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Annual Report

July 1, 1968 - June 30, 1969

Marine Sciences Research Center  
State University of New York  
Stony Brook, New York 11790

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ORGANIZATION

State University of New York

Chancellor Samuel B. Gould

State University of New York at Stony Brook

President John S. Toll

Vice President for Academic Affairs H. Bentley Glass

Marine Sciences Research Center

Donald F. Squires, Director

Marine Sciences Research Center Advisory Committee

<p>Dr. Meir H. Degani Department of Science Maritime College at Fort Schuyler</p>	<p>Dr. Robert A. Sweeney Great Lakes Laboratory State University College at Buffalo</p>
<p>Dr. Robert D. Hennigan Water Resources Center State University College of Forestry Syracuse University</p>	<p>Dr. Thomas W. Donnelly Department of Geology State University of New York at Binghamton</p>
<p>Dr. John M. Kingsbury Department of Botany Cornell University</p>	<p>Dr. Robert Allen Chairman, Statewide Biology Comm. State University of New York at Albany</p>
<p>Dr. Vincent J. Schaefer Atmospheric Research Center State University of New York at Albany</p>	<p>Mr. Robert Sykes Director Lake Ontario Environmental Laboratory State University College at Oswego</p>
<p>Mr. Walter L. Smith Department of Life Sciences and Marine Technology Suffolk County Community College</p>	<p>Dr. John Jones Lake Erie Environmental Studies Program State University College at Fredonia</p>
<p>Dr. John F. Storr Department of Biology State University of New York at Buffalo</p>	<p>Dr. Raymond F. Jones Department of Biological Science State University of New York at Stony Brook</p>



## Research Faculty

Edward R. Baylor, Senior Research Biologist; Professor of Biological Sciences  
 Thomas F. Goreau, Resident Director of the Discovery Bay Laboratory; Professor of Biological Sciences (Stony Brook)  
 M. Grant Gross, Research Oceanographer; Associate Professor of Oceanography  
 Stephen Obrebski, Assistant Research Biologist; Instructor in Biological Sciences  
 Donald F. Squires, Director; Professor of Biological Sciences; Professor of Earth and Space Sciences  
 Peter K. Weyl, Senior Research Oceanographer; Professor of Oceanography  
 George C. Williams, Senior Research Biologist; Professor of Biological Sciences

### Staff of the Marine Sciences Research Center

Assistant to the Director	Peter K. deNyse
Special Assistant for Sea Grant Activities	Judith D. Smith
Manager, Discovery Bay Laboratory	Richard S. Jackson (through November 10, 1968) Yehoshua Neumann (November 12, 1968 - July 11, 1969)
Technical Assistants	Renzo Simeone Lester Kiehn
Secretarial Staff	Lorraine Glynn Marian Hannifin June Weiner Leona Peters
Research Assistants	Chien Chang Mike Scheffler Karen Hendriksen

## DIRECTOR'S REPORT

### Mandate

The Marine Sciences Research Center was established through resolution of the Board of Trustees of State University of New York on March 11, 1965: Resolved that the President be, and hereby is, authorized to proceed with the establishment of a Marine Sciences Research Center as a part of the State University of New York at Stony Brook, with the understanding that the Center will serve as a University-wide program and that the responsibility and authority for operation of such a Center will be vested in the administration and faculty of that institution.

### Introductory Statement

Prof. H. Bentley Glass, Vice President for Academic Affairs, State University Center at Stony Brook, assumed acting directorship of the Marine Sciences Research Center at the time of its establishment and began recruitment of staff. In September, 1966 Dr. Peter K. Weyl was appointed to the Research Faculty with a joint appointment as Professor of Oceanography, Department of Earth and Space Sciences. Associate Professor of Biological Sciences George C. Williams and Instructor of Biological Sciences Stephen Obrebski were also given joint appointments to the Center at that time.

In September, 1967 Prof. Thomas Goreau was appointed jointly to the faculty of the Center, the Department of Biological Sciences at Stony Brook and the Department of Physiology at the University of the West Indies. Several junior staff members and secretaries joined the Center in 1967 and 1968.

Early in the Center's history, the State University acquired a 168.5-acre site at Flax Pond under the leadership of Prof. Frank Erk of the Department of Biological Sciences and other members of the faculty. A wooden bridge connecting the mainland with the barrier beach at Flax Pond was built in the summer of 1968 under the supervision of Dr. Oakes Ames, Assistant to Prof. Glass. With the help of Drs. Weyl and Goreau, President Toll made preliminary arrangements to have the Discovery Bay Laboratory sponsored jointly by the University of the West Indies and the State University at Stony Brook. Professor Goreau was named Director of this facility.

The present Director of the Marine Sciences Research Center, Dr. Donald F. Squires, was appointed in September, 1968, also joining the Departments of Earth and Space Sciences and Biological Sciences. At the same time Drs. Grant Gross and Edward Baylor were also named to the Center staff, with joint appointments as Associate Professor in the Earth and Space Sciences Department, and Professor of Biological Sciences, respectively.

From its inception the Marine Sciences Research Center has been developing as a focus for environmental studies, particularly as they apply to the estuarine and oceanic coastline of New York State. This role is dictated by two main factors: The proximity of Long Island Sound, the bays of Long Island and the New York Bight to Metropolitan New York makes this area a natural laboratory for the study of man's impact upon the marine environment. Secondly, local environmental degradation already caused by man's industrial and domestic pollutants has had a depreciatory effect on the quality of life on Long Island. Research and study programs concerned with the complex interactions of local environmental problems were launched during the year of this report.

Environmental studies undertaken without the cooperation and understanding of industry and local and state government are destined to be ineffective. Thus, in the first year of operation the Center has made a considerable effort to identify the industrial and governmental organizations having an interest in the local environment so that mechanisms for future activities and liaisons can be established. The Technical Assistance Office and the Regional Marine Resources Council have been particularly helpful in this area.

In recognition of the complexity of environmental research the Center has undertaken to identify the disciplines that must participate in its studies and those persons in the University system whose interests may contribute to its objectives. Because of the serious leadership problem inherent in a program of such diversity, the Center has begun to develop a Research Faculty representing a broad range of disciplines in the natural, engineering and social sciences, to act as project leaders in the Center's research programs. Thus, the Center is developing as an organization which not only performs administrative functions but also provides intellectual leadership in a wide range of disciplines spanning a statewide system of two-year campuses university colleges and university centers. The key to success in this effort will be the assemblage of an interacting group of creative researchers who through their cross disciplinary activities will develop a broad appreciation of today's pressing environmental problems, thus providing the new approaches and techniques needed to solve them. Such a faculty will also serve as a core intellectual resource in the development funding of research activities.

The Center's program above all should not exclude projects and activities introduced from outside; rather it should serve as a nucleus for the development of research activities and provide a body of expertise to assist in the development of projects by researchers throughout the university

system. Much of the report year has been spent implementing the concept of the research faculty and project leadership through conversations on many State University campuses and the development of facilities for research and instruction.

University-wide Advisory Committee

Two meetings of the Advisory Committee of the Marine Sciences Research Center were held during the year: October 31, 1968 at the New York City offices of State University of New York; April 17, 1969 at State University Maritime College, Fort Schuyler. In addition to reviewing the general philosophy of the Center, the Committee gave particular attention to the development by the Marine Sciences Research Center of facilities for marine research and instruction. At the April meeting a subcommittee composed of Drs. Donnelly (Chairman), Storr and Degani was formed to advise the Committee and the Director on priorities for facilities development.

The Committee reviewed and approved for submission to campus administration titles for the Center's Research Faculty, which parallel academic titles:

Professor	- Senior Research Oceanographer
Associate Professor	- Research Oceanographer
Assistant Professor	- Assistant Research Oceanographer

The Committee also approved a system of titles for persons desiring affiliation with the Center. These include Research Associate, Research Affiliate and Member.

The Advisory Committee will be an important arm of the Marine Sciences Research Center in the development of its program, particularly where it concerns the involvement of the University community as a whole. Not the least of its considerations have been the Great Lakes laboratories being developed by the three University Colleges located on the Great Lakes, inasmuch as the Great Lakes are considered a part of the marine environment by the Federal granting community. The active participation of the Advisory Committee in the planning and guidance of the Center's programs will assure that this unique experiment in centralized development and research programming will maximally benefit the State University of New York.

## Staff Changes

It is with deep regret that the Marine Sciences Research Center records the death of Richard S. Jackson on November 10, 1968 resulting from injuries sustained in an automobile accident. Mr. Jackson has served as Manager of the Discovery Bay Laboratory and as Director of Diving Operations. He will be sorely missed by all who have used the facility. Mr. Yehoshua Neumann was appointed to replace Mr. Jackson temporarily, pending the selection of a new Laboratory Manager.

Mr. Renzo Simeone resigned as Technical Specialist in the Chemical Laboratory, Marine Sciences Research Center, to continue his education. He was replaced on an interim basis by Mr. Robert Kalin, a graduate student in the Department of Earth and Space Sciences.

Mr. Stephen Obrebski, Assistant Research Biologist, resigned from the Center on January 31, 1969 in order to undertake independent research in Corsica. A successor is being sought.

New faculty appointments were made on September 1, 1968. They included: Dr. Edward R. Baylor, a graduate of the University of Michigan and most recently a member of the Woods Hole Oceanographic Institution research staff, whose particular research interests include sensory physiology, behavior of vertebrates and invertebrates, zooplankton aggregations and population estimates of fish food organisms. Dr. Baylor has a joint appointment in the Department of Biological Sciences at Stony Brook.

Dr. M. Grant Gross, appointed as Research Oceanographer, was formerly associated with the Division of Sedimentology of the National Museum of Natural History, Smithsonian Institution. Dr. Gross, who continues a joint appointment with the Department of Oceanography at the University of Washington, is particularly interested in radioactivity in the ocean, particle-water interactions, sedimentary processes, stable isotopes and carbonate sediments. He has been jointly appointed to the Department of Earth and Space Sciences at Stony Brook as Associate Professor of Oceanography.

Dr. Donald F. Squires, appointed as Director of the Center, is also jointly appointed to the Department of Earth and Space Sciences and the Department of Biological Sciences. Dr. Squires previously served as Deputy Director of the Smithsonian's Museum of Natural History. His research interests are in systematics and ecology of deep-water corals and in communications systems within the biological sciences.

## University-wide Activities

In conjunction with the Marine Sciences Research Center's efforts to establish liaison throughout the State University, the Director spent a significant portion of the winter and spring, 1968-69, traveling to 13 State University campuses. The purpose of these trips was to introduce administrators, faculty and students to the Marine Sciences Research Center--its statewide nature, programs existing and planned, opportunities available for research and study through its auspices, etc.--as well as to ascertain the marine capabilities and interests of each campus. Visits were made to State University Centers at Albany, Binghamton, Buffalo; the Cornell University Contract Colleges; State University Colleges at Fredonia, Brockport, Buffalo and New Paltz; the Maritime College at Fort Schuyler; and Farmingdale Agricultural and Technical College as well as Nassau and Suffolk County Community Colleges.

An important result of these visits is an awareness of the scope of marine research being undertaken throughout the State University system and the breadth of competence of the system in both research and instruction. From the contacts made will develop the Center's ability to involve researchers from other campuses in marine activities.

During the 1968-69 academic year the Marine Sciences Research Center sponsored 11 seminars, which were presented at various State University campuses. The seminars frequently attracted faculty and students from nearby State University colleges as well as from the host campus. Following is a list of guest speakers, their affiliations and topics of discussion, and the campuses at which they spoke.

Dr. John Lee, College of the City of New York; Microfauna in a square millimeter of ocean bottom; State University at Stony Brook.

Dr. John Bunt, University of Miami; Sea ice as a site of primary productivity; State University College at Plattsburgh.

Dr. John Kingsbury, Cornell University; Economics of Irish moss; Suffolk County Community College.

Dr. Peter Dehlinger, University of Connecticut; The origin of the Juan de Fuca and Gorda ridges in the northeast Pacific; State University at Albany.

Dr. Allan Faller, University of Maryland; Recent studies of flow discontinuity circulation; State University at Albany.

Dr. Redwood Wright, Woods Hole Oceanographic Institution;  
Potential energy and the circulation of the North Atlantic;  
State University at Stony Brook.

Dr. Jack Pearce, Sandy Hook Marine Laboratory; Some quanti-  
tative aspects of benthic ecology; State University at Stony  
Brook.

Dr. John McN. Sieburth, University of Rhode Island; Gelbstoff  
and food chains in the ocean; State University at Stony Brook.

Dr. Edward Baylor, Marine Sciences Research Center; Plankton  
biology through underwater acoustics; Alfred University.

Dr. Joel Hedgpeth, Oregon State University; Flora and fauna  
of the Galapagos Islands; State University at Stony Brook.

Dr. David Allee, Cornell University College of Agriculture;  
Some studies in support of planning in Southold, Long Island;  
State University at Stony Brook.

## Conferences

Two-year-college conference. To encourage maximum two-year-college participation in a comprehensive statewide marine program, the Marine Sciences Research Center held on May 16 and 17, 1969, a conference on marine technology training programs for faculty and administrators from these schools. Initially 60 persons from 22 colleges responded to an open invitation to attend the meeting; financial limitations and scheduling conflicts kept the final roster down to 40 persons from 19 colleges. The following persons attended:

Mr. Glenn Fairchild	State University Agricultural and Technical College, Alfred
Mr. David Schwert	
Prof. Jane Katz	Bronx Community College
Mr. Mitchell Wenzel	
Prof. Richard Heller	
Mr. Harold Hill	
Prof. David Sterling	Broome Technical Community College
Prof. Floyd West	
Mr. William Nelson	State University Agricultural and Technical College, Delhi
Mr. Robert Tillman	Dutchess Community College
Mr. William Jacobs	
Mr. Wendell Hinkey	
Dr. Louis Pyenson	State University Agricultural and Technical College, Farmingdale
Prof. H. E. Barke	
Prof. Donald Swan	
Dr. Michael Abbatiello	
Prof. William Moore	
Prof. Charles Erlanger	
Mrs. Barbara L. Pickard	Hudson Valley Community College
Prof. Irving Resnick	Kingsborough Community College
Mr. M. Jay Brown	Manhattan Community College
Prof. Stanley F. Cornish	Mohawk Valley Community College
Prof. Walter Scheible	Monroe Community College
Raymond A. Wood, Ph.D.	Orange County Community College
Eugene Leff, Ph.D.	Queensborough Community College
Mrs. Blossom Fleming	Rockland Community College
Mr. Albert Burchsted	Staten Island Community College
Miss Pamela Carlton	
Mr. Joel Schwartz	

Prof. Walter Smith  
 Prof. C. Douglas Hardy  
 Mr. John Black  
 Mr. William H. Pease, Jr.

Suffolk County Community College

Mr. Walter Moore  
 Mr. Edward Rushbrook

Sullivan County Community College

Mr. Robert Sena  
 Mr. Roger Beaulieu

Ulster County Community College

The meeting began Friday afternoon, May 16, with a panel discussion followed by a question and answer period. Serving as panelists were Capt. T. K. Treadwell of the U.S. Naval Oceanographic Office, Washington; Dr. Walter Brooking of the U.S. Office of Education, Washington; Dr. Edward F. Mackin, Vice President of the Massachusetts Board of Regional Community Colleges, Boston; and Prof. Walter Smith, Chairman of the Marine Sciences and Technology Program, Suffolk County Community College, Selden, N.Y. The discussion chiefly concerned the role of the two-year colleges (agricultural and technical, community) in training marine technologists, focusing upon job opportunities and curriculum needs, all within a general framework of, "Exactly what is marine technology, anyway?" That evening at dinner Dr. Squires outlined both the current status and the projected goals of the Marine Sciences Research Center.

On Saturday morning the group broke up into informal working sessions, each led by one of the previous day's panelists. A final summary meeting was addressed by Mr. Ronald Fink of the Two-Year College Office, Albany. Before adjourning, the conferees voted to establish a committee to assist and coordinate marine technology training throughout State University. The committee will study the professional needs in this field to determine the knowledge and skills required to meet these needs and to plan curricula accordingly. It was suggested that such a study might be supported with Sea Grant funds.

Saturday afternoon, participants were taken on a tour of the Flax Pond research and study facility and the marine technology laboratory at Suffolk County Community College.

Long Island Sound Conference. On December 14, 1968 Yale University and the Marine Sciences Research Center cosponsored the first of a series of informal conferences concerned with research on Long Island Sound. The meetings are intended to provide a forum for discussions of this research in order to promote cooperative studies. The first all-day session acquainted people working in the area with one another and outlined exactly what research was being done or was planned. Attending from State University Were:

Marine Sciences Research Center. Edward R. Baylor, M. Grant Gross, Donald F. Squires, George C. Williams, Peter K. deNyse

State University Maritime College at Fort Schuyler: Joseph D. Longobardi, Joseph J. Pescatore, David Epstein

Suffolk County Community College: John A. Black, Charles D. Hardy, Walter L. Smith.

A second conference was planned, to be sponsored by the Marine Sciences Research Center.

Newsletter

Vol. 1, No. 1 of the Marine Sciences Research Center Newsletter was issued in April, 1969, the first of a series intended to transmit throughout State University and to interested outsiders developments in the University's expanding marine program. Circulation of the Newsletter within State University serves the Center's mandate to operate on a statewide basis by keeping the University community abreast of opportunities for marine work and study as they become available. The initial issue described the Center and its history, listed members of the Research Faculty and Advisory Committee, introduced the Center's outlying laboratory facilities and recently inaugurated research programs, etc. At present, the Newsletter is scheduled to appear three times yearly--spring, fall and winter--with a flexible format geared to accomodating news as it occurs as well as lengthier discussions of ongoing programs, facilities and other topics of interest. Over 250 copies of the first issue were distributed to all State University campuses (libraries, faculty and administrators), Central Administration and persons at outside agencies participating in the Center's marine programs and planning processes.

## Sea Grant

State University is joining Cornell in applying as a consortium for Institutional support under the provisions of the National Sea Grant Act of 1966. Since September, 1968 and probably through November, 1970 these institutions will be working to 1) develop an integrated, multi-disciplinary Sea Grant program, consisting of research, training and extension services designed to spur the utilization and management of New York State's marine resources; and 2) prepare a document to submit to the National Science Foundation requesting long-range Sea Grant support. Within the period of this report the following activities serving these goals have been carried out.

1. A Special Assistant for Sea Grant Activities, who will gather information on Sea Grant programs and write the proposal, joined the staff of the Marine Sciences Research Center in November, 1968.
2. Introductory letters were sent to the Vice President of Academic Affairs of all State University campuses, requesting information on current and planned programs of marine training and education. Approximately 30 per cent of the campuses responded, listing this information as well as providing the names of faculty members engaged in research projects with a marine facet or having marine interests present but undeveloped. Correspondence on an individual basis has proceeded with some of the persons, and the Director has met with many on his visits to SUNY campuses.
3. A meeting of two-year colleges concerning marine technology training programs was held at the Marine Sciences Research Center on May 16 and 17, 1969 (described elsewhere in this report).
4. "Notice of Research Project" summaries for all sponsored marine research underway within State University have been obtained with the help of the Research Foundation. Information on internally supported research, pilot programs, etc., has been obtained via other channels, such as annual reports and personal communications.
5. Work began on an application for a \$15,000 planning grant, for one year, to cover expenses related to development of the final proposal. Such expenses include the salary of the Special Assistant for Sea Grant Activities, support for disciplinary and structural conferences, travel of key planning personnel to strategic SUNY campuses and Cornell,

and other miscellaneous items.

6. Mr. Robert Hennigan, Director, State University Water Resources Center, College of Forestry at Syracuse U., has been designated administrator of the Great Lakes sector of the Sea Grant program, its being divided into two provinces--marine and the Great Lakes.

## Community Services

The Director of the Marine Sciences Research Center served as a member of the Regional Marine Resources Council of the Nassau-Suffolk Regional Planning Board. In this capacity he was able to effectively communicate the program of the Marine Center to the Council composed of civic leaders, members of local, state and federal agencies and interested citizens. Participation in the programs of the Regional Marine Resources Council and joint research efforts will be an important part of the community liaison of the Center.

During the year the staff of the Center lectured to many civic groups.

"Marine Alert", a public service for the coastal area of Long Island Sound (New York and Connecticut) and the Atlantic coastal areas of Long Island and New Jersey was instituted in November, 1968. The Center maintains a 24-hour answering service to receive calls from residents of these areas who wish to report unusual or untoward happenings, such as large fish die-offs, oil spills, rubbish on beaches, etc. The information is relayed to the cognizant Federal, state or local agency for action. A follow-up call to the initial caller informs him of the action taken by the agency contacted. If the occurrence is of interest to Center's staff, they may also visit the caller. The service has been well received with substantial publicity in local newspapers.

Not only does the service indicate to the public the interest of the Marine Sciences Research Center in environmental problems, but it also informs the staff of local marine-related events that may be scientifically interesting.

From the initiation of the program through June, 1969, 23 calls were received by the Center. The predominant number (10) concerned oil slicks in the Sound and the New York Bight. In one instance immediate action by the U.S. Coast Guard resulted in the apprehension of a long-time offender. The presence of floating or beached debris, and unusual fish and plankton phenomena followed the slicks in frequency of reporting.

The following agencies cooperated with the Center in handling the reports: U.S. Coast Guard, N.Y.S. Department of Conservation, Federal Water Pollution Control Agency Office at Metuchen, N.J., Suffolk County Health Department, Nassau County Public Works and Health Departments, and the Connecticut Water Resources Commission. The agency contacted depended upon the location and nature of the marine event.



## FACILITIES

### The Marine Sciences Research Center

From its inception the Marine Sciences Research Center has been housed with the Department of Earth and Space Sciences. Initially in the Physical Laboratories Building, the Center moved in November, 1968 into 9,000 square feet of space in the newly constructed Earth and Space Sciences Building. In addition to central office spaces and faculty offices, three large laboratories have been assigned to the Center: Geochemistry--1,400 square feet; Physical Oceanography--1,400 square feet; and Biological Oceanography--1,400 square feet. The Center is fortunate to have such excellent quarters in a new, fully air-conditioned, excellently equipped laboratory facility.

During the year the faculty of the Center have devoted considerable time to the design of a projected, permanent building to house the Marine Sciences Research Center on the Stony Brook campus. The decision to seek quarters on the campus follows the recommendations of consultants and of the Advisory Committee and recognized that modern marine research requires access to the facilities of a major campus including students, libraries, computers and specialized laboratories rather than proximity to the sea. Following the recommendations of the Advisory Committee and correspondence with other similar laboratories in the United States, a proposed building is planned to house 30 faculty of the Center, 60 visiting faculty, and 120 graduate students. Although the program has been designed for a totally new structure, it is probable that the Marine Sciences Research Center will locate in an existing building appropriately rehabilitated. To provide research facilities for all campuses and a scope of visiting faculty such as that proposed, a net square footage of 68,000 square feet is projected.

### The Flax Pond Field Study Site

During the year the Flax Pond Field Study area was utilized for field trips and research.

Improvements to the Flax Pond area during the report year included: 1. construction of a footbridge linking the main drive along the southern boundary of the pond with the island, thus providing access from the mainland to the barrier beach without trespassing on privately owned land. The bridge also enables students to cross the tidal channel without disturbing the muddy bottom. It had been noted that such

disturbances were having a deleterious effect upon organisms on either side of the crossing area. 2. Gates were erected at the entrance to the parking lot and to the lane leading to the footbridge and appropriate notices installed as a preliminary measure to reduce trespass.

During the year the construction of the marine laboratory of the Division of Marine Fisheries, New York State Conservation Department was completed on the Flax Pond site. The new laboratory, approximately 15,000 net square feet in size, includes three enlarged laboratories for shell fish culture and algae studies and a circulating sea system that draws water from the southeastern portion of the pond. The building was occupied by the Department in April, 1969. It is planned to undertake a number of cooperative programs using this new research facility.

A program for the State University Laboratory at Flax Pond was written and submitted to the university architects. The structure is envisioned as containing two large laboratories suitable for research or class instruction having water table as well as laboratory benches. General support facilities include workshops, cold room, dark rooms, tec., and a number of separately accessed faculty and graduate research rooms. The net area of the laboratory including a number of subsidiary aquarium shelters is estimated at 15,000 square feet. The concept of the aquarium shelter was adopted to provide maximum flexibility of use for the area. It is anticipated that demand for the use of the laboratory will be greatest during the summer, and that during this period "open-and-close" shelters providing some protection from the elements would be most utilitarian. The same shelters could be used during the winter to house experimenters working in colder temperatures. No architect has been selected for the project, but it is hoped that the facility can be completed by the summer of 1972.

## Utilization of Flax Pond, July 1, 1968 - June 30, 1969

<u>Dates</u>	<u>Person &amp; Affiliation</u>	<u>Purpose</u>
Spring, summer 1968- 1969	George J. Hechtel Asst. Prof. Biology SUNY/Stony Brook	Field trips for classes in invertebrate biology
Spring, summer 1968- 1969	George C. Williams MSRC	Catching fish for experiments
Spring summer 1968- 1969	Erwin J. Ernst Science Teacher, high school	Field trips with biology classes
Apr.-May 1969	Charles F. Buddenhagen Curator, Earth and Space Sciences Dept., SUNY/ Stony Brook	Conducted field classes & labs for courses in mineralogy & geology; collected marine specimens for ESS aquarium
June 1969	Arthur Moore Graduate student, Biology Dept., SUNY/ Stony Brook	Work on Master's thesis on the <u>Orchestidae</u>

The Discovery Bay Laboratory, Jamaica, W.I.

The Discovery Bay Laboratory, operated jointly by the State University of New York and the University of the West Indies, is presently housed in temporary facilities located 20 feet from the Bay in a very attractive location. They consist of a main "wet" laboratory, three small "dry" laboratories, a workshop and a dive locker. Three boats are available: a 22-foot twin outboard-motor powered vessel, a 15-foot work boat and a 12-foot inflatable dinghy that can be carried by car to remote sites. There is a Landrover for transport of equipment and personnel.

The main laboratory is equipped with three long workbenches and two wet tables supplied with fresh running seawater, with a variety of glass and plastic aquaria. There are additional wet tables with large aquaria on the verandah just outside the main laboratory. The smaller dry laboratories have benches and shelves only. One of the rooms is air-conditioned for protection of electronic, optical and other apparatus sensitive to heat and moisture.

Equipment and supplies include standard glass and plastic ware, reagents, glass distilled water supply, dissecting and compound microscopes, histological apparatus, drying oven, pH meter, top loading and analytical balances, photographic equipment and some darkroom facilities, refrigerator, freezer, centrifuge, diverse collecting gear, underwater cameras, etc. The electricity supply is 220 V and 110 V, 50 cycle. A generator giving 60 cycle, 110 V current is also available.

The diving facility is equipped with two high capacity air compressors, a recompression chamber with air bank, scuba tanks, regulators and ancillary diving equipment, miscellaneous marine stores. Maintenance of this equipment is done in the laboratory workshop.

Construction of a new, permanent laboratory began on June 1, 1969 and will probably be complete by March 1970. The contractor is Les Wilson & Company of Ocho Rios, Jamaica. This facility will be approximately eight times larger than the present temporary laboratory. The first stage development includes five research laboratories, dark room instrument store, large wet laboratory, offices, small library, workshop, compressor and dive locker, marine store, pump house, boat dock, etc. The research and office wing is air-conditioned. Later development will include a library seminar room, additional research laboratories, lecture and seminar room, teaching laboratory, student dorms and staff residences.

Visiting investigators at Discovery Bay, summer 1968 - summer 1969

(\*stayed at the Altair Residence)

*Mr. D. L. Meyer	Yale University June 18 - July 14, 1968	Crinoids - biology & ecology
*Dr. L. S. Land	University of Texas June 30 - Aug. 21, 1968	Submarine lithification
*Dr. R. N. Smith	SUNY/Stony Brook July 11-25, 1968	Ostracod taxonomy & ecology
*Dr. O. A. Schaeffer	SUNY/Stony Brook July 22-26, 1968	Dating of raised reefs
*Mr. W. Moore	"	"
*Mr. J. B. Jackson	Yale University August 3-22, 1968 April 26-28, 1969 May 6-18, 1969	Molluscan fauna of reefs
*Miss R. Keeley	Yale University Aug. 21 - Nov. 6, 1968	Ecology of clionid sponges
*Dr. S. Frost	University of Indiana Aug. 26 - Sept. 5, 1968	Collecting fossil corals
*Dr. D. Wallace	"	"
*Dr. L. B. Slobodkin	SUNY/Stony Brook November 2-4, 1968	Planning course on tropical ecology
*Dr. R. Smolker	SUNY/Stony Brook December 17-30, 1968	Ornithology of Jamaica

*Dr. R. Gaudet	SUNY/Stony Brook December 17-30, 1968	Epiphytic ferns
*Mr. H. Reiswig	Yale University Oct. 25 - Dec. 31, 1968	Biology/ecology of sponges
*Mr. J. G. Vermeij	Yale University January 2-19, 1969	Ecology of supratidal gastropods
*Dr. I. Eibl Eibesfeldt	Max Plank Inst., Germany January 24-28, 1969	Reef fish behavior
*Dr. P. K. Weyl	SUNY/Stony Brook Jan. 25 - Feb. 4, 1969	Coral chapter for textbook
Mr. F. Dumas	February 3-10, 1969	Marine archaeology
*Mr. P. Vine	University of West Indies January 11-14, 1969	Spirorbis, taxonomy & ecology
*Mr. D. Barnes	University of Newcastle-Upon-Tyne Jan. 12 - April 15, 1969	Diurnal growth periodicity in corals
*Dr. E. R. Trueman	Manchester University Feb. 1-4, 1969 March 16-31, 1969	Burrowing bivalves
*Dr. D. F. Squires	Marine Sciences Research Center March 12-13, 1969	New Marine Laboratory
*Dr. N. D. Newell	American Museum of Natural History March 29 - April 4, 1969	Bivalve structure

*Dr. D. W. Boyd	University of Wyoming March 29 - April 3, 1969	Hinge structure in bivalves
*Mr. C. Wynter	Princeton University April 4 - April 8, 1969	Coral reef fishes
*Dr. R. Brauer	Wrightsville Biomedical Laboratory, Duke University April 23 - May 2, 1969	Submarine habitats
*Mr. M. Jordan	"	"
*Dr. K. E. Chave	University of Hawaii June 7-13, 1969	Geochemistry of reef carbonates
*Dr. L. Land	University of Texas May 31 - July 15, 1969	Submarine lithification
Dr. L. Muscatine	University of California at Los Angeles June 21 - Sept. 10, 1969	Algal-animal symbiosis
Dr. R. K. Trench	"	"

### Research Vessels

The Queen of the MSRC fleet, the R/V FRUMP, was found to be severely damaged when she was being prepared for launching in the spring of 1969. The R/V FRUMP was at this point considered by consultants to be no longer seaworthy. Inasmuch as she had been constructed for pleasure purposes rather than as a work boat, the decision was made to replace her. Accordingly, Dr. Baylor combed the eastern seaboard north of New York in search of an appropriate work boat. A 39-foot Nava Scotian hull fishing boat was selected and purchased with funds advanced by the Research Foundation. The vessel was brought to Port Jefferson harbor and preliminarily outfitted for use as an oceanographic vessel. A contest was held on the local campus to select a name for her--the winning name, submitted by Miss Leona Peters of the MSRC, was MICMAC, the name of a tribe of Nova Scotian Indians. The MICMAC has been heavily utilized during the year and has been only preliminary outfitted as a research vessel. Considerable funds will be spent in the coming year to fit aboard the latest equipment for both research and instruction.

The R/V CHALLENGER of the Sandy Hook Laboratory, U.S. Fish and Wildlife Service was chartered for a three day cruise in Long Island Sound to gather basic nutrient data. For studies with Sperry Rand Corporation the Oyster Boat "Commander" was chartered from the Long Island Oyster Farms, Inc.

### The International Harvester Van

The International Harvester van operated by the Center traveled a total of 11,875 miles during the year. In addition to its use by the members of the MSRC staff, the van assisted in moving Earth and Space Sciences Department into its new building and took its students on field trips.

### Research Cruises

The following is the research log of the R/V MICMAC. Prepared by Lester Kiehn, Captain.

Date	From	To	Purpose	Chief Scientist
April 26	Bass River, Mass.	Block Island	In transit	
April 27	Block Island	Greenport, N.Y.	In transit	
	Yard Work at Greenport, New York			
May 5	Greenport	Port Jefferson	In transit	
May 14	Port Jefferson	Northport	Thermal Pollution Project	Weyl
May 15	Northport		Test work	Weyl
May 17	Northport		Thermal Pollution Project	Weyl
May 21	Northport		Thermal Pollution Project	Weyl
May 22	Northport	Port Jefferson	In transit	
May 23	Port Jefferson	Northport and return	Thermal Pollution Project	Weyl
	Dockside work at Port Jefferson			
June 10	Northport		Thermal Pollution Project	Weyl
June 11	Northport		Thermal Pollution Project	
June 17	Northport	Huntington and return	In Transit	
June 26	Northport		Thermal Pollution Project	Weyl
June 30	Northport	Fort Schuyler	Leg 1 - Long Island Sound Cruise	Weyl



## RESEARCH REPORTS

Research activities carried out by the faculty of the Center were far flung.

Dr. Thomas F. Goreau, Resident Director, Discovery Bay Laboratory.

Field studies of coral reef structure and ecology were undertaken at the Gulf of Eliat and the Sinai Peninsula under joint sponsorship of the Tel Aviv University, the Office of Naval Research and the Smithsonian Institution. Additional investigations of coral-reef communities near Discovery Bay, Jamaica and Guam in the Marianas Islands were supported by the Office of Naval Research. These studies were the basis for the projects described below:

1. Ecology and taxonomy of West Indian reef corals. Studies are continuing on the species composition of Jamaica, near Discovery Bay. Of the total of 72 species found here to date, 18 are new. Vertical distribution, habitat specificity and relation to environmental factors are being determined by means of underwater observations carried out to depths of 80 meters by divers. The taxonomic studies are being done in collaboration with J. W. Wells of Cornell University. Miss J. C. Lang of Yale University is investigating behavioral and immunochemical relationships among closely related species and formae.

2. Studies on the Class Sclerospongia. A new class of silico-calcareous sponges containing several new orders in the phylum Porifera has been discovered in the reefs of Jamaica and Guam. These forms appear to be survivors of the supposedly extinct Palaeozoic Stromatoporoids. These investigations are being carried out in collaboration with W. D. Hartman, Yale University.

3. Studies with C. M. Yonge are in progress on the metabolic interaction of the giant clam Tridacna and its symbiotic zooxanthellae.

4. Fungiacava eilatensis n. gen., n. sp. Investigations of a new coralliophilous bivalve inhabiting fungiid reef corals are being carried out with C. M. Yonge and T. Soot-Ryen.

5. Submarine lithification in tropical reef environments, with Lynton Land (University of Texas).

6. Taxonomy and Ecology of Jamaican calcareous algae, with E. A. Graham (U. West Indies).

Dr. M. Grant Gross, Research Oceanographer

Studies of the behavior of radioactive substances in the marine environment which were initiated earlier and are continuing, specifically concern the radionuclides discharged by the Columbia River into the northeast Pacific Ocean. Two projects are involved: 1) a study of the near-bottom currents on the continental shelf, using seabed drifters, and 2) an attempt to formulate a sediment budget for the materials contributed by the Columbia River. Both projects are continuing with research associates and other personnel funded by the Atomic Energy Commission through the Department of Oceanography, University of Washington, Seattle. During this period two papers were completed concerning this program and are to be included in a volume on Columbia River studies published by the AEC.

Dumping of fine-grained waste solids in the coastal ocean now constitutes the largest single source of sediment entering the continental shelf of the United States between Cape Cod and Cape Hatteras, greatly exceeding the natural sediment load of all rivers along the U.S. North Atlantic coast. These wastes are derived from excavations in New York City, from dredging operations, and from coal ash, sewage sludges, and construction debris; such wastes have a wide but unknown range of chemical and physical composition. (Floatable materials are not dumped at sea.) Many of these materials differ substantially from sediments naturally transported by rivers to the ocean, but there have, however, been few investigations and no long range studies to test effects of these wastes on the ocean.

A long range program has been initiated to investigate the amount and composition of waste solids dumped in the ocean, the processes that affect them in the ocean, and their long range effects both on the ocean bottom and on the ocean waters where they are discharged.

Because of the large volume of wastes coming from the New York City metropolitan region, the coastal ocean adjacent to Long Island was chosen as the site for the initial study. The study includes Long Island Sound and the continental shelf area between the eastern end of Long Island and the entrance to Delaware Bay. In addition to having the largest volume of waste solids now discharged to the ocean, the area appears to have the longest history of such discharges on the North American continent.

Waste solids from this region is believed to be typical of those which are likely to be discharged more widely along the Atlantic coast of the United States as the coastal area is increasingly urbanized and industrialized.

The program is divided into three phases:

Phase 1. Determination of the volumes of wastes dumped, locations of disposal sites, amount of wastes remaining in the disposal sites, and chemical and physical characteristics of solids discharged by the most important sources.

Phase 2. Study of interactions between the various solids and the seawater or the ocean bottom. This part of the program is intended to be conducted in conjunction with biological assessments of the effects of these interactions.

Phase 3. Development and testing of predictive models and including the development of potential beneficial uses for these waste solids.

At present the study is primarily oriented toward geological and geochemical aspects of environmental alteration. Even so, biological aspects are included as many of the chemical interactions either affect or are affected by biological processes. The present intention is to broaden the program to include more of the biological aspects in the future, as well as closer integration with related engineering studies of solid waste handling and treatment in coastal metropolitan regions.

With Systems Management Division of the Sperry Rand Corporation Dr. Gross carried out field tests of the unmanned worksub developed by Sperry Rand. This underwater vehicle carries television cameras and has the potential for retrieving objects. It was tested in conjunction with the examination of solid waste disposal areas in Long Island Sound. Work was conducted from May 5 - May 14, 1969.

Sediment-sampling activities and bottom observations in Long Island Sound were undertaken in connection with project to study the effect of the Long Island Lighting Company's Northport facilities on the adjacent marine environment. A course on Solid Waste Management as background material for research activities on problems of waste solid disposal in the marine environment was attended July 23-28, 1969. A joint project with U.S. Bureau of Sports Fisheries and Wildlife, Sandy Hook Marine Laboratory was initiated to study deposits on the continental shelf affected by discharges of sewage sludges and other wastes. With

Ludwig Associates, New York, and Department of Water Resources, City of New York the effects of various pollutants on the sediments in Jamaica Bay was undertaken. Cooperative studies continued with Woods Hole Oceanographic Institution on near-bottom currents in Long Island Sound using seabed drifters. WHOI contributes drifters and processes returns and data.

Dr. Peter K. Weyl, Senior Research Oceanographer

In March, 1969, a grant from the Long Island Lighting Company initiated the first year of a three year study of the effects of a fossil fueled power plant upon a temperate estuary. To be investigated are the physical parameters of the thermal plume and the waters of the Long Island Sound, the effects of the power plant and its waste heat upon zooplankton and phytoplankton, thermal effects upon the benthic biota, the water chemistry changes involved in the waste hot water, and the record of the altered environment as reflected in the sediments of the region. Participating in the project, which will be led by Professor Weyl are: Dr. George Williams, Dr. Edward Baylor of the Marine Sciences Research Center; Dr. George Hechtel, Division of Biological Sciences, SUSB; Dr. Erwin Ernst, Head of the Science Department, Three Village School District; Professor C. D. Hardy, Visiting Investigator at the Center and on Sabbatical Leave from Suffolk County Community College.

Instrumentation was developed to allow for the study of the thermal plume and its behavior and a temperature survey was made over a full tidal cycle describing the temperature anomaly due to the power plant. A preliminary heat budget for Long Island Sound was drawn up. And, a pumping system which will allow water to be drawn from depths of up to 150 feet through a water chemistry laboratory aboard ship was devised.

Studies of Vertical Ocean Circulation were continued under sponsorship of a research contract from the Office of Naval Research. Vertical water movements in the Black Sea were studied using data obtained by the Institute of Marine Sciences, University of Miami and preliminary work-ups of data for the Mediterranean were begun. Temperature/salinity data were compiled for use in constructing a two-dimensional model of the distribution of water bodies and characterization of their dynamics.

George C. Williams, Senior Research Biologist

Studies of the development of fish eggs with relation to temperature and salinity continued. Eggs of Winter Flounder were examined at temperatures from  $-1.5^{\circ}$  to  $8^{\circ}$  and found to take two months to develop although they produce normal larvae.

Eggs of the Cunner can withstand many hours of direct sunlight, an important factor in the development of these pelagic eggs. Evidence of higher mortalities of the eggs of these species was suggested at salinities in excess of 30‰ .

Donald F. Squires, Director

Continuation of his activities as Project Director in the development of an information storage and retrieval system for geological and biological data occupied most of the direct research time of the Director.



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