

ANNUAL REPORT OF RESEARCH ACTIVITIES FOR
MARINE SCIENCES RESEARCH CENTER

1. Participation by MSRC in USGGS Global expedition of OSS
Oceanographer:

Professor R. N. Smith sent a student on part of the cruise in the Indian Ocean to collect samples of ostracods. A total of 25 plankton tow samples, 13 cores, and 24 bottom grab samples were collected between India and Australia.

Mr. W. S. Moore, a graduate student in geochemistry working under Professor Oliver Schaeffer crossed the Atlantic, the Mediterranean, the Indian Ocean and the South Pacific to carry out radiochemical studies of sea water. A total of 37 large volume (100-100 liter) samples and 119 smaller samples (1-30 liters) were collected both near the surface and at depth. During most of June and July, Mr. Moore worked at the Tata Institute of Fundamental Research in Bombay India to process the samples obtained during the early part of the cruise. A paper on these results was presented at the American Geophysical Union annual meeting in April 1968.

Transportation expenses for the cruise were supported by NSF Grant GA-967.

2. Deep ocean circulation:

The vertical stability of a column of sea water has been investigated. Due to the non linearity of the equation of state of sea water, the stability of sea water depends on the depth. To simplify stability considerations, a new oceanographic parameter, the equivalent salinity has been introduced. The equivalent salinity is the salinity sea water at a potential temperature of 0°C would have to have in order to be neutrally stable with respect to the water found at a particular depth. The distribution of the equivalent salinity at a depth of 5 km in the World Ocean has been mapped and a vertical profile of the equivalent salinity in the Western Basin of the Atlantic Ocean has been prepared. Vertical mixing can readily be discussed using the equivalent salinity and its variation with depth. A paper on this subject was presented at the 1968 annual meeting of the AGU and a written paper is in preparation.

A statistical model of the deep circulation of the ocean is being developed. The model hopes to describe the time variation of the potential temperature-salinity-depth distribution function. This work is being supported by a contract from the Office of Naval Research (NR 083-235), starting April 1968. In order to begin with a simple system, a statistical model for the Black Sea is in preparation. A complete print-out of Oceanographic Data for this Sea has been received from the National Oceanographic Data Center.

PUBLICATIONS DURING THE PERIOD

- Duedall, Iver W. and Weyl, Peter K., The Partial Equivalent Volumes of Salts in Seawater, Limnology and Oceanography, Vol. 12, No. 1, pp. 52-59, January 1967.
- Weyl, Peter K., The Solution Behavior of Carbonate Materials in Seawater, Studies in Tropical Oceanography, pp. 178-228, Miami 5, October 1967.
- Weyl, Peter K., Oceanography, An Introduction to the Marine Environment. Vol. I and II, Preliminary Edition, New York: John Wiley, 1968, 468 pp.

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In February of 1967 Plankton nets were set across the mouth of Flax Pond Inlet for the gathering of Plankton on the incoming tides of Long Island Sound. The samples were taken on a weekly basis for Dr. Steven Obreski, Marine Biologist on the Marine Sciences Research Center staff. The samples were taken up to the end of March, at which point the currents in the inlet washed away the shore anchors used to hold the nets. Plankton samples for the rest of the year were obtained by Plankton net dredging from the Marine Sciences Research Center research vessel "Frump". The Plankton samples were divided among the Biology department personnel who requested them, and some samples were used for the Earth and Space Sciences Oceanography course 104.

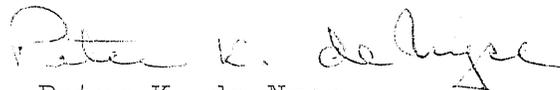
In June and July of 1967 a three part survey of Flax Pond was carried out:

- (Part I) A survey of the Marine Biota of the channel tidal zones and channel bottoms was made under the direction of Dr. George Hechtel.
- (Part II) A study of sediment dispersal by Mr. Charles Buddenhagen.
- (Part III) A study of the tidal cycles and levels by Mr. Peter de Nyse.

The results of this survey have been printed under separate cover.

In July and August of 1967 a series of 25 stations were made by the Marine Sciences Research Center research vessel "Frump" at the following points in Long Island Sound: Lords Point, Connecticut, off Bridgeport Harbor, Stratford Shoals, Smith Town Bay, Port Jefferson Harbor, Mount Misery Shoals, and at Mount Sinai Harbor. At each station a minimum of 10 liters of bottom sediment were dredged, five liters were preserved in formalin, and five liters were kept on ice in an effort to keep alive any Benthic organisms present. These samples were collected for Dr. Ray Smith of the Earth and Space Sciences department. From these samples several selected Ostracod specimens were gathered which are the basis of a report on "The Origin of Frontal Muscle Scars of Trachyleberid and Hemicytherid Ostracods". This report to be submitted to "Science" magazine by Dr. Smith in May of 1968.

In the latter part of 1967, the Marine Sciences Research Center research vessel "Frump" was used in a series of tow tests for the evaluation of an experimental hydrofoil Catamaran designed, created and built by the engineering department under the direction of Dr. Walter Bradfield.



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