THE WOODS HOLE OCEANOGRAPHIC INSTITUTION

REPORT FOR THE YEAR 1942

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I. TRUSTEES

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THOMAS BARBOUR, Museum of Comparative Zoölogy, Cambridge, Mass.
JNO. A. FLEMING, Carnegie Institution, Washington, D. C.
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ALBERT E. PARR, American Museum of Natural History, New York, N. Y.
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LAMAR R. LEAHY, U. S. Navy, Retired, 910 Park Avenue, New York City, N. Y.
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B. W. ST. CLAIR, 10 Arrow Street, Cambridge, Mass.

To serve until 1944

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Ex Officio

COLUMBUS O'D. ISELIN, Woods Hole Oceanographic Institution, Woods Hole, Mass.
LAWRASON RIGGS, 120 Broadway, New York N. Y.

OFFICERS

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COLUMBUS O'D. ISELIN, Clerk of the Corporation, Woods Hole Oceanographic Institution, Woods Hole, Mass.

II. MEMBERS OF THE CORPORATION

Charles Francis Adams, 15 State Street, Boston, Mass.
Thomas Barbour, Museum of Comparative Zoölogy, Cambridge, Mass.
Henry B. Bigelow, Museum of Comparative Zoölogy, Cambridge, Mass.
Isaiah Bowman, Johns Hopkins University, Baltimore, Md.
Vannevar Bush, 1530 P Street, N.W., Washington, D. C.
The Commandant (Admiral R. R. Waesche), U. S. Coast Guard, for the time being, Washington, D. C.
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The Director, (Admiral L. O. Colbert), U. S. Coast & Geodetic Survey, for the time being, Washington, D. C.
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Jno. A. Fleming, Carnegie Institution, Washington, D. C.
Alexander Forbes, Harvard Medical School, Boston, Mass.
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A. G. Huntsman, University of Toronto, Toronto, Canada
The Hydrographer (Admiral G. S. Bryan), U. S. Hydrographic Office, for the time being, Washington, D. C.
Columbus O'D. Iselin, Woods Hole Oceanographic Institution, Woods Hole, Mass.
Frank B. Jewett, 195 Broadway, New York, N. Y.
Lamar R. Leahy, U. S. Navy, Retired, 910 Park Avenue, New York, N. Y.
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T. Wayland Vaughan, 3333 P Street, Washington, D. C.

III. REPORT OF THE TREASURER

To the Members and Trustees of the
Woods Hole Oceanographic Institution:

Gentlemen:

The accounts for the year 1942 have been audited by Messrs. Stagg, Mather & Hough, Public Accountants.

During the year bonds costing $89,395.50 were redeemed at a net profit of $2,241.54 (after adding the applicable reserve for amortization).

There was invested during the year, in bonds $80,412.50 and in stocks $15,017.24.

In addition to the amount of $24,656.01 due from the General Account to the Special Income Account at the end of 1941, there was withheld during the year further special income of $2,512.50 making a total of $27,168.51 due this fund at the end of 1942. The continued holding of these funds due special income in the general fund was necessitated by the unavoidable delay in the payment of our vouchers on Government projects.

The indebtedness of the Government to the Institution increased from $42,471.55 at the end of 1941 to $69,335.10 at the end of 1942.

There was billed to the Government during the year $202,718.89 for disbursements incurred for the Government and $40,562.96 allowance for general overhead. In addition to this a large part of our income is being used for the benefit of the Government without reimbursement other than that mentioned above.

The entire appropriation of $4,800.00 for the reserve for periodic replacements was added to that fund. This fund has grown very satisfactorily and amounted to $47,592.94 in market value at the end of the year.

The total expenses of the Institution (not including disbursements for the Government and after applying the allowance from the Government for overhead) was under income, including special income, by $29,117.12.

The cash position was not improved due to the increase in accounts receivable from the Government.

The gross income on the securities in the Endowment Fund excluding special income (extra dividends) was about .0445 of cost and .0497 of value at the end of the year.

Summaries of the balance sheet and comparative income and expense statement for 1941 and 1942 are appended. The expenditures for the Government are not included.

Respectfully submitted,

Lawrason Riggs
Treasurer

BALANCE SHEET

ENDOWMENT FUND ASSETS

	Quoted Market Value		
Endowment fund assets:			
Bonds (less reserve for amortization of bond premiums, $7,717.21)	$1,134,247.25	$1,206,862.79	
Stocks	$1,082,396.88	1,261,306.48	
Cash		5,703.25	$2,473,872.52
Reserve fund assets:			
Bonds	$ 4,517.50	$ 4,697.50	
Stocks	$ 11,846.13	19,099.02	
Cash		6,988.03	30,784.55
			$2,504,657.07

PLANT ASSETS

Laboratory plant:		
Land	$ 27,072.32	
Buildings	323,213.12	
Laboratory equipment	21,361.93	
Crew room equipment	557.95	
Library	13,500.00	$ 385,705.32
Ship "Atlantis":		
Construction	$ 218,674.47	
Equipment	27,298.50	245,972.97
Ship "Anton Dohrn"		17,145.67
Small Boat and equipment		6,570.55
		$ 655,394.51
Depreciation fund assets (for periodic replacements):		
Bonds (quoted market value $31,882.50)	$ 32,035.00	
Cash	15,710.44	47,745.44
		$ 703,139.95

CURRENT ASSETS

Current funds—Cash	$ 4,350.07	
Less—Due to special income fund (below)	27,168.51	$ *22,818.44*
Special income assets:		
Investments:		
Bonds (quoted market value $7,900.00)	$ 7,900.00	
Stocks (quoted market value $2,621.88)	2,809.46	
Cash (including $27,168.51 due from current funds—Cash) (above)	27,324.53	38,033.99
Accounts receivable:		
Navy Project No. 1	$ 4,515.28	
Navy Projects Nos. 2 to 8	64,819.82	
Mess Accounts	407.60	69,742.70
		$ 84,958.25
Total assets		$3,292,755.27

DECEMBER 31, 1942

ENDOWMENT FUNDS

Endowment fund—General	$2,000,000.00	
Endowment fund—For upkeep of plant	419,419.96	
	$ 2,419,419.96	
Add—Accumulated net gain on securities called or sold	54,452.56	$2,473,872.52
Reserve fund	$ 23,395.57	
Add—Accumulated reserve fund income	7,388.98	30,784.55
		$2,504,657.07

PLANT FUND

Plant fund general		$ 607,642.13	
Plant fund reserve—Transferred in prior years from current surplus	$ 46,952.38		
Add—Appropriation from current funds: Library	800.00	47,752.38	$ 655,394.51
Reserve for periodic replacements			47,745.44
			$ 703,139.95

CURRENT LIABILITIES AND SURPLUS

Accounts payable:		
Institution	$ 5,135.34	
Navy Projects	6,382.41	$ 11,517.75
Capital surplus:		
Balance at December 31, 1941	$ 44,323.38	
Add—Excess of income over expenses for the year ended December 31, 1942	29,117.12	73,440.50
		$ 84,958.25
Total funds, current liabilities and surplus		$3,292,755.27

STATEMENT OF INCOME FROM ENDOWMENT FUND INVESTMENTS AND FROM CURRENT ASSETS, AND EXPENSES (LESS ALLOWANCE FOR GENERAL OVERHEAD BY THE U. S. GOVERNMENT) APPLICABLE THERETO, INCLUDING EXPENDITURES FOR PERMANENT PLANT ADDITIONS

FOR THE YEARS ENDED DECEMBER 31, 1942 AND DECEMBER 31, 1941

		Year Ended December 31, 1942			*Year Ended December 31, 1941*		
Income:							
From endowment funds:							
Interest (including in 1942 special income of $200.00)		$51,777.88			$ 54,384.34		
Dividends (including in 1942 special income of $3,268.07)		60,849.84			64,260.93		
Net profit on bonds called or sold during the year, special income		—			390.40		
			$112,627.72			$119,035.67	
Less—Custodian fees and expenses			1,589.87			1,559.16	
Total income				$111,037.85			$117,476.51
Expenses:	*Budget—1942*						
Upkeep of plant:							
Upkeep of buildings and grounds	$ 7,847.00	$17,365.22			$ 8,801.62		
Upkeep of "Atlantis"	10,000.00	9,393.41			9,298.14		
Upkeep of "Asterias"	200.00	611.34			550.53		
Upkeep of "Anton Dohrn"	—	3,369.28			4,225.93		
Insurance	6,062.00	7,129.83			7,311.29		
Depreciation	4,800.00	4,800.00			4,800.00		
	$ 28,909.00		$ 42,669.08			$ 34,987.51	
Operating expenses:							
Operation of "Atlantis"	$ 34,664.00	$26,263.45			$ 28,675.41		
Operation of "Asterias"	825.00	891.75			1,000.33		
Operation of "Anton Dohrn"	—	4,547.94			3,347.75		
Scientists' salaries	27,245.00	23,218.70			23,720.56		
Scientific supplies and equipment	4,500.00	3,584.28			7,145.91		
Traveling expenses	475.00	881.28			925.28		
Publications	3,000.00	1,846.37			1,667.59		
Administration	7,600.00	14,171.23			9,048.31		
Amortization of bond premiums	2,500.00	1,288.63			1,739.13		
Contribution to retirement fund	1,500.00	1,382.83			1,543.22		
Interest on bank loan	500.00	152.22			35.16		
Staff meetings	50.00	—			33.13		
Mess (net)	—	785.93			—		
	$ 82,859.00		79,014.61			78,881.78	
Total expenses	$111,768.00		$121,683.69			$113,869.29	
Expenditures for permanent plant additions:							
Additions to library	$ 800.00	$ 800.00			$ 800.00		
Reconditioning the "Anton Dohrn"	—	—			17,145.67		
	$ 800.00		800.00			17,945.67	
(Not budgeted)	$ 682.00		—			—	
	$113,250.00		$122,483.69			$131,814.96	
Less—Allowance for general overhead, by the U. S. Government			40,562.96			21,277.64	
				81,920.73			110,537.32
Excess of income over expenses				$29,117.12			$6,939.19

IV. THIRTEENTH ANNUAL REPORT OF THE DIRECTOR FOR THE YEAR 1942

BY C. O'D. ISELIN

Because our facilities during the past year have become more and more used for a variety of research programs in which oceanography has a practical application in warfare, this report can only summarize a small part of the work which has been in progress. The laboratory has been an exceedingly busy place, both in winter and in summer. Many investigators have been working here who do not ordinarily concern themselves with oceanography. It is also good to report that much of the new work is increasing our knowledge of the sea and will be of lasting importance to oceanography at the end of the war.

Research Vessel Atlantis

It was decided early in the year to send the "Atlantis" to the Caribbean or the Gulf of Mexico in order to secure observations which would be used for studying various phases of the heat and water vapor exchange between the sea and the atmosphere. The preparations for this cruise consumed all of January, for there was much to be done to outfit the vessel for work at sea under war time conditions.

While cruising down the coast one night early in February the "Atlantis" was struck a glancing blow by a tanker. The collision occurred near Cape Hatteras and the "Atlantis" was able to put in to Norfolk under her own power. The starboard rail was badly bent inward for about 40 feet while a number of frames in the middle part of the vessel were sprung and a fair size hole was made above the waterline just aft of the main rigging.

Fortunately we were able to persuade the Newport News Shipbuilding and Drydock Company to undertake the repairs, and within two weeks the "Atlantis" was as good as new and able to proceed down the coast. The cost of the repairs, amounting to about $10,000, was entirely taken care of by insurance.

By the time the "Atlantis" reached Key West the Caribbean had become unsafe, so it was decided to work in the central part of the Gulf of Mexico. During March and April, under Mr. Woodcock's direction, a very complete study of diurnal temperature variations near the surface was carried out there. It is believed that these data are unique. They have enabled us to study the relative importance of the several variables which combine to produce vertical temperature changes at shallow levels. Further observations on the effect of the wind on the pattern of convectional circulation near the surface were also secured.

Early in May the "Atlantis" put in at Galveston for fuel and stores. While she was in port enemy submarines began to operate in the Gulf of Mexico. Insurance rates went sky high and it was decided that further work at sea would be impractical. With the approach of the hurricane season it became possible to move her to Lake Charles, Louisiana, where she could be moored in a much better protected spot. She has been there ever since.

Captain F. S. McMurray of the "Atlantis" left to take command of a cargo steamer and others left for various reasons so that by the end of the year the crew was reduced to only three men in place of the usual seventeen. Meanwhile, the vessel has been put in excellent condition, the entire deck having been caulked and all interior surfaces cleaned off and repainted. Thus upkeep is now reduced to a minimum.

Research Vessel Anton Dohrn

Throughout the year the "Anton Dohrn" has been used along the coast, between Maine and North Carolina. She has worked mainly by day, returning to port nearly every night. Such operations involve no more risk than that accepted by the fishing fleet and it has seldom seemed necessary to take out special insurance. Thus through the "Anton Dohrn" we have continued to secure some observations, although at relatively short distances from the land. At the same time it has been possible to make many minor improvements so that she has been gradually transformed into a most useful and convenient vessel.

Motor Boat Asterias

The "Asterias" has likewise been employed continuously in local waters. She has been used for a wide variety of purposes, and there has been much building in and ripping out of equipment. By the end of the war she will bare many honorable scars.

Laboratory Equipment

Besides the expansion in our shop facilities, begun last year and continued during 1942, we have made considerable additions to the furniture and fixtures in the main building. A big chemical table was built into one of the second floor laboratories, so that we now have three large rooms equipped for chemical work. In several cases, by means of temporary partitions, extra laboratory space has been gained. The storage facilities in the attic have been improved and increased. At the same time of course it has been necessary to increase our stock of commonly used laboratory equipment. Thus, out of our own funds, we have in many ways improved the usefulness

of the laboratory, both during the present emergency and for the years to come.

Personnel

At the Annual Meeting of the Trustees Dr. Alfred C. Redfield was appointed Associate Director and he arranged for a year's leave of absence from Harvard University. At the same time two new staff appointments were made: Dr. E. Bright Wilson, Jr. as Associate in Chemistry and Mr. Alfred H. Woodcock as Associate in Oceanography.

Fellowship holders who worked at the laboratory during the summer were: Dr. Robert Pyle, Dr. George Whiteley, Mr. William Schallek, Mr. George Scott and Mr. Donald B. Johnstone.

Visiting investigators included Dr. Lawrence Irving, Dr. Pierre Scholander, Dr. George Edwards, Dr. and Mrs. Earl Myers, Mr. Gerome Brush, Mr. D. W. Bishop and Mr. D. W. Claff.

During the year a number of persons connected with the laboratory have gone on active duty with the armed forces: Lieut. Commander Floyd Soule in the Coast Guard Reserve, Lieut. Francis Kinnicutt in the Naval Reserve, Lieut. T. N. Kelley in the Coast Guard Reserve, Lieut. (j.g.) Mary Sears in the Women's Reserve, U. S. Naval Reserve, Ensign Herbert Schroeder in the Coast Guard Reserve, Second Lieut. George Kelly in the Marine Corps Reserve and Private William Condon in the Army.

Library

Our contribution to the library of the Marine Biological Laboratory was again $800. This sum was spent as follows: 18 subscriptions to current journals and monographs, 15 books purchased, 2 back sets completed by purchase, 3 back sets partly completed by purchase and 95 volumes bound. Seventeen current journals were received in exchange for our publications and 9 were received as gifts.

Publications

Number 2 of Volume IX of "Papers in Physical Oceanography and Meteorology" appeared.

The following contributions were published during 1942:

No. 184. J. L. Hough. Sediments of Cape Cod Bay, Massachusetts. *Jour. Sedimentary Petrology*, Vol. 12, No. 1, pp. 10–30.

No. 286. Floyd M. Soule. Physical Oceanography—The Grand Banks Region and the Labrador Sea in 1940. Excerpt from International Ice Observation and Patrol Service in the North Atlantic Ocean. Season of 1940, *U. S. Coast Guard Bull.*, pp. 36–89.

No. 291. H. R. SEIWELL. An Analysis of Vertical Oscillations in the Southern North Atlantic. *Proc. Am. Philos. Soc.*, Vol. 85, No. 2, pp. 136–158.

No. 292. THEODOR VON BRAND and MORRIS W. RAKESTRAW. Decomposition and Regeneration of Nitrogenous Organic Matter in Sea Water. IV, Interrelationship of Various Stages; Influence of Concentration and Nature of Particular Matter. *Biol. Bull.*, Vol. LXXXI, No. 1, pp. 63–69.

No. 297. FRED B. PHLEGER, JR. Foraminifera of Submarine Cores from the Continental Slope, Part 2. *Bull. Geol. Soc. Amer.*, Vol. 53, pp. 1073–1098.

No. 304. RICHARD E. LEE. The Occurrence of Female Swordfish in Southern New England Waters, with a Description of their Reproductive Condition. *Copeia*, No. 2, pp. 117–119.

No. 305. R. B. MONTGOMERY and M. J. POLLAK. Sigma-T Surfaces in the Atlantic Ocean. *Sears Found. Jour. Mar. Res.*, Vol. V, No. 1, pp. 20–27.

No. 307. ROBERT W. PENNAK. Harpacticoid Copepods from some Intertidal Beaches near Woods Hole, Massachusetts. *Trans. Am. Micro. Soc.*, Vol. LXI, No. 3, pp. 274–285.

No. 308. ALFRED C. REDFIELD. The Processes Determining the Concentration of Oxygen, Phosphate and other Organic Derivatives within the Depths of the Atlantic Ocean. *Papers in Physical Oceanography and Meteorology*, Vol. IX, No. 2, pp. 1–22.

No. 309. WILLIAM C. SCHROEDER. Results of Haddock Tagging in the Gulf of Maine from 1923 to 1932. *Sears Found Jour. Mar. Res.*, Vol. V, No. 1, pp. 1–19.

No. 310. W. H. JOHNSON. Effect of Light on Copepods as Food for Passamaquoddy Herring. *J. Fish. Res. Bd. Can.* 5(4), pp. 365–376.

No. 311. CHARLES E. RENN. Demonstration of Labyrinthula Parasite in Eel-Grass from the Coast of California. *Science*, Vol. 95, No. 2457, pp. 122.

No. 312. C. O'D ISELIN. Interaction Between the Hydrosphere and the Atmosphere. *Trans. N. Y. Acad. Sci.*, Series II. Vol. 4, No. 3, pp. 99–106.

No. 314. EARL H. MYERS. Rate at which Foraminifera are Contributed to Marine Sediments. *Jour. Sedimentary Petrology*, Vol. 12, No. 2, pp. 92–95.

No. 315. GORDON A. RILEY. The Relationship of Vertical Turbulence and Spring Diatom Flowerings. *Sears Found. Jour. Mar. Res.*, Vol. V, No. 1, pp. 67–87.

No. 316. EARL H. MYERS. Biological Evidence as to the Rate at which Tests of Foraminifera are Contributed to Marine Sediments. *Journal of Paleontology*, Vol. 16, No. 3, pp. 397–398.

No. 317. RICHARD E. LEE. The Hydrophysics of the Broad-billed Swordfish, *Xiphias gladius L. Biol. Bull.*, Vol. LXXXII, No. 3, pp. 401–412.

No. 318. ATHELSTAN F. SPILHAUS. Maps of the Whole World Ocean. *Geog. Rev.*, Vol. XXXII, No. 3, pp. 431–435.

No. 320. OLGA HARTMAN. Report on the Scientific Results of the Atlantis Expeditions to the West Indies under the Joint Auspices of the University of Havana and Harvard University. The Polychaetous Annelida. *Mem. Soc. Cub. Hist. Nat.*, Vol. 16, No. 2, pp. 89–104.

No. 321. THEODOR VON BRAND, NORRIS W. RAKESTRAW and J. WILLIAM ZABOR. Decomposition and Regeneration of Nitrogenous Organic Matter in Sea Water. V. Factors Influencing the Length of the Cycle; Observations upon the Gaseous and Dissolved Organic Nitrogen. *Biol. Bull.*, Vol. 83, No. 2, pp. 273–282.

No. 322. FENNER A. CHACE, JR. Reports on the Scientific Results of the Atlantis Expeditions to the West Indies, under the Joint Auspices of the University of Havana and Harvard University. The Anomuran Crustaces. I Galatheida (Families Chirostylidae, Galatheidae and Porcellanidae). *Torreia*, No. 11, pp. 1–106.

No. 324. RICHARD E. LEE. Notes on the Color Changes of the Sea Robin (*Prionotus strigatus* Cuvier) with Special Reference to the Erythrophores. *Jour. Exper. Zool.*, Vol. 91, No. 2, pp. 131–153.

Scientific Program

The study of the "Atlantis" plankton collections from Georges Bank continued throughout the year under Dr. Clarke's direction. Mr. Bumpus devoted his time to this work until the spring when Miss Delabarre took over. Dr. Sears also devoted much of her time to plankton studies. Although no new collections were secured, except those brought back from Peru in April by Dr. Sears, the existing material was more than sufficient to keep the available staff busy. During the summer months Dr. Whiteley cooperated in the identification and enumeration of the larger forms. Considerable progress was made in the preparation of final reports on various phases of all of this work.

Dr. Waksman and Dr. Carey resumed their studies of marine bacteria during the summer, assisted by Mr. Johnstone. They studied the role of bacteria in the transformation of copper in the sea and the effect of copper on bacterial development. These investigations have been continued by Mr. Johnstone at Rutgers.

Dr. Irving and his many assistants and associates have continued working on the rate of metabolism of marine organisms. Thus all summer we had an active physiological group in the laboratory.

Dr. Pyle, a fellowship holder, worked on the development of the sinus gland in crustacea. Mr. Lee, another fellowship holder, spent the summer completing the work he had begun the previous year. He managed to complete two reports before taking a position at New York University. Mr. Scott working under Dr. Redfield's direction studied the relationship of the mineral environment on the chemical composition of living cells. He found that the amounts of calcium, sodium, magnesium and potassium in a mineral environment determine the ratio and concentration of these ions combined by the protoplasm in an algal cell. Finally, Dr. and Mrs. Myers, as visiting investigators, were busy with their large collection of foraminifera from the Dutch East Indies. In September they left Woods Hole to work at the Hopkins Marine Station in California.

This very brief summary of the biological work in progress here during the past year should serve to indicate that in spite of the war we have not

forgotten our obligation to support and to encourage the study of the ocean in all its aspects. Although the physical side of our program has been much less active, this still remains a laboratory where all qualified investigators who are interested in the sea are welcome. It is believed that it will not become necessary to change this policy and that the only serious restriction to pure oceanography is the limitation which the war has imposed on field observations.

V. STAFF

(As of December 31, 1942)

COLUMBUS O'D. ISELIN, Associate Professor of Physical Oceanography, Harvard University, and Assistant Curator of Oceanography Museum of Comparative Zoölogy; Director.

ALFRED C. REDFIELD, Professor of Physiology, Harvard University; Associate Director.

CORNELIA L. CAREY, Assistant Professor of Botany, Barnard College; Associate in Marine Bacteriology.

GEORGE L. CLARKE, Associate Professor in Biology, Harvard University; Marine Biologist.

WILLIAM MAURICE EWING, Associate Professor in Geophysics, Lehigh University; Associate in Submarine Geology.

BOSTWICK H. KETCHUM, Associate in Marine Biology.

RAYMOND B. MONTGOMERY, Lecturer on Maritime Meteorology and Oceanography, Assistant Professor of Meteorology, New York University; Physical Oceanographer.

ALBERT E. PARR, Director of American Museum of Natural History, New York; Associate in Oceanography.

FRED B. PHLEGER, JR., Associate Professor of Geology, Amherst College; Submarine Geologist.

NORRIS W. RAKESTRAW, Associate Professor of Chemistry, Brown University; Chemical Oceanographer.

CHARLES E. RENN, Tutor in Biology and Instructor in Sanitary Engineering, Harvard University; Associate in Marine Bacteriology.

GORDON A. RILEY, Marine Biologist, Yale University; Marine Physiologist.

C.-G. ROSSBY, Professor of Meteorology, University of Chicago, and Assistant Chief, U.S. Weather Bureau, Washington, D. C.; Associate in Physical Oceanography.

MARY SEARS, Instructor in Zoölogy, Wellesley College; Planktonologist.

H. R. SEIWELL, Physical Oceanographer.

FLOYD M. SOULE, Principal Physical Oceanographer, U. S. Coast Guard; Associate in Physical Oceanography.

ATHELSTAN F. SPILHAUS, Associate Professor of Meteorology, Chairman of the Department of Meteorology, New York University; Physical Oceanographer.

HENRY C. STETSON, Research Associate in Paleontology, Museum of Comparative Zoölogy; Submarine Geologist.

SELMAN A. WAKSMAN, Microbiologist, New Jersey Agricultural Experiment Station; Marine Bacteriologixt.

EDMOND E. WATSON, Assistant Professor of Physics, Queen's University; Physical Oceanographer.

E. BRIGHT WILSON, JR., Associate Professor of Chemistry, Harvard University; Associate in Chemistry.

ALFRED H. WOODCOCK, Assiociate in Oceanography.

CHARLOTTE S. GRIFFIN, Secretary to the Associate Director.

HELEN F. PHILLIPS, Secretary to the Director.

WILLIAM C. SCHROEDER, Business Manager.

ETHELYN T. BIRD, Secretary.

WILLIAM SCHROEDER, Superintendent of Buildings and Grounds.