating the substance of such change shall be given to all Corporation Members entitled to vote on amending the Bylaws.

Any Bylaw adopted by the Trustees may be amended or repealed by the Members entitled to vote on amending the Bylaws.

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

XVI. The Corporation will indemnify every person who is or was a trustee, officer or employee of the Corporation or a person who provides services without compensation to an Employee Benefit Plan maintained by the Corporation, for any liability (including reasonable costs of defense and settlement) arising by reason of any act or omission affecting an Employee Benefit Plan maintained by the Corporation or affecting the participants or beneficiaries of such Plan, including without limitation any damages, civil penalty or excise tax imposed pursuant to the Employee Retirement Income Security Act of 1974; provided, (1) that the Act or omission shall have occurred in the course of the person's service as trustee or officer of the Corporation or within the scope of the employment of an employee of the Corporation or in connection with a service provided without compensation to an Employee Benefit Plan maintained by the Corporation, (2) that the Act or omission be in good faith as determined by the Corporation (whose determination made in good faith and not arbitrarily or capriciously shall be conclusive), and (3) that the Corporation's obligation hereunder shall be offset to the extent of any otherwise applicable insurance coverage, under a policy maintained by the Corporation or any other person, or other source of indemnification.

VI. REPORT OF THE DIRECTOR

Introduction

The fashion of substituting for the traditional Christmas card a lengthy circular letter, often ill-duplicated and partially illegible, continues to gain devotees. These Director's Reports, like circular letters, are supposed to highlight events of the year past. I wish that they, too, had a deadline for composition close to the New Year. Then I should have before me several fresh examples, just arrived, of the circular Christmas letter. Some would be hortatory, but some would show me how not to proceed.

"Do not," they would warn, "try to cover everything that happened in the course of the year. Do not, as a slovenly alternative, deal only with what interests you, or solely with what has happened during the past two weeks. Do not assume that the recipients share your self-pity or self-aggrandizement. Do not select, from among all the subject possibilities, an undisciplined few."

What not to do is, unfortunately, easier here as elsewhere to exemplify than is the positive. If the life of a small family over the course of a year is unyielding to epistolary rules, then how intractable is a year's life of a great institution, if it must be encompassed within a report of a few pages that are less than instantly soporific! How much more intractable still is such a year's life when it has been
REPORT OF THE DIRECTOR

marked by problems and progress, defeats and achievements, hopes proven vain and hopes fulfilled!

Still, like the correspondent who needed, last Christmas, to tell us the year’s truth of her family in four pages (single-spaced) devoted to her husband’s lower-back pain, I feel duty-bound to try. I, too am a neighbor to psychogenic discomforts. Having just now discovered her manuscript, mimeographed on green-tinted bond paper, amidst the schematics for our TV (which faltered at Christmas-time), I am newly mindful of the pitfalls of the genre, and of the laughter implicit in it. I have approached my task seriously enough this year, knowing that it will be judged dull or sharp according to the reader’s preconceptions. But I have done the thing with a light heart, keeping before me a specific application of the great truth discovered by Will Rogers: “It’s no trick being a humorist when you have the whole government working for you.”

Think, then, of these few pages as a kind of MBL-family Christmas letter; arriving, not with the ice-crust that rims the Eel Pond in December, but with the mid-August rafts of cruising boats there. Think of it as an attempt to provide the absent member with some sense of what has happened since the last issue; but not with a comprehensive and representative summary of all the toothaches, the raffle-prizes, the IRS refund, the reports from teacher about our youngest’s being cheeky again. There is a real comfort if the attempt fails: all the facts are summarized comprehensively in the remaining, and far more important, pages of this Annual Report. The financial ones carry the imprimatur, not only of our indispensable Treasurer, but also of our admirably scrupulous auditors.

Construction and Rehabilitation: Capital Campaign Phase I

By the time this report is printed and distributed, all but a few minor components of the Phase I projects, planned and announced as the first steps of our Second Century Fund campaign, will have been funded and completed. The Environmental Sciences Center and the Candle House restoration were completed during 1981: Rehabilitation of Lillie began very early in 1982, that project having been fully subscribed during the prior year. Most of it will be done by June. The final jobs await a quieter time after Labor Day, when certain specialized equipment—such as the replacement for Lillie’s wonderful elevator—will be delivered, and when there is once again the possibility that our contractor may park his large vehicles, trailer-trucks, and cranes behind Lillie without causing an outbreak of violence.

The Environmental Sciences Center has turned out far better than we dared to hope. The architects (Peirce, Pierce & Kramer) have done an imaginative job in an exceedingly difficult assignment: to convert an old, frame-and-shingle dormitory building to attractive office, conference, and teaching space, and then to attach the result, in an aesthetically acceptable way, to a modern, high-technology laboratory annex. All that has been done without compromising harmony of style and scale on the Quadrangle, and without ruining the view toward Great Harbor.

As good-looking as the facility is, it is also practical. All staff of the Ecosystems Center now occupy it, and it serves their purposes efficiently. There remains a significant amount of unfinished laboratory space that will provide for rational expansion and probably for transient use. The Environmental Sciences Center is a great step forward for MBL ecology. As is always the case in new laboratory buildings, minor problems have surfaced with heavy utilization of the facilities, but those are reparable and will soon be corrected.
The Candle House will surely be a model for similar restorations elsewhere. No important feature of its external appearance has been altered, but the interior is entirely new, and entirely satisfactory. Here, too the architects (Earl R. Flansburgh and Associates) combined sensitivity and good taste with technical skill, to bring a splendid old building, long dead so far as habitability was concerned, completely back to life. The administration are now housed there and have been since January, 1982. Unless my eyes and ears deceive me, they are housed in comfort and with decent furnishings consistent with the importance of their jobs. All of the space cleared in Lillie has become new laboratories or the expanded domain of the MBL Library.

Details of the Lillie rehabilitation, which is a project more costly and far more complex than the others of Phase I, are properly left to the Annual Report for 1982, since the bulk of the work will have been done in that year. 1981 was, nevertheless, the year that saw this undertaking, keystone of the entire plan for campus rehabilitation, funded. The Kresge Foundation's challenge grant ($0.5 million) was paid in recognition of our having raised another million (and somewhat more) in direct grants and pledges, including one of $100,000 from the MBL Associates in aid of the Auditorium renovations.

The donors to all these projects are too numerous to mention here. The gratitude owed them is too great to be expressed properly in a circular letter, but it is proper to note that all parts of the private sector were represented: Corporations, large and modest-sized; charitable Foundations; individuals, within and without the immediate MBL family, the gifts from those good people covering the entire range of possibilities, from bequests of real property to large, outright gifts of cash.

The work of Phase I will have cost, in toto, more than was planned in 1979, but by the standard of similar undertakings in other institutions, we have done remarkably well in these three inflation-plagued years. More importantly, the fund raising effort has accomplished more than simply to stay on schedule: it has in fact kept pace, overall, with the actual costs of the work. As will be evident in a later section of this Report, the MBL financial staff deserve special thanks for managing their part of this intricate undertaking.

As to the fund-raising itself, there is not much more to be said: it has kept pace. We could, and should, however, have done even better. The MBL's message is, as I know from experience, quite unique. That makes our case, once the chance to present it comes, differentiable from that of the host of schools, colleges, and social agencies now clamoring for the attention of private philanthropy. The clamor is, moreover, increasing steadily as government withdraws from the programs to which it has been committed for decades past.

Unique as the MBL's message is, therefore, and uniquely valuable for our culture as its services to biology are, there isn't much time to lose in fund raising: as the competition mounts, so will the negative effects of regional loyalties; arguments about "elitism;" the legitimate outcry for replacement of social services; and the likely continuation of economic troubles stemming from high energy costs and foreign industrial competition.

Progress toward the establishment of a competent, permanent in-house development capability was slow in 1981, for reasons beyond the possibility of control. All the work of funding Phase I had therefore to be done under the existing arrangements, with their heavy burdens upon the Director, his long-suffering secretary, and the Laboratory's external consultants. Effective as those arrangements may have been in terms of dollars won, and by comparison with the achievements of other institutions, they have not, in my opinion, been effective enough.
I am delighted to report, however, that in 1982 the MBL appointed a highly qualified Director of Development, with whose person and work many readers of this Report will have become familiar by the time of publication. We trust that there will be adequate time in which, with the aid of the new Development staff, we can achieve the stated goals of the Second Century Fund Campaign, and perhaps go beyond them, before the Laboratory's hundredth birthday.

Operations

1. Financial

Controller Edward Casey left the MBL in the early spring of 1981. The Associate Director, who remained in office for some eight months until, for personal and professional reasons, he found it necessary to resign, undertook as part of his assignment to stand in for the Controller. That effort had but limited success. The Associate Directorship—a position we have decided not to fill again—made too many other demands upon the incumbent's time. The search for a successor to Mr. Casey did not therefore begin seriously for a good many months.

Again, it gives me honest pleasure to report that a critical management problem was solved in due course: in April of 1982, Mr. John W. Speer, former chief financial officer of Rhode Island College, joined the Laboratory as its Controller. The high expectations of his performance we had, upon the basis of credentials and his important prior achievements, are being fulfilled. Objective evidence thereof is already to be seen everywhere in the Laboratory's financial activities.

It is, nevertheless, important to note that the Controller's department, every member of it, had to carry on for nearly a year without the authority and technical leadership of a Head. They responded as MBL staff seem nearly always to have done; quietly, and without complaint. The routine and the extra jobs were done: accounts payable, accounts receivable, payroll, personnel, the technically and psychologically demanding management of grants and contracts. They were done well.

I would like to think that these colleagues have understood the sincerity of my personal thanks, and I hope that somehow those of the entire MBL community will also be conveyed to them. I, for one, judge it no slight achievement for the Laboratory to have ended so complicated and management-deficient a year with its finances, for all practical purposes, in balance.

Among the threats and bad auguries of the past year in the domain of federal support for basic research, a positive event stands out for the MBL and the other U. S. A. marine laboratories. In the early spring of 1981, a group of Directors of those laboratories issued a brief report to the National Science Foundation. This document* resulted from earlier meetings, at first of the entire group, and later of a Steering Committee elected to prepare the draft. Its central concern was the financial plight of marine laboratories, especially those committed solely or largely to the study and research utilization of marine plants and animals.

Among its recommendations was the establishment within the N.S.F. of a special, inter-program funding mechanism, the purpose of which would be to provide "core" support for the maintenance and improvement of capital facilities at these laboratories. To the great credit of the Foundation's officers, they had provided

partial financial support for the study, and among them are several who had anticipated its outcomes.

As it emerged, there was very little criticism of existing practices, but a good deal of argument for the need to rectify, by new practices, a potential threat to a group of indispensable national research facilities. After study of this report at all administrative levels, the Foundation responded by announcing a new program, quite close in design to what had been recommended. Initial-year funding is much less than the amount suggested, but more than we might have hoped for, considering the Foundation’s already perilous budget situation for 1982.

What is important about these events, and about the evidence of good will and understanding within the N.S.F. administration, is not the detail of first-year funding, nor the announced rules (which are in fact reasonable). Rather, the new program formalizes recognition, by the key science agency of government, that marine biological laboratories are a national responsibility; they should, and probably will some day be, supported via more appropriate funding mechanisms. This is no more than has been done for many years in behalf of blue-water oceanography, but it is heartening to know that similar recognition of marine biology laboratories, of their missions and their accomplishments transcending descriptive marine biology, has emerged.

It would be difficult to overstate the potential importance of this for eventual rationalization of overhead cost recovery systems in institutions such as ours, quite independently of the quantitative arguments that rage, and will continue to rage, on the subject of overhead costs. For the MBL, where under-recovery of operating costs from the grants in whose behalf those costs are incurred has been a depressing fact of life, this is all good news.

2. Library

I shall not report here upon the Library’s record of operations for the past year, since our Librarian has space of her own for the purpose elsewhere in this volume, but I cannot resist quoting from one of her recent memoranda: “At the present moment two electricians are working over my head installing new lighting, carpenters are drilling in the hall, and tile men are crawling on the future floor across the hall. So—being unable to do much of anything else I shall sit in the midst of chaos and send you thoughts . . .”

Ms. Fessenden’s written thoughts in this form can be pithy, often sufficiently pithier than the example to preclude their publishability in the learned press; but they always represent accurately the state of mind of the Library staff. In the present instance, that state of mind is influenced by Chaos, but—as I replied to her eventually—What a Lovely Chaos! After a very few months of it, we shall have that expanded and improved Library facility for which the MBL Corporation, and indeed the entire Woods Hole scientific community, have been agitating for decades.

3. Buildings and Grounds

Mr. Robert Gunning, who was eligible for a well-deserved and productive retirement in 1982, has been convinced, against his quite sensible initial decision, to remain on active duty as Head of the Department for another year. It was a generous decision under the circumstances; it means that we shall have the benefit of continuity in management and technical direction of that all-important component of the MBL staff during the rehabilitation of the Lillie Laboratory.
The negotiations alluded to had no negative effect upon the steady routine of the Department. In 1981, 45 laboratories in Lillie were renovated, including removal of the last of Dr. Drew’s marvelously impregnable, obtrusive concrete sinks and tables, and their replacement with equipment made of stainless steel and fiberglass. All the old, cracked cast iron plumbing has been removed and replaced with fiberglass floor drains and polypropylene piping; sea water supply is now that long-sought dual system. First major steps in modernizing Lillie’s heating systems were taken, including installation of thermostatic steam radiator valves and remote, wall-mounted thermostats in all laboratories.

For those many Corporation members and other investigators who are concerned about housing, it is pleasant to report that the B&G staff have refurbished completely the dormitory wing of the Brick Apartment House—an area that comprises three apartments, eighteen bedrooms, and three bathrooms. It will be ready for occupancy in the 1982 summer session.

4. Marine Resources

Having written a great many words of praise on this subject in last year’s Director’s Report, and since then in several other documents, I feel sure that more of them would be redundant here. Suffice it to say that having the new R/V GEMMA at its disposal has made the work of the department much easier than in the past. Not content with that relaxation of their difficulties, John Valois and his staff have responded by extending—without having been asked—its benefits to the entire MBL community, e.g., by adding another day to the squid delivery schedule. Satisfactory as GEMMA has proven, there remains an urgent need for properly operating and well-adapted vessels. While it was an earlier plan to eliminate from the fleet all wooden boats, the petrochemical origin of polyester resins has made the cost of new fiberglass boats prohibitive. Accordingly, the wooden R/V CIONA has had a complete refit, including much work on the hull and deck rig, with the result that this familiar workhorse, which has served the MBL for twenty years, should now have at least another ten in her.

Not mentioned in earlier reports is the work of the SCUBA diving team attached to this Department. It consists of three competent divers, whose equipment and work schedules are handled with far greater care than even the applicable regulations require. In consequence, such MBL regulars among marine animals as Microciona, Spisula, Chaetopterus, Metridium, and Asterias continue to be available for research. If these forms had to be dredged, rather than collected by divers, they would no longer be “available” in the sense of utility.

The new, but already productive collaboration between the Marine Resources Department and the Laboratory for Marine Animal Health deserves special mention, but more appropriately below, under the head of Research Programs.

5. Public Information

This Department was known until recently as “Public Relations,” but the representations of an honored Trustee, more sensitive to language and titular affect (because of his profession, as well as in consequence of his good literary genes) than the rest of us, convinced us to change the name. Barbara Haskell was in charge through 1981 and until March, 1982, at which time she resigned because of the need to move away from the Cape. This will be a loss deeply felt, because under Haskell’s direction and with her painstaking attention to style and content,
all the MBL publications coming from the Department showed a discontinuously upward change in quality.

Those publications include more than the familiar MBL NEWSLETTER and NEXUS. Issued from the Department's office are such ad hoc literary objects (and they have, some of them, been literary) as news releases to the press and biographical sketches of speakers—as for the Friday Evening Lectures.

In 1981 the Department undertook a number of important, new, non-recurring responsibilities, such as collaboration with producers and other powerful persons of the television world, and with the editors and staff writers of commercial and corporate magazines. These collaborations yielded several important television events (e.g., segments of a NOVA program), a splendid article in the Polaroid Corporation's CLOSE-UP, and references to MBL science and scientists in such national publications as NEWSWEEK.

Barbara Haskell's able and energetic assistant, Lee Anne Campbell, has agreed to serve, and is serving competently at the time of writing, as acting Public Information Officer, until such time after establishment of our new Development office as all concerned may consult together on possible changes in organization and size of the Department. It is a hopeful sign for the future that this, and a few other Departments at the MBL, have acquired the depth of skilled manpower to allow such flexibility.

6. The George M. Gray Museum

The principal function of our Gray Museum is (1) to assist MBL and outside investigators and students in the identification of local and regional species of plants and animals, and (2) to supply otherwise poorly accessible information on collection and maintenance of organisms. The museum contains several thousand preserved specimens of local animals, as well as sample forms inhabiting the waters from Maine to Virginia. The herbarium contains about 5,000 sheets, principally of Cape Cod and Islands species. Holdings of the museum have been extensively catalogued and checklisted: the Curators, of whom Dr. Wesley N. Tiffney is the Chief, are available to assist investigators Monday through Friday, for a total of 20 hours per week. Their guidance is easily arranged for, as is opening of the museum at special times, by appointment. This modest, but excellently operated activity serves several hundred users per year, for each of whom those services are very important indeed.

7. Instructional Programs

In 1981 the Laboratory offered seven regular summer courses, each of which was, by the test of critical external opinion (as mine is not: I think that they're the best biology courses in the world), up to the historic high standard of the species. The second offering of our newest course, the Biology of Parasitism, headed by John David, was even more exciting and better-received within the community—if such a thing is possible—than the first. Rudy Raff's direction of the Embryology course was efficient as before, and the course content remained a remarkable example of eclecticism surviving in the midst of scholarship and high technical standards. Ivan Valiela and John Teal co-directed the Marine Ecology course for the fifth year and agreed, upon request of the Director and the Committee on Instruction, to continue for a sixth while the course's problems (entirely in the category of financial support) and strengths (the existing syllabus, the extraordinary opportunities of surrounding landscapes; the absence of such courses in any of the area universities) are assessed carefully, and financial support for the successor is
sought. There will be, I hasten to add, no problem in recruiting a new Instructor-
in-Chief. It is our concern, however, to give him a proper start.

Harlyn Halvorson’s second year as head of the new Microbial Ecology course was eminently successful, and his unusual skills (for a distinguished experimental scientist) in management and fund-seeking have benefited the students and the MBL in a multitude of ways. In the unique Neural Systems and Behavior course, Ronald Hoy was joined this year by Eduardo Macagno to form a co-directorate. For this course, as in all the others, we now have objective, external peer-group evidence to support our internal conviction (always dangerous when left to itself) of excellence.

Joel Rosenbaum succeeded K. VanHolde, for the 1981 Physiology offering, as Instructor-in-Chief. This old and distinguished course, which has one of the longest continuous records of training grant support, has now undergone one of its quinquennial changes of direction: neither abrupt nor in respect of intellectual rigor, but perceptible nevertheless. As might be expected, it now has a new commitment to the study of motility, cytoskeletal organization, and nucleo-cytoplasmic interactions at that level, and it is at the forefront of the field.

I might note here that being at the forefront does not preclude cyclicity: the last time this last emphasis was brought to the course it was done by Daniel Mazia, aeons ago, when the writer sat in on the lectures as an excuse for not starting to work on his thesis at the crack of dawn.

John Hildebrand and Tom Reese directed the Neurobiology Course for their second year, and that had two noteworthy outcomes. First, and by far the more important for the writer, who must pay attention to serious things, was their perfect adherence to budget, without any noticeable attrition of quality. Second was that, in connection with applications for continued funding, they sought some modest testimonials in the course’s behalf from a number of the world’s most eminent neuroscientists. The outcome, which should have been no surprise, since most of those are also alumni or associates of the course, was nevertheless gratifying: With no exception, those asked wrote letters to the course directors asserting—in sum—that the MBL summer Neurobiology course is the only one, and therefore the best, of its kind in the world; that it would be an unthinkable disservice to American neurobiology for its support to be diminished and its survival threatened.

Gerald Peters and Fred Ausubel paid us an extended visit during the summer of 1981 for purposes of planning the organization and funding of our next major offering in the plant sciences, a pilot version of which is to be mounted in 1982, and the definitive offering in 1983, funding and the goodwill of the vegetable gods permitting.

1981 versions of the January semester and the Short Courses were in the main as described in earlier reports. The details are given elsewhere in this volume. Both series have been a boon to the Laboratory and to the participants, as the records attest. There having been some important events and decisions for change in these programs in 1982, I leave the subject for much fuller discussion next year.

The Macy Scholars’ Program and the Steps Toward Independence Program made their accustomed contributions in 1981. The comment applied to the January semester, above, in respect of 1982 changes, applies here as well.

Dr. Morton Maser, who is Assistant Director for Educational and Research Services, has been a dedicated impresario of those performances by which the needs of the instructional program, as disparate as Admissions and advertising, on the one hand, and service laboratories (e.g., EM, hot lab), on the other, are met. Assisting him as Admissions Officer, Jane Leighton has maintained civility and decorum (“kept the lid on,” as one of our patois-prone instructors defined it) in
a busy office with heavy potential for disturbance of the peace. I refer, thereby, to the habit of other administrations with programs to which many want access and few can gain it; and for which funding and student support is a labyrinth, of hiding the Admissions office and officers.

The MBL does not hide its Admissions office. Yet it has been a quiet, efficient, and friendly place. This last leads me to render thanks also to Joan Howard, Grants and Contracts Officer and a member of the Controller's Department, whose threading the labyrinth of training and other grants, specifically in support of our courses, has been as skillful a performance as Jane Leighton's.

Research

1. Summer

The MBL was full again in the summer of 1981, and the summer was again full in the other sense—of lectures, symposia, and demonstrations beyond the traditionally scheduled ones. There were, for example, not only the expected Friday Evening Lectures, but such special events as a lecture by Adrian Horridge, visiting from Australia, on the insect compound eye, and Lynn Margulis's Associates' Lecture entitled "The Earliest Life on Earth," making heavy and audience-enthralling use of the magic lantern. The Rockefeller Foundation and the MBL co-sponsored a week-long special lecture series on Scientific Information Systems and Information Retrieval, with such participants as Kenneth S. Warren, Eugene Garfield, William Goffman, and Frederick Mosteller. These sessions were well-attended, and, fitting to the new partnership of the MBL and the WHOI in library matters, were held alternately at the two institutions.

It would be asking for trouble to identify a specific subset of the summer's many research achievements as particularly noteworthy. I can quell disbelief of that assertion by analogy, in a domain with which all readers are surely familiar: the baroque Concerto Grosso.

Those who organize ensembles to play these wonderful works know that for acceptable results in public performance, the orchestra can tolerate no weak players. All must be at least highly competent; by preference, excellent. These concerti are scored for two groups of players (one small and one larger). One consists, usually, of the first-desk violinists (two), a violist, a cellist, perhaps ombalo. These are known as the concertoINO: they play the interesting melodic lines and sound the central harmonies. The second group provides back-up and is known, collectively, as ripieni (literally "fillers").

Suffice it to say that there is conflict: You cannot have a collection of first-class musicians agree among themselves about who is ripieno and who is concertoNO. Nor does drawing lots help. No sensible fiddler will risk on a coin-toss having to play endlessly repeated bass notes. He would rather fight. Yet you do need equally good musicians; and you do need ripieni.

I divulge, for the curious, the best of several solutions devised over the centuries since Torelli and Corelli, Vivaldi and Boccherini started all the trouble. It works for all but the most polished professional groups, where the need to earn a living transcends pride, and the players do as they are told in order to get paid.

The trick is never to emphasize the identities of lead and fill players. It is, if at all possible, to allow rotation from one part to another (within voices), but to contrive for your most trustworthy players to be in the first chairs on the night of a performance, having seen to it that they practiced the parts well. It is to avoid
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sedulously any congratulatory words about individual parts, but to dwell instead upon the marvels of the orchestra as a whole.

It should now be clear why I prefer to deal with the research accomplishments of summer investigators, in a full-house MBL summer, as though the whole population were a sort of *Virtuosi di Woods'ole*. And that would do little violence to the truth. They are. A glance at a partial record—the published abstracts of the General Scientific Meetings, in the October issue of the *Biological Bulletin*—will bear me out. And note, please, that it is a partial record only. Not all of the summer's results are communicated in that form. The eventual full-length papers that result from a summer's work at the MBL appear in a score of different journals, in several languages, and over the course of the next three or four years.

Any subset of those papers, collected by conscious effort, sustains the conclusion obtained from independent tests of quality, *e.g.*: research grant support in this competitive time; academic positions and honors; the eventual destinations and jobs of students and postdoctoral fellows who do research here with the principal investigators. It is that the summer research population at the MBL, like that of its course faculty, is drawn, not from the middle of a national achievement distribution, but very much from its high side.

I have been accused, once or twice, of "elitism" while presenting data in support of the above. If that is the definition of the word, then so be it. But I should point out that no rules of the MBL except peer-opinion require it to be so, and that the geographic, institutional, disciplinary, and socio-economic origins of the population in question are so extraordinarily broad as to make such a definition fatuous.

2. Year Round Programs

For purposes of reporting, the year round programs are much less of a problem. The year round research group at the MBL being of a size with some pretty large university Departments, it is possible at least to mention enough samples, if not all of the programs, to yield an impression of the spectrum of research interests and accomplishments. That, it turns out, is worth doing, for the spectrum, although not the size and the resulting interaction, is the same, summer and year round.

For as long as I can remember, the MBL has had a few distinguished *emeriti* and senior faculty of other institutions in residence and at work the year round. A splendid current example of the phenomenon is D. Eugene Copeland, Professor *emeritus* of Tulane University and Trustee *emeritus* of the MBL. Gene Copeland first retired and brought his productive research program to Woods Hole in 1977. Since then he has continued, with grant support from NIH and NSF, his important fine-structure studies on the teleost swim bladder and retina.

The work is of physiological significance, for the swim bladder wall can retain gases (such as O₂) against pressures as high as 300 atm, while there are mechanisms in the eye that raise the local oxygen tension twenty times higher than would be produced by the dissociation of oxyhemoglobin. A part of Copeland's program requires work on the fish as soon as they are brought to the surface, and since deep-sea species are the ones of interest, this means work on large oceanographic vessels. Dr. Copeland has the interesting distinction of being the first MBL principal investigator to serve as a chief scientist aboard a WHOI research vessel.

The *NIH Laboratory of Biophysics*, William J. Adelman, Chief, is a large, year round *contract* program, *i.e.*, one in which the research is done, effectively, "on location" with respect to the parent organization, the National Institute of
Neurological and Communicative Diseases and Stroke. By that mechanism, the lead scientists are employees of the Institute, while the remainder of the program—space, facilities, staff (including scientists)—is provided and managed by the contractor, the MBL. The Laboratory of Biophysics, Woods Hole Unit, has two sections, one on neural membranes, Dr. Adelman in charge, and one on neural systems, Dr. Dan Alkon in charge. Both these programs are large enough to preclude even a summary of current activity, but activity there is in good supply.

The section on neural membranes is concerned with the structure and functions of neural cells at the ultrastructure and molecular levels. In it, advanced electronoptical, electrophysiological, computer, and mathematical methods are employed in the analysis of membrane ionic channels, models for their physical and electrical behavior, and the periodic structures of subcellular macromolecular arrays of the neuroplasm. Squid giant axons are the experimental material of most common use, but other marine animal preparations are employed as well.

The section on neural systems investigates the processing of information, especially in reference to learning, in simple neural networks and in the component cells of those networks. The preparation of primary interest in this group is the nudibranch mollusc, *Hermissenda crassicornis*, cultured in the laboratory. A broad range of electrophysiological, biochemical, morphological, developmental, and behavioral experiments is carried out on conditioned animals and their nervous systems.

Among the recent successes of this multilevel approach to a defined, whole-animal neural system has been the identification of complete sensory pathways responding to natural stimuli such as light and gravitational field. Changes in associative learning behavior can now be related specifically to altered properties of individual motor neurons.

This approach to the cellular analysis of learning, which is simultaneously integrative and reductionist, is receiving close attention from cognitive scientists, as well as from neurobiologists, across the country.

Dr. Shinya Inoué, who must here represent a considerably larger group of principal investigators in cell and developmental biology concerned with cell motility and morphogenesis, continues the development of his uniquely sophisticated video microscopy system. With its aid, he and Dr. L. G. Tilney have recently visualized directly, and analyzed the diffusion-limited kinetics of, actin polymerization at the tip of the growing acrosomal process (perforatorium).

Yuchiro Tanaka, one of the first two recipients of a Jean and Katsuma Dan Fellowship, came from Sugashima to work with Inoué for six months in 1981. Dr. Tanaka has discovered a reversible relaxation of the cleavage furrow in *Arbacia* eggs treated with Cytochalasin B or D. By a combination of time-lapse video microscopy and tracking of cortical pigment granules, local changes in structure of the cell cortex can be visualized, measured, and analyzed. These studies promise to contribute importantly to elucidation of the role of actin filaments in cytokinesis.

J. R. Whittaker, one of a group of MBL developmental biologists concerned with localization and chemical identification of cytoplasmic morphogenetic determinants in the early embryo, is also the Director of the Boston University Marine Program at the MBL, whose faculty are engaged in a broad range of other disciplines as well (e.g., behavior, neurophysiology, cell biology, ecology), and in graduate education. Whittaker has recently succeeded in the remarkable feat of transferring cytoplasm from cells of the muscle lineage in ascidian embryos to those of the epidermal lineage, causing thereby the eventual expression of a characteristic muscle enzymatic activity (acetylcholinesterase) in progeny of the epidermal lin-
eage, where the activity would not otherwise appear. This opens the way toward the long-sought test for the chemical identity of a specific morphogenetic determinant in a classically mosaic embryo.

Another large year round program, indeed, the largest now established at the MBL, is the Ecosystems Center, George M. Woodwell, Director. Its committed grant support in 1981 (some of it applicable, of course, to subsequent years) was more than $5 million. The scientific staff of the Center are a quintessentially collaborative group, each investigator lending his expertise to a range of Center projects. The senior staff of the Center includes a number of internationally recognized figures in ecology.

Biogeochemical cycles are among the major interests and their investigation entrains contributions from most of the staff. In this connection, they have recently refined their estimate of the global release of CO$_2$ to the atmosphere attributable to deforestation. It falls in the range of $2-5 \times 10^9$ metric tons annually, which figure is to be compared with an estimated release from combustion of fossil fuels, world-wide, at $5.2 \times 10^9$ metric tons. The implication of such figures, if both are nearly correct, for the origins and control of an ominously rising CO$_2$ load in the earth's gaseous envelope, will be obvious.

Another important contribution comes from the staff members investigating sulfur cycling. They have found that a major fraction of the net primary production of salt marshes flows through the sulfur cycle of water and sediments in the marsh. That the complex transformation of sulfur in salt marshes and in other parts of the coastal zone are energetically linked to photosynthesis is a significant finding for the important analysis of those transformations.

The Laboratory of Sensory Physiology, Edward F. MacNichol, Director, and Alan Fein, Deputy Director, accommodates the research of a group of some twelve resident investigators and up to seven visiting or collaborating scientists. The Laboratory centers its investigations on the physiology and biophysics of vision, particularly on the uniquely favorable experimental preparations available from marine animals. The study of cone pigments by microspectrophotometry of single receptors, a technology in which this laboratory has long been at the forefront, has recently been featured in major articles for the general reader interested in science (Scientific American and The Sciences).

Other work in progress and of great importance in visual physiology deals with the state of Ca, most of which seems not to be the free ion, in the receptors. Identification of the ligand and determination of its chemical structure is the goal of this work. A rapidly responding and reliable electrode for measurement of intracellular Ca in the ventral photoreceptors of Limulus has been developed, and is being employed for measurement of Ca during illumination and light adaptation. Results obtained thus far show that while the amount of intracellular calcium does change during excitation and in the course of adaptation, the Ca concentration is not a direct indicator of receptor sensitivity.

I mention now, to complete this survey of year round research, two examples of programs in marine biomedicine, the only area in which year round activity at the MBL has recently been allowed a significant net increase in size, space, and facilities.

Dr. Carol Reinisch, Associate Professor in the Tufts University School of Veterinary Medicine, is in residence at the MBL as a condition of her academic appointment and responsibilities. The appointment represents a step toward the establishment of closer, and eventually curricular, ties between that institution and the MBL. Carol Reinisch's research interests are in cellular immunology and in
the pathology of marine invertebrate animals (which subject she and Mrs. Frederik Bang profess in the MBL's January Course under that name).

An interesting example of the confluence of her two research interests, and likewise of basic with applied research, is her current work on neoplasia in *Mya arenaria*. Aside from their inherent oncological interest, these studies, which have been in progress since October of 1981, are of practical toxicological and public health value: the animals in which tumor incidence is studied are collected (with cooperation of the Commonwealth of Massachusetts) from tidal flats closed to shellfishing because of pollution.

Hematopoietic tumors in these animals are not rare: the incidence is in the neighborhood of 15%. Dr. Reinisch has generated a series of monoclonal antibodies (in Balb/c By mice) to the neoplastic *Mya* cells. At least nine of these react with surface antigens of the tumor cells, but not with those of normal cells. The work has, therefore, two distinct, implicit future directions: (1) careful, large-scale epidemiological studies of tumor incidence, employing the sensitive new diagnostic tools, in "clean" as well as polluted environments (and using, also, *Mytilus* for a test of the generality of the *Mya* findings); and (2) identification, using electrophoresis, of the antigens being recognized by the monoclonal antibodies, and their subsequent isolation and purification.

The Laboratory for Marine Animal Health, whose director is Prof. Louis Leibovitz, of Cornell University, represents a new program that is year round offspring to the flourishing Aquatic and Veterinary Medicine Program ("Aquavet"), a collaboration among the MBL, Cornell, and the University of Pennsylvania; and an important step toward equipping the entire marine resources effort at the MBL, including the Department of that name, for the next decade.

Such a program of preparedness, for the one Department without which research at the MBL could not proceed for more than a few days, entails a measured response to, and a plan for dealing with, several threats: (1) instability, unpredictability, or even disappearance of populations of wild animals needed for research (*e.g.*, squid!); (2) unidentified, and hence uncontrollable disease within populations of specimens already collected and held; (3) failure of the very old wooden buildings, relics of simpler and easier times, in which the high-intensity and contemporaneous marine resources activities are housed. The list can go on.

The third of those threats has, as its response, our plans for a new Marine Resources Center. Other than to identify and create programs of research that will share such a facility with the Department and its staff, there is little more to do than to find the money. The first two, however, imply a newly urgent need for whole volumes of scientific information that does not yet exist, *e.g.*, (1) the practical ecology of forms needed now and in the future for research, and (2) a diagnostic pathology and clinical medicine of those animals.

The Aquavet program is concerned with establishment and codification—i.e., with the creation of such a discipline. It is a young venture, but it has already proven successful. It is clear that the informed clinical approach, for which veterinarians are trained, can and does allow insight into the diseases of hitherto unstudied species, and that such insights suggest and imply practical methods of control.

Dr. Leibovitz, who is a distinguished pathologist, and whose research activities in that field continue as before, except that he is now in residence at the MBL year round, has also established a strong working relationship with John Valois, head of the Marine Resources Department, and with its staff. Not unexpectedly
for those of us who know Valois, cooperation and interest have been mutual: the Department has collaborated fully with the new Laboratory for Marine Animal Health (LMAH) in mounting those of its programs that require access to Marine Resources facilities and procedures. There are already several such programs, and I can hope to accomplish no more here than to convey, by means of a list, an impression of their scope, their purposes, and their research components:

Morning Rounds, for health inspection of all animals maintained here, with a new system of records that document numbers of animals held, numbers removed, morbidity, and mortality each day.

Direct and immediate examination of sick and dead animals, followed by necropsy in a special area set aside for it, and, for cases of interest, by detailed diagnostic pathology.

Regular water quality testing.

After a year of operation, the LMAH emerges as a practical and valuable activity, certain to have its descendant(s) in a key role in the MBL’s planned Marine Resources Center. Specific priorities for maintaining animal health have already appeared: temperature control, sediment control, prevention or minimization of abrasive injuries. A new program of preventive care is in the making. A large number of specific infections and contagious bacterial, viral, mycotic, and parasitic diseases have been diagnosed in species that are of concern to us.

As the experimental facilities improve, it will be possible to reproduce these diseases and to define the specific pathogenicities. Therewith, by the classical sequence of scientific medicine, will come control measures, and in some cases, cures. Such information is an indispensable adjunct to data on water quality limits, nutritional requirements, and specific environmental needs of each species. It should be very much easier to proceed from such a background to mariculture proper, i.e., to raising animals of defined and appropriate genetic constitution, entirely in the laboratory, than to investigate culture systems by the “Try it and See What Happens” method.

There is no question that this can be done: it is already being done here for a few species, and more broadly applicable biological (e.g., reproductive, developmental) and engineering data are accumulating rapidly. What is needed is to prepare deliberately for a time when we shall need, or want, to do the same for any other species that we must now hunt and capture in the wild.

H. B. Steinbach

Over a long career in teaching undergraduates, graduate students, and post-doctoral fellows, I have come to appreciate the wisdom of G. B. Shaw’s self-analysis: he claimed to have taken the greatest pains in deciding exactly what to say, and then to have said it with utmost leviy. Although I do not claim any sort of kinship with GBS, it is the method I adopted for leading the reader into this rather lengthy and serious Report.

The method fails consistently, however, in one kind of communication: that having to do with the loss of a valued and beloved colleague. Even if the head were cunning enough, the heart does not permit it.

H. Burr Steinbach, former MBL Director, distinguished scientist, and uniquely successful administrator, died at his home in Woods Hole on December 21, 1981. All MBL regulars knew him well, for although he was a man who valued privacy, he was also very knowable. This was, I think, the result of a great and beneficial calm that lay at the core of his personality.
His mind was of a complexity consistent with the pioneering work he did in cellular physiology, and with his sensitivity to other complex people; yet he was a simple man, as easy for a child to talk to as for a committee of Nobel Laureates. He managed and manipulated some of the most troublesome organizations in existence (university Biology Departments are, of course, high on that list), and yet he managed, somehow, to convey to everyone a perfect openness.

For such a man, usually cheerful, able to do whatever he wanted to do, unused to any sort of physical complaint, it must have been especially terrible to discover himself in the grip of an incurable neurological disease, his most valued physical powers, such as that of speech, disappearing day by day. Yet even then his simplicity and decency, his openness, remained.

During the final months, when every few days he would take an increasingly difficult walk around Woods Hole, he stopped regularly at our office in Lillie, and conversed with us by use of a pencil and a writing-pad, hung on him like a necklace. Not a few jokes were exchanged. The other people in the office, not known for their readiness to drop what they are doing in order to visit, did so automatically and happily for Burr.

He died as he had lived: with dignity and humanity. His is a great loss that we must record among the events of 1981.

VII. REPORT OF THE CONTROLLER

At the Executive Committee meeting of May 8, 1982 during which a considerable amount of time focused on financial matters, it was suggested that, as a part of the annual financial report, the Controller highlight the more significant factors that have dominated the financial situation during the past year. In response to that request, I am providing some information that members of the Corporation might find useful in evaluating our financial performance during 1981.

In unrestricted Current Funds, we had a fund balance reduction of $43,871 (exclusive of a $75,087 transfer to unrestricted Plant Funds). While the financial objective is a balanced budget, the small operating loss that was experienced is not considered significant in the larger view of overall financial operations. This is particularly so when one realizes that the value of MBL plant funds increased by over $1.5 million, a direct result of major renovation projects.

Revenues

Overall, unrestricted revenues increased by almost 5 percent, which by contemporary economic standards must be considered at best "level funding." The two areas where reductions were experienced were in unrestricted gifts and investment income. Unrestricted gifts dropped by 20 percent, which might be a matter of serious concern if it were not for the fact that our restricted gifts, mostly from the Candle House and Lillie renovations, increased significantly over 1980. In total, gifts (unrestricted and restricted) amounted to over $1.8 million, which was slightly ahead of 1980.

Investment income was down 2 percent from 1980. This reflects a conscious decision by the MBL to shift a significant portion of its investments from income-producing to capital-growth stocks. While revenue was down 2 percent, the value
of the investment portfolio increased by 5.7 percent, which is encouraging, given the overall performance of the stock market during 1981.

**Expenditures**

Unrestricted expenditures increased by 17 percent, reflecting, for the most part, the continued and persistent problem of inflation. Increases in administration costs included efforts to improve our development and financial management programs. Instruction costs increased by 39 percent over 1980, which indicates new commitments to the educational programs. While “unrestricted” expenses for Library support were down 15 percent, this reduction was more than offset by an increase in “restricted” funding, resulting from more effective use of gifts in support of the Library. In fact, aggregate financial support for the Library increased by 17 percent. Costs of plant operations were up by 16 percent, a direct result of increases in heating and electricity charges.

As we move from 1981 to 1982, the financial report suggests several areas for immediate attention. First, efforts must be made to improve support via unrestricted gifts. Second, we must continue attempts to increase overhead yield. Third, a better and more timely system of budget and financial control management must be implemented. Finally, we must evaluate carefully the ways in which we are spending funds to ensure that expenditures are efficient, effective, and optimally controlled.

**VIII. REPORT OF THE TREASURER**

The Laboratory struggled to hold operating expenses within its income in 1981. As the accompanying financial statements show, the effort was not entirely successful. Gross income increased minimally in comparison with 1980, but expenses rose significantly.

Mindful of inflation’s toll, the Executive Committee has from time to time approved increases in laboratory space rents and various use charges and fees. Comparison of year to year operating income items shows the positive effects of these actions, as well as the caution with which they have been taken.

Investment income again contributed importantly to gross income. In part, this reflects the high interest rates which continued through 1981. Also significant, however, is the fact that the Laboratory’s capital campaign generated funds which were invested profitably while awaiting application to their intended purposes within the campus rehabilitation and program plan (approved in 1979).

Inflation began to abate somewhat, late in 1981. Its effects therefore continued through most of the operating year to pose difficult management problems. Energy costs, for example, again exceeded expectations, causing plant operating expenses to escalate. Educational programs cost a good deal more to mount in 1981 than previously. Administrative expenses also increased. The expenses of fund raising, for example, were higher in 1981 as the capital campaign gathered momentum. Various steps to provide needed depth to the MBL’s management capability also added to the year’s administrative costs.

Stepped-up efforts to deal with the problem of delayed receipts were made in 1981. In most cases, the MBL’s billed charges are paid by other institutions or by government agencies. User delays in approving and forwarding the Laboratory’s
invoices, coupled with the normal institutional delays in payment processing, create lags of many months to years in the receipt of payments. Fortunately, the Laboratory has not yet had to borrow in order to carry its receivables. Long payment delays nevertheless result in lost income, e.g., interest, on monies owed to the MBL. Payment delays are especially unfair when the MBL finds itself, in effect, financing research expenses for which funds are available and reposing in other hands. For this reason, the Executive Committee has endorsed the policy of requiring advance payment for certain charges, beginning and enforceable in 1982.

The management and Executive Committee have given considerable attention to those trends and events which have the potential of altering significantly the Laboratory's future ability to fulfill its missions. Examples of such critical concerns are the effects of current and likely future cutbacks of government sponsorship for research and teaching; the greatly increased competition for private funds; and the growing sophistication of biological research technology, which requires ever-greater investment in facilities and equipment. Each such issue contains a major financial dimension.

Faced with the need to understand the detailed implications of such trends and events, the MBL is fortunate to have attracted to the position of Controller a person strongly qualified to direct the Laboratory's financial administration. Mr. John W. Speer, whose most recent service was as Controller and Chief Financial Officer of Rhode Island College, joined the management team of the MBL in April, 1982.
To the Trustees of  
Marine Biological Laboratory  
Woods Hole, Massachusetts

We have examined the balance sheets of Marine Biological Laboratory as of December 31, 1981 and 1980, and the related statements of current funds revenues and expenditures and changes in fund balances for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included confirmation from the custodians of securities owned at December 31, 1981 and 1980, and such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

Prior to January 1, 1981, the Laboratory capitalized the original cost of land, buildings and related initial furnishings and equipment; while the cost of subsequent additions and remodeling was expensed when incurred. Generally accepted accounting principles require that such additional additions and remodelings are capitalized and depreciated over their estimated useful lives.

In our opinion, except for the effect on the 1980 financial statements of the matter discussed in the preceding paragraph, the financial statements referred to above present fairly the financial position of Marine Biological Laboratory at December 31, 1981 and 1980, and its current funds revenues and expenditures and the changes in fund balances for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis, except for the change, with which we concur, in the method of accounting for capitalization of fixed assets as described in Note C.

Boston, Massachusetts  
May 10, 1982
### MARINE BIOLOGICAL LABORATORY

#### BALANCE SHEETS

**December 31, 1981 and 1980**

<table>
<thead>
<tr>
<th>Assets</th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current funds:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestricted:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and savings deposits</td>
<td>$ 212,262</td>
<td>$ 363,907</td>
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<tr>
<td>Money market securities</td>
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<td>1,250,000</td>
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<td>Accounts receivable, net of allowance for uncollectible accounts</td>
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<td>728,611</td>
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<tr>
<td>Other assets</td>
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<td>5,004</td>
</tr>
<tr>
<td>Due from (to) restricted current funds</td>
<td>(597,747)</td>
<td>105,104</td>
</tr>
<tr>
<td>Due to invested funds</td>
<td>(90,133)</td>
<td>(26,669)</td>
</tr>
<tr>
<td>Due to restricted plant fund</td>
<td>(720,535)</td>
<td>(1,052,224)</td>
</tr>
<tr>
<td><strong>Total unrestricted</strong></td>
<td>1,297,036</td>
<td>1,373,733</td>
</tr>
<tr>
<td>Restricted:</td>
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<td></td>
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<tr>
<td>Accounts receivable</td>
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<td>733,431</td>
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<td>2,085,227</td>
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<tr>
<td>Due from (to) unrestricted current fund</td>
<td>597,747</td>
<td>(105,104)</td>
</tr>
<tr>
<td>Due from invested funds</td>
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<td>350,967</td>
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<tr>
<td><strong>Total restricted</strong></td>
<td>3,475,073</td>
<td>3,064,521</td>
</tr>
<tr>
<td><strong>Total current funds</strong></td>
<td><strong>$ 4,772,109</strong></td>
<td><strong>$ 4,438,254</strong></td>
</tr>
<tr>
<td><strong>Invested funds:</strong></td>
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<td></td>
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<tr>
<td>Investments, at cost (Notes B and F)</td>
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<td>4,219,999</td>
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<tr>
<td>Due from unrestricted current fund</td>
<td>90,133</td>
<td>26,669</td>
</tr>
<tr>
<td>Due to restricted current funds</td>
<td>(350,967)</td>
<td>(350,967)</td>
</tr>
<tr>
<td><strong>Total invested funds</strong></td>
<td><strong>$ 4,228,051</strong></td>
<td><strong>$ 3,895,701</strong></td>
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<tr>
<td><strong>Plant funds:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestricted:</td>
<td></td>
<td></td>
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<tr>
<td>Land, buildings and equipment (Note C)</td>
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<tr>
<td>Less accumulated depreciation</td>
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<td>4,535,825</td>
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<tr>
<td><strong>Total unrestricted</strong></td>
<td>10,063,759</td>
<td>8,404,559</td>
</tr>
<tr>
<td>Restricted:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due from unrestricted current fund</td>
<td>720,535</td>
<td>1,052,224</td>
</tr>
<tr>
<td><strong>Total restricted</strong></td>
<td>720,535</td>
<td>1,052,224</td>
</tr>
<tr>
<td><strong>Total plant funds</strong></td>
<td><strong>$10,784,294</strong></td>
<td><strong>$ 9,456,783</strong></td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of the financial statements.
## REPORT OF THE TREASURER

**MARINE BIOLOGICAL LABORATORY**

### Balance Sheets

**December 31, 1981 and 1980**

<table>
<thead>
<tr>
<th>Liabilities and Fund Balances</th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current funds:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestricted:</td>
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<tr>
<td>Accounts payable and</td>
<td>$530,917</td>
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<tr>
<td>accrued expenses</td>
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<td>Deferred income</td>
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<td>Total unrestricted</td>
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<tr>
<td>Restricted funds:</td>
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<tr>
<td>Unexpended gifts and grants</td>
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<td>Unexpended income of</td>
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<td>endowment funds</td>
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<tr>
<td>Total restricted</td>
<td>3,475,073</td>
<td>3,064,521</td>
</tr>
<tr>
<td>Total current funds</td>
<td>$4,772,109</td>
<td>$4,438,254</td>
</tr>
<tr>
<td><strong>Invested funds:</strong></td>
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<tr>
<td>Endowment funds</td>
<td>2,218,669</td>
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<td>Quasi-endowment funds</td>
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<td>Retirement fund (Note D)</td>
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<td>Total invested funds</td>
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<td>$3,955,701</td>
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<tr>
<td><strong>Plant funds:</strong></td>
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<tr>
<td>Unrestricted</td>
<td>10,063,759</td>
<td>8,404,559</td>
</tr>
<tr>
<td>Restricted</td>
<td>720,535</td>
<td>1,052,224</td>
</tr>
<tr>
<td>Total plant funds</td>
<td>$10,784,294</td>
<td>$9,456,783</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of the financial statements.
## marine biological laboratory

### STATEMENTS OF CURRENT FUNDS REVENUES AND EXPENDITURES

for the years ended December 31, 1981 and 1980

<table>
<thead>
<tr>
<th></th>
<th>Unrestricted</th>
<th></th>
<th>Restricted</th>
<th></th>
<th>Total</th>
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<tr>
<td><strong>Revenues:</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Instruction:</td>
<td></td>
<td></td>
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<tr>
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<tr>
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<td>113,958</td>
<td>192,224</td>
<td>142,082</td>
<td>214,224</td>
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<td>Research:</td>
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<td>Laboratory rentals</td>
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<td>723,986</td>
<td></td>
<td></td>
<td>754,370</td>
<td>723,986</td>
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<tr>
<td>Grants and contracts:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
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<td>2,001,188</td>
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<td>134,709</td>
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<td>381,954</td>
<td>368,600</td>
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<td>Library</td>
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<td>133,728</td>
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<tr>
<td>Biological Bulletin</td>
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<td>98,877</td>
<td></td>
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<td>102,817</td>
<td>98,877</td>
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<td>Support departments:</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Research services</td>
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<td>259,834</td>
<td></td>
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<td>307,749</td>
<td>259,834</td>
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<tr>
<td>Marine resources</td>
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<td>80,332</td>
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<td>99,629</td>
<td>80,332</td>
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<td>142,828</td>
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<td></td>
<td>118,865</td>
<td>142,828</td>
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<tr>
<td><strong>Total revenues</strong></td>
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<td><strong>3,393,280</strong></td>
<td><strong>3,041,272</strong></td>
<td><strong>2,633,802</strong></td>
<td><strong>6,592,790</strong></td>
<td><strong>6,027,082</strong></td>
</tr>
</tbody>
</table>
### Expenditures:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction</td>
<td>366,177</td>
<td>264,238</td>
<td>200,564</td>
<td>326,216</td>
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<tr>
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<td>1,945,869</td>
<td>2,424,055</td>
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<td>Scholarships and stipends</td>
<td>—</td>
<td>—</td>
<td>265,565</td>
<td>295,937</td>
<td>265,565</td>
<td>295,937</td>
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<tr>
<td>Dormitory</td>
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<td>165,688</td>
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<td>184,034</td>
<td>165,688</td>
</tr>
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<td>Dining Hall</td>
<td>192,282</td>
<td>178,810</td>
<td></td>
<td></td>
<td>192,282</td>
<td>178,810</td>
</tr>
<tr>
<td>Library</td>
<td>231,530</td>
<td>272,261</td>
<td>146,029</td>
<td>49,784</td>
<td>377,559</td>
<td>322,045</td>
</tr>
<tr>
<td>Biological Bulletin</td>
<td>105,535</td>
<td>114,628</td>
<td></td>
<td></td>
<td>105,535</td>
<td>114,628</td>
</tr>
</tbody>
</table>

**Support departments:**

<table>
<thead>
<tr>
<th></th>
<th>Unrestricted</th>
<th>Restricted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research services</td>
<td>483,946</td>
<td>392,422</td>
<td>483,946</td>
</tr>
<tr>
<td>Marine resources</td>
<td>269,680</td>
<td>221,250</td>
<td>269,680</td>
</tr>
<tr>
<td>Administration</td>
<td>872,917</td>
<td>697,270</td>
<td>878,900</td>
</tr>
<tr>
<td>Plant operation</td>
<td>885,800</td>
<td>761,515</td>
<td>888,364</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total expenditures</td>
<td>3,595,389</td>
<td>3,069,808</td>
<td>6,636,661</td>
</tr>
<tr>
<td>Excess (deficit) of revenues over expenditures</td>
<td>$ (43,871)</td>
<td>$ 323,472</td>
<td>$ (43,871)</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of the financial statements.
### MARINE BIOLOGICAL LABORATORY

**STATEMENTS OF CHANGES IN FUND BALANCES**

for the years ended December 31, 1981 and 1980

<table>
<thead>
<tr>
<th></th>
<th>Current Funds</th>
<th>Invested Funds</th>
<th>Plant Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unrestricted</td>
<td>Restricted</td>
<td>Endowment</td>
</tr>
<tr>
<td>Balances at December 31, 1979</td>
<td>$ 720,614</td>
<td>$ 2,692,819</td>
<td>$ 1,918,170</td>
</tr>
<tr>
<td><strong>Increases:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestricted current fund revenues</td>
<td>2,796,513</td>
<td>2,945,800</td>
<td>1,197,810</td>
</tr>
<tr>
<td>Grants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifts</td>
<td>304,045</td>
<td>257,816</td>
<td></td>
</tr>
<tr>
<td>Investment income</td>
<td>292,722</td>
<td>309,535</td>
<td></td>
</tr>
<tr>
<td>Realized net gains (losses) on sale of investments</td>
<td></td>
<td></td>
<td>159,330</td>
</tr>
<tr>
<td>Addition to retirement fund</td>
<td></td>
<td></td>
<td>(671)</td>
</tr>
<tr>
<td>Tuition</td>
<td>31,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Decreases:</strong></td>
<td></td>
<td></td>
<td>(3,069,808)</td>
</tr>
<tr>
<td>Instruction, research and general expenditures</td>
<td></td>
<td></td>
<td>(24,329)</td>
</tr>
<tr>
<td>Indirect costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payments to pensioners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net change in fund balance before transfers</td>
<td>323,472</td>
<td>371,702</td>
<td>159,330</td>
</tr>
<tr>
<td><strong>Transfers—additions (deductions):</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additions to plant funds</td>
<td>(236,147)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balances at December 31, 1980</td>
<td>807,939</td>
<td>3,064,521</td>
<td>2,077,500</td>
</tr>
</tbody>
</table>
### Increases:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted current fund revenues</td>
<td>3,022,414</td>
</tr>
<tr>
<td>Grants</td>
<td>3,709,400</td>
</tr>
<tr>
<td>Gifts</td>
<td>242,023</td>
</tr>
<tr>
<td>Investment income</td>
<td>180,830</td>
</tr>
<tr>
<td>Realized net gains on sale of investments</td>
<td>24,766</td>
</tr>
<tr>
<td>Realized net gains on disposal of fixed assets</td>
<td>43,685</td>
</tr>
<tr>
<td>Addition to retirement fund</td>
<td>116,403</td>
</tr>
<tr>
<td>Tuition</td>
<td>46,745</td>
</tr>
<tr>
<td></td>
<td>33,096</td>
</tr>
<tr>
<td></td>
<td>467,704</td>
</tr>
</tbody>
</table>

### Decreases:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction, research and general expenditures</td>
<td>3,595,389</td>
</tr>
<tr>
<td>Indirect costs</td>
<td>3,041,272</td>
</tr>
<tr>
<td>Payment to pensioners</td>
<td>667,869</td>
</tr>
<tr>
<td>Depreciation</td>
<td>(25,669)</td>
</tr>
<tr>
<td>Net change in fund balance before transfers</td>
<td>(310,526)</td>
</tr>
<tr>
<td></td>
<td>(310,526)</td>
</tr>
</tbody>
</table>

### Transfers—additions (deductions):

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additions to plant funds</td>
<td>75,087</td>
</tr>
<tr>
<td>Balances at December 31, 1981</td>
<td>$ 688,981</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of the financial statements.
A. Purpose of the Laboratory:

The purpose of Marine Biological Laboratory (the “Laboratory”) is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.

B. Significant Accounting Policies:

Basis of Presentation—Fund Accounting

In order to ensure observance of limitations and restrictions placed on the use of resources available to the Laboratory, the accounts of the Laboratory are maintained in accordance with the principles of “fund accounting.” This is the procedure by which resources are classified into separate funds in accordance with activities or objectives specified. In the accompanying financial statements, funds that have similar characteristics have been combined.

Externally restricted funds may only be utilized in accordance with the purposes established by the source of such funds. However, the Laboratory retains full control over the utilization of unrestricted funds. Restricted gifts, grants, and other restricted resources are accounted for in the appropriate restricted funds. Restricted current funds are reported as revenue when expended for current operating or other purposes. Unrestricted revenue is reported as revenue in the unrestricted current fund when earned.

Endowment funds are subject to restrictions requiring that the principal be invested with income available for use by the Laboratory. Quasi-endowment funds have been established by the Laboratory for the same purposes as endowment funds; however, any portion of these funds may be expended.

The financial statements for 1981 and 1980 reflect certain changes in format and presentation of the various funds. These changes have been made by the Laboratory to distinguish and identify the specific nature of certain restricted funds. Other reclassifications of amounts previously reported have been made to enhance the comparability of the financial statements.

Investments

Investments purchased by the Laboratory are carried at cost. Investments donated to the Laboratory are carried at fair market value at date received. For determination of gain or loss upon disposal of investments, cost is determined based on the average cost method.

Investment Income and Distribution

The Laboratory follows the accrual basis of accounting except that investment income is recorded on a cash basis. The difference between such basis and the accrual basis does not have a material effect on the determination of investment income earned on a year-to-year basis.

Investment income includes income from the investments of specific funds and from the pooled investment account. Income from the pooled investment account is distributed to the participating funds on the basis of the market value at the beginning of the quarter, adjusted for the cost of any additions or disposals during the quarter.
C. Land, Buildings and Equipment:

Following is a summary of the unrestricted plant fund assets:

<table>
<thead>
<tr>
<th>Classification</th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>$ 719,798</td>
<td>$ 639,693</td>
</tr>
<tr>
<td>Buildings</td>
<td>12,535,197</td>
<td>10,694,543</td>
</tr>
<tr>
<td>Equipment</td>
<td>1,652,189</td>
<td>1,606,148</td>
</tr>
<tr>
<td></td>
<td>14,907,184</td>
<td>12,940,384</td>
</tr>
<tr>
<td>Less accumulated depreciation</td>
<td>4,843,425</td>
<td>4,535,825</td>
</tr>
<tr>
<td></td>
<td>$10,063,759</td>
<td>$ 8,404,559</td>
</tr>
</tbody>
</table>

The original cost of land, buildings and related initial furnishings is capitalized when assets are acquired. Prior to January 1, 1981 the cost of subsequent additions and remodeling was expensed when incurred which amounted to approximately $135,000 in 1980. Effective January 1, 1981 the Laboratory adopted the accounting policy of capitalizing such additions and remodeling in accordance with generally accepted accounting principles. For the year ended December 31, 1981 this change in accounting principle increased land, buildings and equipment by $794,000 and depreciation expense by $2,000. The financial statements have not been restated for the cumulative effect of this change since the amounts are not determinable.

Depreciation is computed using the straight-line method over estimated useful lives.

D. Retirement Fund:

The Laboratory has a noncontributory pension plan for substantially all full-time employees which complies with the requirements of the Employee Retirement Income Security Act of 1974. The actuarially determined pension expenses charged to operations in 1981 and 1980 were $137,009 and $117,557, respectively. The Laboratory's policy is to fund pension costs accrued, as determined under the aggregate level cost method. As of the latest valuation date, based on benefit information obtained January 1, 1982, the actuarial present values of vested and nonvested benefits, assuming an investment rate of return of 6%, were approximately $955,479 and $39,561, respectively. At January 1, 1982 net assets of the plan available for benefits, were approximately $1,055,861.

E. Pledges and Grants:

As of December 31, 1981 and 1980, the following amounts remain to be received on gifts and grants for specific research and instruction programs, and are expected to be received as follows:

<table>
<thead>
<tr>
<th></th>
<th>December 31, 1981</th>
<th>December 31, 1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unrestricted</td>
<td>Restricted</td>
</tr>
<tr>
<td>1981</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>$20,000</td>
<td>$96,800</td>
</tr>
<tr>
<td>1983</td>
<td></td>
<td>95,000</td>
</tr>
<tr>
<td>1984</td>
<td></td>
<td>40,000</td>
</tr>
<tr>
<td></td>
<td>$20,000</td>
<td>$231,800</td>
</tr>
</tbody>
</table>

In February 1979, the Laboratory initiated the MBL Second Century Fund, a phased effort, to secure $23 million in support of capital rehabilitation, new construction, and endowment. As of December 31, 1981, the Laboratory has received pledges related to this effort of approximately $4,000,000 of which a substantial portion has been collected.
F. Investments:

The following is a summary of the cost and market value of investment assets at December 31, 1981 and 1980, and the related investment income and disposition of investment income for the years ended December 31, 1981 and 1980.

<table>
<thead>
<tr>
<th>Invested funds:</th>
<th>Cost</th>
<th></th>
<th>Market</th>
<th></th>
<th>Investment Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Government securities</td>
<td>$918,742</td>
<td></td>
<td>$831,790</td>
<td></td>
<td>$102,201</td>
<td></td>
</tr>
<tr>
<td>Corporate fixed income obligations</td>
<td>217,920</td>
<td></td>
<td>167,930</td>
<td></td>
<td>28,024</td>
<td></td>
</tr>
<tr>
<td>Common stocks</td>
<td>3,116,473</td>
<td></td>
<td>3,504,027</td>
<td></td>
<td>154,454</td>
<td></td>
</tr>
<tr>
<td>Preferred stocks</td>
<td></td>
<td></td>
<td>3,137,223</td>
<td></td>
<td>133,246</td>
<td></td>
</tr>
<tr>
<td>Money market securities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,033</td>
<td></td>
</tr>
<tr>
<td>Real estate (market at cost)</td>
<td>218,201</td>
<td></td>
<td>218,201</td>
<td></td>
<td>20,715</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17,549</td>
<td></td>
<td>17,549</td>
<td></td>
<td>5,410</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$4,488,885</td>
<td></td>
<td>$4,739,497</td>
<td></td>
<td>$305,394</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$4,219,999</td>
<td></td>
<td>$4,712,945</td>
<td></td>
<td>$320,237</td>
<td></td>
</tr>
</tbody>
</table>

Less custodian fees

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th></th>
<th>1980</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27,758</td>
<td></td>
<td>25,105</td>
<td></td>
</tr>
<tr>
<td></td>
<td>277,636</td>
<td></td>
<td>295,132</td>
<td></td>
</tr>
</tbody>
</table>
## REPORT OF THE TREASURER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Government securities</td>
<td>955,903</td>
<td>1,113,603</td>
<td>914,202</td>
<td>1,044,597</td>
<td>129,163</td>
<td>134,378</td>
</tr>
<tr>
<td>Corporate fixed income obligations</td>
<td>149,985</td>
<td>330,750</td>
<td>110,325</td>
<td>318,863</td>
<td>20,184</td>
<td>45,806</td>
</tr>
<tr>
<td>Common stocks</td>
<td>900,047</td>
<td>634,074</td>
<td>961,133</td>
<td>753,281</td>
<td>33,417</td>
<td>17,806</td>
</tr>
<tr>
<td>Money market securities</td>
<td>173,596</td>
<td>6,800</td>
<td>173,596</td>
<td>6,800</td>
<td>14,450</td>
<td>1,443</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,179,531</strong></td>
<td><strong>$2,085,227</strong></td>
<td><strong>$2,159,256</strong></td>
<td><strong>$2,123,541</strong></td>
<td><strong>197,214</strong></td>
<td><strong>199,433</strong></td>
</tr>
</tbody>
</table>

Less custodian fees | 9,126 | 5,992 |
| **Total** | **188,088** | **193,441** |

### Current unrestricted funds:

- Earned on corporate savings accounts and money market funds |
  - Investment income | 171,980 | 158,588 |
  - **Total** | **$637,704** | **$647,161** |

### Disposition of investment income:

- Restricted for current use:
  - Utilized in current operations | 283,574 | 289,672 |
  - Available for future operations | 20,304 | 19,863 |
  - **Total restricted current funds** | **303,878** | **309,535** |
- Retirement fund | 46,745 | 44,904 |
- Unrestricted—utilized in current operations | 287,081 | 292,722 |
| **Total** | **$637,704** | **$647,161** |
IX. REPORT OF THE LIBRARIAN

It was a year of planning and designing for the expansion of library space. The present collection is literally bursting off the shelves onto the side counters and tables, so the additional 5,000 square feet of space will be invaluable over the next ten years.

Discussions began in January with architects, a library consultant, users, and staff. The final plan will include the following:

1. A tower will be constructed at the back of the Lillie Building to house a center staircase and elevator and provide access to all five stacks and three main floors.
2. Wet labs on the third floor which are presently over library space will be eliminated. This area will become the future space for the entire “book” collection.
3. The first floor administration area will house the archives and rare book collection, future microform machines and materials, and a conference room for Lillie scientists and library users.

Demolition and construction will begin in January, 1982, to be completed by the first of May in order to be ready for the summer users.

In 1981 we added 66 new journal titles to the collection, purchased 2,031 books, and filled over 4000 inter-library loan requests. We also added a 5600 Xerox machine to the copy service center, a Wang word processor, and an electronic typewriter for cataloging. Over 600 computer bibliographic searches were completed by three staff members who attended nine computer-update training sessions during the year.

X. EDUCATIONAL PROGRAMS

SUMMER

BIOLOGY OF PARASITISM

Instructor-in-chief

DAVID, JOHN, Harvard Medical School

Other faculty, staff, and lecturers

ASKENASE, PHILIP, Yale University School of Medicine
BANG, FREDERIK, Johns Hopkins University
CARTER, RICHARD, National Institutes of Health
CAULFIELD, JOHN, Harvard Medical School
CROSS, GEORGE, Wellcome Research Laboratories, United Kingdom
DAVID, PETER, Harvard Medical School
DAVID, ROBERTA, Harvard Medical School
DESSEIN, ALAIN, Harvard Medical School
FEARON, DOUGLAS, Harvard Medical School
GERSON, RICHARD, Yale University School of Medicine
GITLER, CARLOS, The Weizmann Institute of Science, Israel
HARN, DONALD, Harvard Medical School
HOMMEL, MARCEL, Harvard Medical School
KAFATOS, FONS, Harvard University
KARNOVSKY, MANFRED, Harvard Medical School
KEUSCH, GERALD, Tufts University
EDUCATIONAL PROGRAMS

MARSDEN, PHILIP, Universidade de Brasilia, Brazil
MAY, ROBERT, Princeton University
MILLER, LOUIS, National Institutes of Health
MOSER, GINA, Harvard Medical School
NELSON, GEORGE, Liverpool School of Tropical Medicine, United Kingdom
NUSSENZWEIG, RUTH, New York University Medical Center
PEREIRA, MIERCIO, New England Medical Center
PFEFFERKORN, ELMER, Dartmouth Medical School
PIESSENS, WILLY, Harvard Medical School
PRATT, DIANE, Harvard Medical School
RIFKIN, MARY, Rockefeller University
ROBERTS, BRYAN, Harvard Medical School
SHER, ALAN, National Institutes of Health
SHERMAN, IRWIN, University of California at Riverside
SIMPSON, LARRY, University of California at Los Angeles
SPIELMAN, ANDREW, Harvard School of Public Health
VINCENT, ALBERT, University of Southern Florida Medical Center
WARREN, KENNETH, The Rockefeller Foundation
WIRTH, DYANN, Harvard University

Students

*AVILA, EVA, Centro de Investigacion y Estudios Avanzados, Mexico
*DUERR, ANN, Massachusetts Institute of Technology
*LIVERTI, PIETRO, Cell Biology Laboratory, Italy
*LICHTENSTEIN, LAWRENCE, Johns Hopkins University
*MENDES, KAMINI, University of Sri Lanka, Sri Lanka
*OCKENHOUSE, CHRISTIAN, New York University Medical Center
*PERLER, FRANCINE, New England Biolabs, Inc.
*PHILIPP, MARIO, National Institute for Medical Research, United Kingdom
*SAFRANEK, LOUIS, Harvard University
*SANTOS, ISABEL, Universidade Federal do Rio de Janeiro, Brazil
*SHAPIRO, STUART, International Laboratory for Research on Animal Disease, Kenya
*SIDNER, RICHARD, University of Cincinnati
*SO, MAGGIE, Cold Spring Harbor Labs
*UNBEKANT, LINDSEY, Harvard University
*WAHLGREN, CARL, University of Stockholm, Sweden
*WINCHELL, ELLEN, Johns Hopkins University

EMBRYOLOGY

Instructor-in-chief

RAFF, RUDOLF, Indiana University

Other faculty, staff, and lecturers

BRANDHORST, BRUCE, McGill University, Canada
BRUSKIN, ARTHUR, Indiana University
COLOT, HILDUR, Brandeis University
DANILCHIK, MICHAEL, University of Washington
EDGAR, ROBERT, University of California at Santa Cruz
GUERRIER, PIERRE, Station Biologique, France
HYMAN, LINDA, Brandeis University
JEFFERY, WILLIAM, University of Texas

1 All summer students listed completed the formal course programs. Asterisk indicates those completing post-course research sessions.
KLEIN, WILLIAM, Indiana University
KUSCH, MEREDITH, University of California at Santa Cruz
MOON, RANDALL, University of Washington
MOREAU, MARC, Station Biologique, France
NETO, RODRIGO, Instituto de Biofisica, Brazil
RAFF, BETH, Indiana University
RANKIN, MARY ANN, University of Texas
ROSBASH, MICHAEL, Brandeis University
RUDERMAN, JOAN, Harvard Medical School
SHOWMAN, RICHARD, Indiana University
SOWERS, LOUIS, Indiana University
TYNER, ANGELICA, Indiana University
VACQUIER, VIC, Scripps Institution of Oceanography

Students

*ADELSON, DAVID, University of Hawaii
*BALTUCH, GORDON, Harvard College
*BARNETT, FAITH, Harvard University
*BROWN, ELIZABETH, University of Washington
*FERGUSON, JAMES, Iowa State University
*GORALSKI, THOMAS, Indiana University
*GRODEN, JOANNA, Cornell Graduate School of Medical Sciences
*HENDERSON, JUDITH, State University of New York at Buffalo
*HOEFEN, PAULA, Pennsylvania State University
*KEENAN, KATHERINE, Yeshiva College
*KROTOSKI, DANUTA, Tulane University
*LIN, PETER, Johns Hopkins University
*MCKINLEY, DANA, University of Miami
*MURTIF, VICKI, Yale University
*NICOSIA, ROBERTO, Medical College of Pennsylvania
*O'BROCHTA, DAVID, University of California at Irvine
*OLIVEIRA, ANA, Universidade Federal Do Rio De Janeiro, Brazil
*SHERMAN, BETH, State University of New York at Stony Brook
*SKUSE, GARY, Syracuse University
*SPAIN, LISA, Indiana University
*TUFARO, FRANK, McGill University, Canada
*WELLS, DAN, Indiana University

MARINE ECOLOGY

Instructors-in-chief

TEAL, JOHN, Woods Hole Oceanographic Institution
VALIELA, IVAN, Boston University

Other faculty, staff, and lecturers

ANDERSON, DON, Woods Hole Oceanographic Institution
CARACO, NINA, Boston University
CONNELL, JOSEPH, University of California at Santa Barbara
DACEY, JOHN, Woods Hole Oceanographic Institution
GIBLIN, ANNE, Boston University
GRASSLE, FREDERICK, Woods Hole Oceanographic Institution
HARGRAVE, BARRY, Bedford Institute of Oceanography, Canada
HOBBIE, JOHN, Marine Biological Laboratory
HORGAN, ERICH, Marine Biological Laboratory
EDUCATIONAL PROGRAMS

HUMES, ARTHUR, Boston University
JACKSON, J., Johns Hopkins University
JANNASCH, HOLGER, Woods Hole Oceanographic Institution
KOELH, MIMI, University of California at Berkeley
KORNBERG, HANS, Cambridge University, United Kingdom
LEVINTON, JEFF, State University of New York at Stony Brook
MADIN, LARRY, Woods Hole Oceanographic Institution
MANN, ROGER, Woods Hole Oceanographic Institution
NIXON, SCOTT, University of Rhode Island
ODUM, WILLIAM, University of Virginia
PETERTSON, BRUCE, Marine Biological Laboratory
PETERTSON, SUSAN, Woods Hole Oceanographic Institution
RIETSMAN, CAROL, State University of New York at New Paltz
SEBENS, KENNETH, Harvard University
WATKINS, WILLIAM, Woods Hole Oceanographic Institution
WILTSE, WENDY, Williams College/Mystic Seaport
WITLACH, ROBERT, University of Connecticut

Students

BAUER, JAMES, Boston University
CHOW, GEORGE, State University of New York at Buffalo
*DAVIS, JONATHAN, Yale University
*HALS, GARY, Capital University
*HUNTER, JUDY, Auburn University
*KEEN, SUSAN, University of Michigan
*LERER, DEBRA, University of Massachusetts
*LIGHT, JEFFREY, University of Colorado
*MARKS, BARBARA, Johns Hopkins University
*MERCURO, KIMBERLEY, Ohio Wesleyan University
RADCLIFFE, GEORGE, Cathedral High School
*SHERRELL, ROBERT, Columbia University
STEPHAN, DIANNE, State University of New York at Syracuse
STOECKEL, MARK, Lafayette College
WAGNER, JEFFREY, State University of New York at Buffalo
*WAGNER, WENDY, Hanover College
*WALCH, MARIANNE, Harvard University
*WRIGHT, ANSON, Harvard University
WYNES, DAVID, Nichols College

MICROBIAL ECOLOGY

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COHEN, YEHUDA, Hebrew University, Israel
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GRASSLE, FREDERICK, Woods Hole Oceanographic Institution
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HOWE, BRIAN, Marine Biological Laboratory
IMHOFF, JOHANNES, Institut Fur Mikrobiologie, Germany
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VINCENT, WALTER, University of Delaware

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*BRILL, HOWARD, Cornell University
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*CAVANAUGH, COLLEEN, Harvard University
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*HALL, VALERIE, Nantucket High School
*HAMELETT, NANCY, Towson State University
*HEUER, ANN, California State University
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*JURICK, RICHARD, University of Hawaii
*KEMP, CHRISTOPHER, National Institutes of Health
*KUDLACZ, JUDY, University of Nebraska at Lincoln
*MILLER, MOLLY, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution
*POONAM, GULATI, Cornell University
*ROBERTS, SUSAN, University of California at San Diego
*ROMERO-JARERO, JORGE, Centro De Ciencias Del Mar Y Limnologia, Mexico
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NEURAL SYSTEMS AND BEHAVIOR

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MACAGNO, EDUARDO, Columbia University

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CALABRESE, RON, Harvard University
CAREW, THOMAS, Columbia University
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DERBY, CHARLES, Boston University
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LEVINTHAL, FRANCOIS, Columbia University
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MURPHY, ROD, State University of New York at Albany
NELSON, MARGARET, Cornell University
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HALLANGER, ANN, University of Wisconsin at Madison
JUNG, LADONNA, Columbia University
KAULEN, PETER, Free University of Berlin, Germany
*KRIEGER, CHARLES, McGill University, Canada
*MOORE, DARRELL, University of Texas at Austin
NOVICKI, ANDREA, University of Hawaii
PALLAS, SARAH, Cornell University
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QUINN, RICHARD, University of North Carolina at Charlotte
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NEUROBIOLOGY

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O'LAGUE, PAUL, University of California at Los Angeles
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REESE, BONNIE, National Institutes of Health
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WIESEL, TORSTEN, Harvard Medical School
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*CORMIER, SUSAN, Clark University
*FELS, GREGOR, Max Planck Institute, Germany
*HOSKINS, SALLY, University of Chicago
*HUBBARD, KAREN, Illinois Institute of Technology
*MATTOX, DOUGLAS, University of Texas Health Science Center
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*MENCO, BERNARD, University of Utrecht, Netherlands
*SILBERSTEIN, LAURA, University of California at San Francisco Medical School
*STEVENS, LESLIE, Harvard University
*STEUENKEL, EDWARD, University of Hawaii
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*WIELAND, STEVEN, Princeton University

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ALTMAN, SID, Yale University
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DENTLER, WILLIAM, University of Kansas
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KALFAYAN, LAURA, Brandeis University
KEDES, LARRY, Stanford University
KHAN, HAMID, Northwestern University Medical School
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KAMIYA, NOBURO, National Institute of Basic Biology, Japan
LASEK, RAY, Case Western Reserve University
LODISH, HAVEN, Massachusetts Institute of Technology
MAY, GRER, Yale University
MAYRAND, SANDY, Worcester Foundation for Experimental Biology
MCCARTHY, MICHAEL, Wesleyan University
MCKINTOSH, RICHARD, University of Colorado
MISCHKE, DIETMAR, Massachusetts Institute of Technology
MITCHELL, DAVID, Yale University
MOOSEKER, MARK, Yale University
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MURRY, ANDREW, Harvard University
OSLEY, MARY ANN, Brandeis University
PARDUE, MARRY LOU, Massachusetts Institute of Technology
PEDERSON, THORU, Worcester Foundation for Experimental Biology
PELHAM, HUGH, Carnegie Institute
PENMAN, SHELDON, Massachusetts Institute of Technology
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RUDERMAN, JOAN, Harvard Medical School
SILFLOE, CAROLYN, Yale University
SLOBODA, ROGER, Dartmouth College
STEIBURG, ELEANOR, Oregon State University
STEINBURG, JUDY, Macalester College
STEINERT, PETER, National Institutes of Health
STEITZ, JOAN, Yale University
STEITZ, THOMAS, Yale University
STEPHENS, RAYMOND, Marine Biological Laboratory
TALIAN, JOHN, Northwestern University Medical School
TIMASHEFF, SERGE, Brandeis University
VAHEY, MARY, Albert Einstein College of Medicine
VAN HOLDE, KEN, University of Oregon
WADSWORTH, PATRICIA, Dartmouth College
WEINTRAUB, HAROLD, Cancer Research Institute
WENSINK, PIETER, Brandeis University
WINKLER, MATTHEW, University of California at Davis
ZACHROFF, ROBERT, Northwestern University Medical School

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*AMOS, WILLIAM, University of Cambridge, United Kingdom
*BANDZIULIS, RAYMOND, Yale University
*BLANK, PAUL, Johns Hopkins University
BUHLE, EMMETT, Johns Hopkins School of Medicine
*CHAMBERS, CAROLYN, Xavier University
*CHOU, YING-HAO, University of Virginia
*DESMONE, DOUGLAS, Dartmouth College
*DONIACH, TABITHA, University of California at Santa Cruz
*DUNN-COLEMAN, ELAINE, University of Virginia
*GREEN, KATHLEEN, Washington University
*GRIMWADE, BRIAN, Yale University
*HAGER, KARL, Yale University
*HERING, GORDON, University of Wisconsin
HILDEBRAND, JOHN, Stanford University
*HOLLINGSWORTH, NANCY, Oregon State University
*HOCK, RICK, Albert Einstein College of Medicine
*JOHNSON, NANCY, Harvard University
*KARNS, LARRY, University of Virginia
*KOBAYASHI, YOSHITERU, University of Tokyo, Japan
*KUWABARA, PATRICIA, University of Pennsylvania
*LUTZ, DOUGLAS, University of Pennsylvania
*MINIE, MARK, University of California at Berkeley
MORELAND, ROBERT, St. Jude Children's Research Hospital
EDUCATIONAL PROGRAMS

*Mróczkowski, Barbara, University of Connecticut
*Rasmussen, Beth, University of North Carolina
*Robey, Ellen, University of Virginia
*Snibes, Michael, Baylor College of Medicine
Stults, Larry, Johns Hopkins University
*Ufkes, Susan, University of Massachusetts at Amherst
*Ward, Gary, University of California at San Diego

JANUARY

BASIC ECOLOGY AND MANAGEMENT OF RESOURCES

Instructors-in-chief

Howarth, Robert, Marine Biological Laboratory
Woodwell, George, Marine Biological Laboratory

Other faculty, staff, and lecturers

Brewer, Peter, Woods Hole Oceanographic Institution
Capuzzo, Judith, Woods Hole Oceanographic Institution
Christensen, Norman, Duke University
Cohen, Edward, National Marine Fisheries Service
Compton, Sarah, U. S. Environmental Protection Agency
Foy, Douglas, Conservation Law Foundation
Goldberg, Edward, Scripps Institution of Oceanography
Grassle, Frederick, Woods Hole Oceanographic Institution
Grosselein, Marvin, National Marine Fisheries Service
Heinselmann, Myron, U. S. Forest Service
Hine, Capt. Lynn, U. S. Coast Guard
Hobbie, John E., Marine Biological Laboratory
Houghton, Richard A., Marine Biological Laboratory
Melillo, Jerry M., Marine Biological Laboratory
Murphy, Evelyn, Harvard University
Peterson, Bruce J., Marine Biological Laboratory
Pisano, Victor, TV Station 38, Boston
Sanders, Howard, Woods Hole Oceanographic Institution
Shaver, Gaius R., Marine Biological Laboratory
Snedeker, James, Anderson and Nichols
Speth, Gus, Council on Environmental Quality
Teal, John, Woods Hole Oceanographic Institution
Vaccaro, Ralph, Woods Hole Oceanographic Institution

Students

Brownawell, Bruce, Woods Hole Oceanographic Institution/Massachusetts Institute of Technology
Demuth, Robert, University of Alabama in Birmingham
Elbe, Ute, College of Santa Fe
Gusman, Linda, Creve Coeur, MO
Gutjahr, Ruth, National Marine Fisheries Service
Haakonsen, Harry, Southern Connecticut State College
Kozak, Patricia, University of New Hampshire
Laderman, Rachel, Woods Hole, MA
Lipman, Deborah, Natural Resources Defense Council
Lowell, Victoria, Tufts University
Lough, Gayle, East Falmouth, MA
Mott, Richard, Tulane University
MARINE BIOLOGICAL LABORATORY

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WEEMS, JANICE, Stetson University

BEHAVIOR

Instructor-in-chief

ATEMA, JELLE, Boston University Marine Program/Marine Biological Laboratory

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BLOUGH, DONALD, Brown University
BOLLING, CLAUDE, Conservation de Paris, France
BRIDGES, ROBERT, Harvard Medical School
BRISBIN, I. LEHR, Savannah River Ecology Program
BRYANT, BRUCE, Boston University Marine Program/Marine Biological Laboratory
CALLARD, GLORIA, Harvard Medical School
CAREY, FRANCIS, Woods Hole Oceanographic Institution
CLARK, CHRISTOPHER, Rockefeller University
DERBY, CHARLES, Boston University Marine Program/Marine Biological Laboratory
DETHIER, VINCENT, University of Massachusetts at Amherst
EDDS, PEGGY, University of Maryland
ELGIN, RANDALL, Boston University Marine Program/Marine Biological Laboratory
FRANCIS, ELIZABETH, Bates College
FRAZIER, JEAN, Brandeis University
GERHARDT, CARL, University of Missouri
HAIN, JAMES, University of Rhode Island
HAUSFATER, GLEN, Cornell University
IRELAND, LEONARD, Bermuda Biological Station, Bermuda
KALMIJN, ADRIANUS, Woods Hole Oceanographic Institution
KAMIL, ALI, University of Massachusetts at Amherst
KREITHEN, MEL, University of Pittsburgh
LANGBAUER, WILLIAM, C. V. Whitney Laboratory
LEVINE, JOSEPH, Harvard University
MÖLLER, PETER, American Museum of Natural History
NYBY, JOHN, Lehigh University
RISTAU, CAROLYN, Rockefeller University
STUART, ALASTAIR, University of Massachusetts at Amherst
SULZMAN, FRANK, State University of New York at Binghamton
SWAIN, TONY, Boston University
WILCOX, STIMSON, State University of New York at Binghamton
WILLIAMS, TIMOTHY, Swarthmore College
WILLIAMS, JANET, Swarthmore College

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BAKER, TAHIRIH, Jackson State University
BROWN, JANICE, Tougaloo College
BRYANT, DONALD, Boston University
CARACO, NINA, Boston University
ELLIOTT, WANDA, Jackson State University
FERME, PAOLA, Boston University
FUJITA, RODNEY, Boston University
GOLDFARB, SHARI, Cornell University
MOSS, ANTHONY, Boston University
SCHUTRUMPF, ANDREW, Northeastern University
SEGAL, YVETTE, Cornell University
EDUCATIONAL PROGRAMS

COMPARATIVE PATHOLOGY OF MARINE INVERTEBRATES

Instructor-in-chief

BANG, FREDERIK, Johns Hopkins University

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DUCKLOW, HUGH, Columbia University
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FARLEY, AUSTIN, National Marine Fisheries Service
LEVIN, JACK, Johns Hopkins University
MICHELSON, EDWARD, Harvard University
PEARCE, JACK, National Marine Fisheries Service
PRENDERGAST, ROBERT, Johns Hopkins University
REINISCH, CAROL, Harvard Medical School
STRANDBERG, JOHN, Johns Hopkins University
SCARBOROUGH, ANN, Johns Hopkins University

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GILLES, KAY, University of California at Santa Cruz
KLINGENSmith, J. SCOTT, University of Mississippi Medical School
KOELLE, REINER, Eisenhower College
LANDY, RONALD, University of Pennsylvania
LEONARD, LESLIE, Johns Hopkins University
MANIGLIA, MARY ANN, Roosevelt University
MCCORMICK-RAY, M. GERALDINE, University of Virginia
ROCK, ALAN, University of Rhode Island
SHIFTLET, GEORGE, Erskine College
SILVERMAN, BARRY, Johns Hopkins University
SPEARS, CLIFTON, Dillard University

DEVELOPMENTAL BIOLOGY

Instructor-in-chief

EDDS, KENNETH, State University of New York at Buffalo

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BEGG, DAVID, Harvard Medical School
BELL, EUGENE, Massachusetts Institute of Technology
COLEMAN, ANNETTE, Brown University
COLEMAN, JOHN, Brown University
FUJIWARA, KUIGI, Harvard Medical School
GERBI, SUSAN, Brown University
GOLD, BERT, Tufts University
GROSS, PAUL, Marine Biological Laboratory
HARRIGAN, JUNE, Marine Biological Laboratory
HEIPLE, JEANNE, Harvard University
HEPLER, PETER, University of Massachusetts at Amherst
INUÉ, SHINYA, Marine Biological Laboratory
LINCK, RICHARD, Harvard Medical School
LUTZ, DOUGLAS, Marine Biological Laboratory
MARCUS, NANCY, Woods Hole Oceanographic Institution
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MASER, MORTON, Marine Biological Laboratory
ROSENTHAL, ERIC, Harvard University
RUDERMAN, JOAN, Harvard Medical School
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YAMIN, MICHAEL, Marine Biological Laboratory

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SANDERS, PAMELA, Texas Southern University
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Neurobiology

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BRIGHTMAN, MILTON, National Institutes of Health
CONNOR, JOHN, University of Illinois
DEFELICE, LOUIS, Emory University School of Medicine
DOWLING, JOHN, Harvard University
FARLEY, JOSEPH, Princeton University
FEIN, ALAN, Boston University Medical School/Marine Biological Laboratory
GOODMAN, STEVEN, Marine Biological Laboratory
GOVIND, C. K., University of Toronto, Canada
HAROSI, FERENCE, Boston University/Marine Biological Laboratory
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KAPLAN, EHUD, Rockefeller University
KRAVITZ, EDWARD, Harvard Medical School
KUZIRIAN, ALAN, National Institutes of Health/Marine Biological Laboratory
LEDERHENDLER, I. IZJA, National Institutes of Health/Marine Biological Laboratory
LEVAY, SIMON, Harvard Medical School
MOORE, JOHN, University of Massachusetts
NEARY, JOSEPH, National Institutes of Health/Marine Biological Laboratory
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RICHARDS, WILLIAM, Marine Biological Laboratory
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SHEREFF, GORDON, Yale University School of Medicine
SHOUKIMAS, JONATHAN, National Institutes of Health/Marine Biological Laboratory
SENFT, STEPHEN, University of Oregon
STEPHENS, RAYMOND, Boston University School of Medicine/Marine Biological Laboratory
SZUTS, ETE, Marine Biological Laboratory
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WEISS, THOMAS, Massachusetts Institute of Technology

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BOLDEN, MARSHA, Texas Southern University
BROOKS, CHARLES, Washington University
BRY, JOHN, Massachusetts General Hospital
CHING-JU, CHEN, University of Rhode Island
EISELE, LESLIE, University of Colorado at Boulder
FAMIGLIO, GREGORY, Massachusetts Institute of Technology
FREED, LAUREL, University of Bridgeport
GART, SERGE, Marlboro College
KRIKORIAN, JACQUELINE, University of Maryland School of Medicine
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LAYTON, BARRY, The Montreal General Hospital, Canada
LYDIC, RALPH, Harvard Medical School
NAFTOLOWITZ, DAVID, Amherst College
NORMAN, PHILLIPPA, Tougaloo College
PEARLSON, YALE, Tufts University
ROCHEL, SARAH, Roche Institute of Molecular Biology
SMITH, MARVA, Dillard University
ZEBLEY, ELMER, New College

SHORT COURSES

ANALYTICAL AND QUANTITATIVE LIGHT MICROSCOPY IN BIOLOGY, MEDICINE, AND MATERIALS SCIENCES

Instructor-in-chief

INOUE, SHINYA, Marine Biological Laboratory

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LUTZ, DOUGLAS, Marine Biological Laboratory
OLWELL, PATRICIA, Seiler Instruments (aus Jena)
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THOMAS, PAUL, DAGE-MTI
WALLACE, PETER, Crimson Camera Technical Sales, Inc.

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BURGOS, MARIO, Harvard Medical School
CHAILLET, JOHN, Yale University Medical School
CHANDLER, WILLIAM, Yale University Medical School
COATES, THOMAS, Riley Hospital for Children
IRVING, MALCOLM, Yale University Medical School
KEITH, CHARLES, New York University Medical Center
MCMEEKIN, LINDA, American Cyanamid Company
MILLER, THOMAS, Harvard Medical School
ROMERO, FAUSTINO, Universidad Nacional Autonoma de Mexico, Mexico
SCHATTEN, GERALD, Florida State University
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WEISS, GILBERT, Life Savers, Inc.

BIOLOGICAL ELECTRON MICROSCOPY FOR TECHNICIANS

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UYDESS, IAN, Carl Zeiss, Inc.

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<tr>
<td>CLAPIN, David F.</td>
<td>University of Ottawa, Canada</td>
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<td>CLARK, John M.</td>
<td>Michigan State University</td>
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<td>COHEN, Joy</td>
<td>New Orleans, LA</td>
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<tr>
<td>COHEN, Jerry</td>
<td>Johns Hopkins University</td>
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<tr>
<td>COHEN, Rochelle S.</td>
<td>University of Illinois College of Medicine</td>
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<tr>
<td>COLLINS, Stephen</td>
<td>Case Western University</td>
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<tr>
<td>COMOGLIO, Paolo</td>
<td>University of Torino, Italy</td>
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<td>CONWAY, Kevin</td>
<td>Johns Hopkins University</td>
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<td>CORNETT, Robert</td>
<td>Iowa State University</td>
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<td>CROWTHER, Bob</td>
<td>Wistar Institute</td>
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<td>CZETO, Alexander</td>
<td>Mellon Institute</td>
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<td>CZINN, Steven J.</td>
<td>Rainbow Babies and Children's Hospital</td>
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<td>DENNISON, William</td>
<td>University of Chicago</td>
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<tr>
<td>DE TOLEDO-MORRELL, Leyla</td>
<td>Rush Medical Center</td>
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<tr>
<td>DICKEY, Adam</td>
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<td>DIPOLO, Reinaldo V.</td>
<td>IVIC, Venezuela</td>
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<td>DIXON, Andrew</td>
<td>Case Western Reserve University Medical School</td>
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<tr>
<td>DONOHUE, Melanie</td>
<td>Boston University</td>
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<td>DUNHAM, Philip</td>
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<td>ECKERT, Richard</td>
<td>Lehman College, CUNY</td>
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<td>EHRENSTEIN, Gerald</td>
<td>National Institutes of Health</td>
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<td>EHRLICH, Barbara</td>
<td>Albert Einstein College of Medicine</td>
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<tr>
<td>EISEN, Andrew</td>
<td>University of Pennsylvania</td>
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<td>EISEN, Matthew</td>
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<tr>
<td>ELLNER, Jerrold</td>
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<td>FATH, Karl R.</td>
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<tr>
<td>FENN, Jane</td>
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GODDARD, Kathryn

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CAVANAUGH, COLLEEN, Harvard University, Year-in-Science
DAUKAS, PAULA, Yale University, Year-in-Science
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WU, S. C., visiting investigator, Academia Sinica, People's Republic of China

XII. HONORS

FRIDAY EVENING LECTURES
GERHARDT, CARL, University of Missouri at Columbia, January 9, "Sound Pattern Recognition in North American Tree Frogs: Neurobiological Implications"
RASMUSSEN, HOWARD, Yale University, January 16, "Calcium and Cyclic-AMP as Synaptic Messengers"
LIEM, KAREL, Harvard University, January 23, "Functional Morphology of the Feeding Apparatus of Fishes: Do Fish Defy Gauss' Principle?"
DARNELL, JAMES E. Rockefeller University, June 26, "Consideration of Animal Cell Function and Evolution"
HOBIE, JOHN E., Marine Biological Laboratory, July 3, "Process Regulation in an Arctic Ecosystem"
HEUSER, JOHN, Washington University School of Medicine, July 9, 10, Forbes Lectures. I. "Structural Basis of Synaptic Transmission" II. "A 3-D Journey Through the Interior of Nerve and Muscle Cells"
NICHOLLS, JOHN G., Stanford University, July 17, Lang Lecture, "One Cell at a Time: The Analysis of a Simple Nervous System"
STEITZ, JOAN A., Yale University, July 24, "Autoantibodies as Probes for Small Ribonucleoproteins from Eukaryotes"
MCILOSTH, J. RICHARD, University of Colorado, Boulder, July 31, "Mitotic Mechanism: Ever Interesting, Still Elusive"
SAGER, RUTH, Sidney Farber Cancer Institute, August 7, "DNA Methylation: From Chlamydomonas to Cancer"
INOUE, SHINYA, Marine Biological Laboratory, August 14, "Form, Movement, and Life: Adventures in Light Microscopy"
GROSS, JEROME, Massachusetts General Hospital, August 21, Zwilling Lecture, "Regulation of Collagenase by Cell-Cell Interactions"
SOMERO, GEORGE N., Scripps Institution of Oceanography, August 28, "Protein Adaptation to the Physical Environment: Discerning Basic Molecular Themes Through the Study of Their Variations"

CHARLES A. LINDBERGH LECTURES IN ECOLOGY
MANN, KENNETH H., Bedford Institute of Oceanography, June 24, "Management of Resources in the Coastal Zone: Laminaria and Lobsters in Nova Scotia"
BOLIN, BERT, University of Stockholm, July 29, “Man’s Interference with the Biosphere on a Global Scale”

ASSOCIATES’ LECTURE
MARGULIS, LYNN, Boston University, August 1, “The Earliest Life on Earth”

SPECIAL LECTURE
HORRIDGE, G. ADRIAN, Australian National University, July 12, “New Work on the Insect Compound Eye”

ROCKEFELLER FOUNDATION LECTURE SERIES “UNDERSTANDING SCIENTIFIC INFORMATION SYSTEMS AND OPTIMIZING INFORMATION RETRIEVAL”
GOFFMAN, WILLIAM, Case Western Reserve University, July 13, “The Ecology of the Biomedical Literature”
WARREN, KENNETH S., Rockefeller Foundation, July 14, “The Quantitative and Qualitative Structures of the Biomedical Literature”
MOSTELLER, FREDERICK, Harvard School of Public Health, July 15, “Design and Evaluation of Biomedical Studies”
GOFFMAN, WILLIAM, Case Western Reserve University, July 16, “Information Retrieval Strategies”
GARFIELD, EUGENE, Institute for Scientific Information, July 17, “Information Retrieval Systems”

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FRANCES S. CLAFF MEMORIAL SCHOLARSHIP

JUNG, LADONNA, Columbia University

EDWIN GRANT CONKLIN MEMORIAL SCHOLARSHIP

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PALLAS, SARAH, Cornell University

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HALS, GARY, Capital University
MOORE, DARRELL, University of Texas at Austin
SHAMMA, SHIHAB, Stanford University
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In 1981, these Scholarships were given in memory of:

W. C. CURTIS
CASWELL GRAVE
L. V. HEILBRUNN
OTTO LOEWI
S. O. MAST
T. H. MORGAN
A. H. STURTEVANT

Recipients:

CHOU, YING-HAO, University of Virginia
DUNN-COLEMAN, ELAINE, University of Virginia
GRIMWADE, BRIAN, Yale University
KOBAYASHI, YOSITERU, University of Tokyo, Japan
LUTZ, DOUGLAS, University of Pennsylvania
OLIVERIRA, ANA, Universidade Federal Do Rio De Janeiro, Brazil
SPAIN, LISA, Indiana University
WAGNER, JEFFERY, State University of New York at Buffalo
WARD, GARY, University of California at San Diego

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LIGHT, JEFFREY, University of Colorado
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OLIVERIRA, ANA, Universidade Federal Do Rio De Janeiro, Brazil
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JEAN AND KATSUMA DAN FELLOWSHIPS
PRATT, MELANIE M., Harvard University
TANAKA, YUICHIRO, Sugashima Marine Biological Station, Japan

MBL AWARD FOR THE MOST OUTSTANDING PAPERS GIVEN AT THE MBL GENERAL SCIENTIFIC MEETINGS OF AUGUST 1980

"Coupling between Horizontal Cells in the Carp Retina Examined by Diffusion of Lucifer Yellow."
By AKIMICHI KANEKO, National Institute for Physiological Sciences, Japan, and ANN E. STUART, University of North Carolina

"An Optical Determination of the Resistance in Series with the Axolemma of Loligo pealei."
By BRIAN M. SALZBERG, University of Pennsylvania, FRANCISCO BEZANILLA, University of California, Los Angeles, and H. V. DAVILA, Universidad Los Andes, Venezuela

XIII. INSTITUTIONS REPRESENTED

<table>
<thead>
<tr>
<th>U. S. A.</th>
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<tbody>
<tr>
<td>Alabama, University of, Birmingham</td>
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<td>Albert Einstein College of Medicine</td>
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<td>Alfred I. duPont Institute</td>
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<td>American Cyanamid Company</td>
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<td>American Museum of Natural History</td>
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<td>Arizona, University of</td>
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<td>Brandeis University</td>
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<td>Bridgeport, University of</td>
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Chicago, University of
Cincinnati, University of
City of Hope Medical Center
Claremont Men's College
Clark College
Clark University
Clarkson College of Technology
Cleveland, University Hospitals of
Cold Spring Harbor Laboratory
Colorado State University
Colorado, University of
Colorado Video
Columbia College
Columbia University
Columbia University, College of Physicians and Surgeons
Connecticut College
Connecticut, University of
Connecticut, University of, Health Center
Conservation Law Foundation
Cornell Medical College
Cornell University
Council on Environmental Quality
Crimson Camera Technical Sales, Inc.
C. V. Whitney Laboratory

DAGE-MTI
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Dartmouth Medical School
Deep Sea Research
Delaware, University of
Denison University
Dillard University
Duke University
Duke University Medical Center
DuPont Corporation

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Eastman Kodak Company
Eisenhower College
Emmanuel College
Emory University
Emory University School of Medicine
Erskine College

Fairfield University
Florida State University
Florida, University of, College of Medicine

General Electric Corporation
George Mason University
Georgia Institute of Technology
Georgia, University of
Gonzaga University

Goucher College
Gray Seal Research Station

Hahnemann Medical College and Hospital
Hamamatsu Systems, Inc.
Hamilton College
Hanover College
Harvard Medical School
Harvard School of Public Health
Harvard University
Haverford College
Hawaii, University of
Hawaii, University of, Kewalo Marine Laboratory

Illinois Institute of Technology
Illinois, University of
Illinois, University of, College of Medicine
Indiana University
Indiana University School of Medicine
Institute for Cancer Research, The
Institute for Scientific Information
Iowa State University
Iowa, University of
IWS Seward Marine Station

Jackson State University
John B. Pierce Foundation Laboratory
Johns Hopkins Hospital
Johns Hopkins University, The
Johns Hopkins University, The, School of Hygiene and Public Health
Johns Hopkins University, The, School of Medicine
Johnson, S. C. & Son

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Kansas, University of
Kresge Eye Institute

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Lamont Geological Observatory
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Leitz, E., Inc.
Life Savers, Inc.
Louisiana State University

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Maine, University of
Marine Biomedical Institute
Marlboro College
Mary Imogene Bassett Hospital
Maryland, University of
Maryland, University of, School of Medicine
Massachusetts Eye and Ear Infirmary
Massachusetts General Hospital
Massachusetts Institute of Technology
Massachusetts State Lobster Hatchery
Massachusetts, University of, Amherst
Medical College of Ohio
Mellon Institute
Merck Institution for Therapeutic Research
Mercy College
MERIT Fund, Inc.
Miami, University of
Miami, University of, School of Medicine
Michigan State University
Michigan, University of
Milton S. Hershey Medical Center
Minnesota, University of
Minnesota, University of, School of Medicine
Miriam Hospital
Mississippi, University of, Medical School
Missouri, University of
Monell Chemical Senses Center
Montefiore Hospital and Medical Center
Moravian College
Morehouse College
Mount Holyoke College
Mount Sinai Hospital
Nantucket High School
National Academy of Sciences
National Cancer Institute
National Institute of Alcohol Abuse and Alcoholism
National Institutes of Health
National Marine Fisheries Service/NOAA
National Resource Defense Council
Nebraska, University of
Neurological Institute
New England Aquarium
New England Biolabs, Inc.
New England Medical Center Hospital
New Hampshire, University of
New Jersey Medical School
New York Blood Center
New York, City University of, Brooklyn College
New York, City University of, City College
New York, City University of, Herbert Lehman College
New York, City University of, Hunter College
New York Institute for Basic Research in Mental Health
New York Medical College
New York State College of Veterinary Medicine
New York, State University of, Albany
New York, State University of, Binghamton
New York, State University of, Buffalo
New York, State University of, Downstate Medical Center
New York, State University of, New Paltz
New York, State University of, Stony Brook
New York, State University of, Syracuse
New York University Medical Center
Nichols College
Nikon, Inc.
North Carolina State University
North Carolina, University of, Chapel Hill
North Carolina, University of, Charlotte
Northeastern Ohio Universities College of Medicine
Northeastern University
Northwestern University
Northwestern University Medical School
Notre Dame, University of
Oak Ridge National Laboratories
Oberlin College
Ohio University
Ohio University College of Medicine
Ohio Wesleyan University
Oklahoma State University
Olympus Corporation of America
Opti-Quip, Inc.
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Pace University
Pennsylvania, Medical College of
Pennsylvania State University
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Pennsylvania, University of, School of Dental Medicine
Pennsylvania, University of, School of Medicine
Pittsburgh, University of
Pittsburgh, University of, School of Medicine
Polaroid Corporation
Polaron Instruments Inc.
Pomona College
Princeton University
Public Health Research Institute
Purdue University
Rainbow Babies and Children’s Hospital
Rhode Island College
Rhode Island, University of
Riley Hospital for Children
Rochester, University of
Rochester, University of, School of Medicine
Rockefeller Foundation
Rockefeller University, The
Roosevelt University
Rush Medical College
Rush-Presbyterian-St. Luke’s Medical Center
Rush University
Rutgers—The State University of New Jersey
Rutgers University Medical School
St. Elizabeth’s Hospital
St. Jude’s Children’s Research Hospital
St. Louis University School of Medicine
St. Peter’s College
St. Vincent Charity Hospital
San Diego State University
Santa Fe, College of
Savannah River Ecology Program
Scripps Institution of Oceanography
Sea World’s Shark Institute
Selker Instruments
Sidney Farber Cancer Institute
Smithsonian Institution
Southern Connecticut State College
Southern Florida, University of
Southern Florida, University of, Medical Center
Stanford University
Stanford University, Hopkins Marine Station
Stanford University, School of Medicine
Stetson University
Swarthmore College
Sweet Briar College
Syracuse University
Temple University Medical School
Tennessee, University of
Texas Medical Center
Texas Southern University
Texas, University of
Texas, University of, Health Science Center
Texas, University of, Medical Branch
Thomas Jefferson University
Thomas Jefferson University Medical School
Tougaloo College

Towson State University
Tufts University
Tufts University Medical School
Tufts University School of Veterinary Medicine
Tulane University
Union College
United States Coast Guard
United States Department of Agriculture
United States Environmental Protection Agency
United States Forest Service
Vanderbilt University
Vanderbilt University School of Medicine
Vassar College
Venus Scientific, Inc.
Vermont, University of
Veterans Administration Medical Center, Boston
Vickers Instruments
Villanova, University of
Virginia Polytechnic Institute and State University
Virginia, University of
Viterbo College
Washington University
Washington, University of
Washington University, School of Medicine
Wayne State University
Wayne State University, School of Medicine
Wesleyan University
West Chester State College
West Virginia University
Williams College
Wisconsin, University of
Wistar Institute
Wofford College
Woods Hole Oceanographic Institution
Worcester Foundation for Experimental Biology
Worcester State College
World Wildlife Fund
Xavier University
Yale University
Yale University, School of Medicine
Yeshiva College

FOREIGN INSTITUTIONS

Academia Sinica, People’s Republic of China
Alberta, University of, Canada
Athens, University of, Greece
Australian National University, Australia
INSTITUTIONS REPRESENTED

Basel, University of, Switzerland
Bedford Institute of Oceanography, Canada
Berlin, Free University of, West Germany
Bermuda Biological Station, England, UK
Brazil, University of, Brazil
Calgary, University of, Canada
Cambridge, University of, England, UK
Cell Biology Laboratory, Italy
Centro de Ciencias del Mar y Limnologia, Mexico
Centro de Investigación y de Estudios Avanzados, Mexico
Claude Bernard, University of, France
Conservation de Paris, France
Copenhagen, University of, Denmark
Dalhousie University, Canada
East Anglia, University of, England, UK
Faculte de Medecine, France
F.I.D.I.A. Research Laboratories, Italy
Hebrew University of Jerusalem, Israel
Hebrew University Medical School, Israel
Institut für Mikrobiologie Zoologie, West Germany
Institute Ferreyra, Argentina
Institute of Molecular Biology, Austria
Institution for Molecularebiologie, Switzerland
Instituto de Biofisica, Brazil
Instituto de Investigación Medica, Argentina
Instituto Politecnico Nacional, Mexico
Instituto Venezolano de Investigaciones Científicas, Venezuela
International Institute of Genetics and Biophysics, Italy
International Laboratory for Research on Animal Disease, Kenya
Korea Advanced Institute of Science and Technology, Kenya
Laboratory de Neurobiologie Cellulare, France

Laval University, Canada
Liverpool School of Tropical Medicine, England, UK
Max-Planck Institute, West Germany
McGill University, Canada
McMaster Medical Center, Canada
Medical Research Council, UK
Melbourne, University of, Australia
Montreal General Hospital
Mount Allison University, Canada
National Institute for Basic Biology, Japan
National Institute for Medical Research, UK
North Wales, University College of, Great Britain, UK
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Oxford, University of, England, UK
Paris, University of, France
Puerto Rico, University of
Scarbrough College, Canada
Sri Lanka, University of, Sri Lanka
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Station Biologique, France
Stazione Zoologici di Napoli, Italy
Stockholm, University of, Sweden
Sugashima Marine Biological Station, Japan
Technical Medical School, Israel
Tel Aviv University, Israel
Tokyo, University of, Japan
Torino, University of, Italy
Toronto, University of, Canada
Universidad Federal de Rio de Janeiro, Brazil
Universidad Nacional Autonoma de Mexico, Mexico
Universidad Peruana Cayetano Heredia, Peru
University School of Medicine, Japan
Utrecht, University of, Netherlands
Wellcome Research Laboratories, UK

XIV. LABORATORY SUPPORT STAFF
Including Persons Who Joined or Left the Staff During 1981

Controller's Office

CASEY, EDWARD G., Controller
CAMPBELL, RUTH B.
DAVIS, DORIS C.

Ellis, Nancy L.
Hobbs, Roger W., Jr.
Walsh, Michael P.

Director's Office

GROSS, PAUL R., President and Director
THIMAS, LISA M.

Valanti, Iris
General Manager’s Office

SMITH, Homer P., General Manager
Baker, Karen H.
Butz, Florence S.
Geggatt, Agnes L.

Associate Director’s Office

Palmer, Douglas W., Associate Director

Education Office

Masen, Morton D., Assistant Director for Educational and Research Services
Allen, Genevieve
Leighton, Jane L., Admissions Officer

Grants Office

Howard, Joan E., Grants Officer

Public Relations Office

Haskell, Barbara, Public Relations Officer
Campbell, Lee Anne

Biological Bulletin

Metz, Charles B., Editor
Lang, Helen E.

Buildings and Grounds

Gunning, A. Robert, Superintendent
Anderson, Lewis B.
Berrios, Jose R.
Bourgoine, Lee E.
Broderick, Madeline
Cafarelli, Peter A.
Carini, Robert J.
Costa, Robert A.
Davis, Mark A.
Dutra, Steven M.
Enos, Glenn R.
Fish, Stephen
Fuglister, Charles D.
Geggatt, Richard E., Jr.
Gibbons, Roberto G.
Gonsalves, Walter W., Jr.
Kleindinst, Thomas N.
Kuil, Elisabeth

Gray Museum

Tiffney, Wesley N., Curator
Boretos, C. Diane
Bush, Louise

Johnson, Frances N.
McGoldrick, Michelle
Pomerleau, Linda M.

Ziemer, Carol A.
St. Hilaire, Lynda D.
Roland, Renee

Mountford, Rebecca
Schwartz, Susan

Lehy, Donald B.
Lewis, Ralph H.
Lchnerhead, William M.
Lovering, Richard A.
Lunn, Alan G.
MacLeod, John B.
Mills, Stephen A.
Moore, Morgan
Peterson, Philip
St. Jean, Simone
Smart, Merilyn A.
Tavares, Gene
Thrasher, Frederick
Varao, John
Weeks, Gordon W.
Whittaker, William

Mills, Susan W.
Montiero, Eva S.
Moul, Edwin T.
Library

FESSENDEN, JANE, Librarian
ASHMORE, JUDITH A. HOUGH, NANCY L.
CLARK, SARAH IRVING, LYNN A.
COOMBS, ROXANNE JOSEPH, ELENORA
DEVeER, JOSEPH M. MARGOLIN, JILL
FITZGERALD, DAVID J. MOUNTFORD, REBECCA J.
GIBBONS, ROBERT G. NORTON, CATHERINE
GRICE, JOAN H. SWAIN, LAUREL
HANLEY, JANICE S.

Marine Resources

VALOIS, JOHN J., Manager
ENOS, EDWARD G., JR. SMITH, A. DICKSON
ENOS, JOYCE TASSINARI, EUGENE
HEBBEN, ROBERT M. TRAPASSO, BRUNO
LAWDAY, LEWIS M. VARAO, JOHN
MURPHY, CHARLES

Research Services

MASER, MORTON D, Assistant Director for
Educational and Research Services
BALDIC, DAVID MAKREDES, NICHOLAS
BARNES, FRANKLIN D. MARTIN, LOWELL V.
BARNES, JOHN S. NICHOLS, FRANCIS H., JR.
EVANS, WILLIAM SILVA, MARK
GOLDER, LINDA M. SYLVA, FRANK E.
GOLDER, ROBERT J. VARAO, JOHN
KERR, LOUIS

Summer Support Staff

ALBERS, CHRISTINA IRISH, BRADFORD G.
ANDERSON, JANICE A. JOHNSON, JEFFREY
ASC, MARGUERITE M. KELLY, KEVIN
ASHMORE, MICHAEL W. KULLBERG, PAULA G.
BLACK, ROBERT W. LEE, JAMES M.
BLAIR, RICHARD H. LEONARD, LESLIE ANNE
BLOODWORTH, BAKER LUNN, JEFFREY
BODZINICK, MARLA MAXWELL, BRETT
BRINKMAN, PAULA M. MLODZINSKA, KATHERINE M.
BROADSTOCK, PENELope MONIZ, KAREN
BURNETT, LYNN PARKER, TIMOTHY
CHILD, MALCOLM PIERCE, RICHARD
COOMBS, GILLIAN ROONEY, CARRIE
CRUISE, MEGHAN F. ROONEY, COLLEEN
EMMONS, BARRY ROSCOE, JOAN E.
FENNELLY, GLENN J. SMITH, NATHAN B.
FITE, DAVID SOUZA, JACQUELINE L.
FITZGERALD, MARY E. STONE, AMY
GIFFORD, HEIDI TRIPP, TERRY
GRASS, ANTHONY VALOIS, FRANCIS
GROSSMAN, ROBERT WALKER, ALLEN R.
GUNTER, SUSAN WHITTAKER, WILLIAM A.
HANSON, ANTHONY WUETHRICHi, LISA
HARDING, RICHARD WYTTENBACH, ROBERT A.