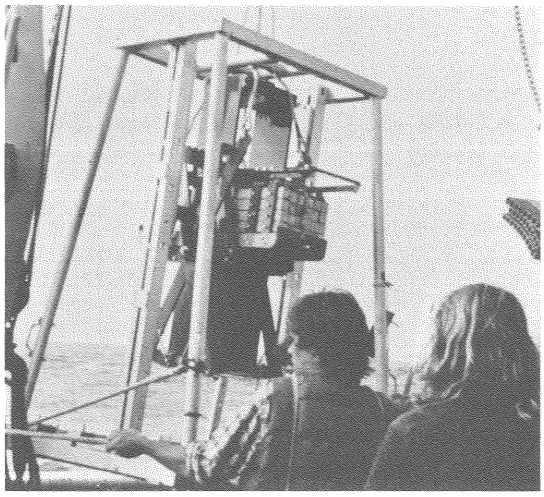
marine sciences research center
state university of new york

newsletter

Stony Brook, New York 11794

Vol. 3, No. 1, March 1978



Scientists take a box core from the R/V VELERO IV in the Pacific Ocean off the Farallon Islands.

MSRC CONDUCTS STUDIES AT NUCLEAR WASTE DISPOSAL SITES

To develop effective controls of the effects of ocean disposal of nuclear wastes in the future, the Environmental Protection Agency has initiated a comprehensive investigation to examine the fate of radioactive wastes dumped into the ocean by the U.S. between 1946 and 1962. Professors R. DAYAL and I. W. DUEDALL are part of this research team and are responsible for sediment geochemical studies of the nuclear waste disposal sites in the Atlantic and Pacific Oceans.

These studies are designed to determine: (1) the nature and extent of radionuclide contamination of the sediments in the waste disposal area, (2) the capability of the sediments to adsorb and retain any released radioactivity, and (3) the processes by which the released radioactivity can be remobilized and dispersed vertically or laterally.

The results of the Atlantic disposal site, located on the upper continental rise 200 km off the Maryland-Delaware coast at a depth of 2800 m show that the sediments are contaminated by radionuclides released from a waste container, but that the extent of contamination is localized. The study shows that the geochemical properties of the sediments play an important role in controlling the dispersion of released radioactivity. Bioturbation has been identified as an active process for redistributing vertically the released radioactivity in sediments. Assuming bioturbation as a diffusional process, Professors Dayal, OKUBO, and Duedall have developed a model that can be applied to quantitatively describe the observed profile of released radioactivity. In comparison with bioturbation, ionic diffusion of radionuclides is of minor importance.

A parallel study in the Pacific involves an investigation of the Pacific Farallon Islands' radioactive waste disposal site located 80 km off San Francisco. MONTE GREGES, a graduate student in the Marine Environmental Sciences Program, is working on this research project for his master's thesis.

WOODHEAD AWARDED OTEC BIOFOULING PATENT

Of the systems being developed to utilize solar energy to generate power, the largest would use vertical temperature differences in the ocean. In this system, which has been dubbed Ocean Thermal Energy Conversion (OTEC), the ocean surface itself acts as the collector for solar energy. Basically the system operates on a simple Rankine cycle: warm surface water (up to 28°C) is drawn over heat exchangers to evaporate a working fluid, which drives a turbine. The vapor is subsequently recondensed for recycling by being passed over heat exchangers circulating cold water (at 4 to 6°C) pumped from the ocean deeps.

The efficiency of energy transfer across the enormous heat exchangers is critical to the operation of OTEC power plants, and biological fouling of the exchangers is a major problem. OTEC systems utilize such vast quantities of seawater that use of biocides is unacceptable. Professor P. M. J. Woodhead, W. E. Heronemus of University of Massachusetts and D. Mager of Pacific Power & Protein have developed a new approach to the biofouling problem and have obtained a U.S. Patent on the design. Their method very simply alternates the evaporating and condensing functions of heat exchangers by interchanging the flow of warm surface and cold deep seawater. Organisms from surface waters that attach to the warm exchanger on one day will be destroyed by the cold water when the flow alternates the following day.

PEOPLE AND MEETINGS

Professor H. J. BOKUNIEWICZ will present a paper entitled "Storm Energy in Estuarine Sedimentary Processes" at the spring meeting of the American Geophysical Union in Miami in April.

Graduate students G. T. GREENE and D. S. BECKER presented a paper entitled "Winter Kill of Hard Clams in Great South Bay, New York, 1976-77 at the Northeast Fish and Wildlife Conference in White Sulphur Springs, West Virginia on 1 March 1978.

Professor EDWARD J. CARPENTER has been nominated to be a "Member at Large" for the American Society of Limnology and Oceanography. The Society has only three such members at any time.

Professor AKIRA OKUBO presented an invited lecture entitled "Diffusion, Advection and Shear Effects in Three-Dimensional Water Pollution Models" at the Instituto di Chimica Fisica, Universita di Venezia, Italy, on 30 November 1977.

Professor BLAIR KINSMAN is one of four outside reviewers selected by the Council of Higher Education of the Commonwealth of Virginia to review all educational programs in the marine sciences, oceanography, and ocean engineering offered by the public colleges and universities of the Commonwealth. The review team will be led by JOEL GOODMAN, Adjunct Professor with MSRC. Professor Kinsman attended a workshop on "Satellite Altimeter Measurements of Sea State" the first week in March in Boulder, Colorado. The workshop was sponsored by the Wave Propagation Laboratory of NOAA.

Professor IVER W. DUEDALL attended the fall meeting of the American Geophysical Union in San Francisco in December. He presented several papers on the disposal of coal wastes and sewage sludge in a special symposium on ocean dumping. Co-authors included: R. DAYAL, H. O'CONNORS, J. PARKER, F. ROETHEL, J. SELIGMAN, and G. GRUNSEICH, all of MSRC; and H. KRAMER, K. JONES, and R. SHROY of the Brookhaven National Laboratory..

Professor J. L. McHUGH attended meetings of the Mid-Atlantic Fishery Management Council in New Jersey, Delaware, and Maryland, in December, January and February. Professor McHugh has been invited to serve on the Steering Committee of a Workshop and Conference on Limited Entry into Fisheries sponsored by the University of Washington's Institute of Marine Resources. Dr. McHugh has also been selected to serve on a Steering Committee to evaluate the feasibility of establishing a Regional Fishery Development Commission in the Middle Atlantic Bight region.

Professors H. H. CARTER and J. R. SCHUBEL presented an invited lecture entitled "A Rationale for Evaluating Thermally Induced Biological Effects Due to Once-Through Cooling Systems" to the Maryland Academy of Sciences' Environmental Research Guidance Committee on 2 March 1978. Professors R. E. WILSON and P. M. J. WOODHEAD collaborated in the research.

Professor P. K. WEYL was a member of the Earth Sciences Review Panel for the National Research Council Associateship Program. The panel reviews applications of outside scientists to do research in national laboratories.

AWARDS

Professors MALCOLM BOWMAN and WAYNE ESAIAS have received grants from the Maurice Hill Research Funds of the Royal Society in London to further their studies of bio-physical coupling in frontal zones. They will use these funds to travel to Great Britain this spring to conduct preliminary experiments and plan future studies in shallow sea frontal zones in the waters overlying the continental shelf off north-western Europe.

Professor BOWMAN received a grant-in-aid from the University Awards Committee to study circulation and frontogenesis around headlands. Tidal flow around headlands frequently leads to increased currents, formation of fronts, jet-like flow, up-welling, and vorticity generation, all of which can stimulate the local primary production and the standing stocks of plankton, fishes, and benthic organisms.

Professor ROBERT MALOUF received a grant from the New York Sea Grant Institute to initiate a study of the population dynamics of the hard clam in Great South Bay. During the first year, he will concentrate on the reproductive biology of the hard clam and on the prevailing processes that affect the reproduction, set, and growth of clams in the Bay.

DAVID J. HIRSCHBERG, graduate student and a Jessie Smith Noyes Fellow, received a grant-in-aid from the Society of Sigma Xi to support his research on the flux of metals in Chesapeake Bay.

Professor Charles Wurster was selected by *The Village Times* as its "Man of the Year in Science" for 1977. He was honored for his research and public service to improve the quality of our environment.

Professor H. J. BOKUNIEWICZ received a grant-in-aid award from the University Awards Committee to study dissipation of tidal energy in Long Island Sound.

MONICA BRICELJ was awarded a gift subscription to ESTUARIES in recognition of her outstanding academic performance during her first semester in our Marine Environmental Sciences Program.

Professors HAROLD B. O'CONNORS and IVER W. DUEDALL were awarded a $40,198 contract by the New York Energy Research and Development Authority for the second year of their study to assess the biological effects of disposal of stabilized coal wastes in the marine environment.

Professor ROBERT E. WILSON received an award from the U.S. Geological Survey for analysis of current meter records and hydrographic data from the Potomac estuary.

Professor J. L. McHUGH received an award from the New York Sea Grant Institute to complete his comprehensive handbook on the hard clam, *Mercenaria mercenaria*. A large scientific literature on hard clam exists, scattered widely in many journals and other publications. Collection and interpretation of this valuable store of knowledge will be of great value to the hard clam industry and to scientists working on industry problems. The handbook will be in two parts, a scientific summary of what is known and what needs to be known, and a popular account in non-technical language.

Professor HAROLD B. O'CONNORS received a grant-in-aid award from the University Awards Program to assess the modification of herbivory by coastal eutrophication. Increases in the inputs of nutrients to coastal waters as a result of man's activities can change the species composition of phytoplankton populations. The new species may be less available to particle feeding herbivores because of changes in the size distribution; generally smaller forms become more abundant. Such reduced availability reduces food chain efficiency and may explain the large unconsumed algal crops that sink, decay, and deplete sub-surface oxygen concentrations in western Long Island Sound.

WAYNE F. PENELLO, MESP graduate student, received a grant-in-aid from the Society of Sigma Xi to support his research into the effects of rooted aquatic plants in mobilizing metals from dredged spoil deposits. Mr. Penello is a Jessie Smith Noyes Fellow.

SOME RECENT PUBLICATIONS

BECKER, D. S. 1978. Evaluation of a hard clam spawner transplant site using a dye tracer technique. MSRC Special Report 10. 37 p.

DUEDALL, I. W., H. B. O'CONNORS, S. A. OAKLEY, and H. M. STANFORD. 1977. Short-term water column perturbations caused by wastewater sludge dumping in the New York Bight Apex. Journ. Water Pollution Control Federation 49:2074-2080.

GREENE, G. T., A. F. MIRCHEL, W. BEHRENS, and D. S. BECKER. 1978. Surficial sediments and seagrasses in eastern Great South Bay, New York. MSRC Special Report 12.

JOHNSON, R. W., I. W. DUEDALL, R. M. GLASGOW, J. R. PRONI, and T. A. NELSON. 1977. Quantitative mapping of suspended solids in wastewater sludge plumes in the New York Bight. Journ. Water Pollution Control Federation 49:2063-2073.

McHUGH, J. L. 1977. Recreational use of shellfishes: issues and conflicts. Pages 56-62 *in* A symposium on Coastal Recreational Resources in an Urbanizing Environment. Cooperative Extension Service, Univ. of Mass.

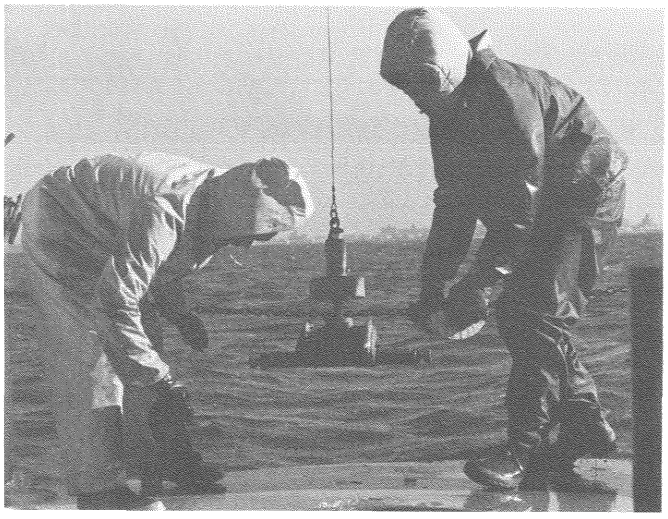
McHUGH, J. L. 1978. Extended fishery jurisdiction: problems and progress, 1977. Pages 69-89 *in* Proceedings of North Carolina Governor's Conference in Fishery Management Under Extended Jurisdiction.

SCHUBEL, J. R. and D. J. HIRSCHBERG. 1977. Pb-210 determined sedimentation rate, and accumulation of metals in sediments at a station in Chesapeake Bay. Chesapeake Science 18:379-382.

SCHUBEL, J. R., A. D. WILLIAMS and W. M. WISE. 1977. Suspended sediment in the Chesapeake and Delaware Canal. MSRC Special Report 11. 72 p.

TERRY, O. T. 1977. Aquaculture. MESA New York Bight Atlas Monograph 17. 36 p.

WILSON, R. E. Review of *Physical Oceanography of Estuaries (and Associated Coastal Waters)* by Charles B. Officer. EOS 59:80-82.



C. R. Jones and B. H. Brinkhuis collect a grab sample from the Outer Bay of New York Harbor for Professor Brinkhuis's study of the effects of sand mining on the Bay's benthic community. He is also assessing the desirability of combining sand mining with the disposal of dredged materials in the borrow pits.

JANUARY MESP GRADUATES

Four students were awarded the M.S. degree through our Marine Environmental Sciences Program in January 1978. The students, the titles of their theses, and their advisors are listed below.

DOUGLAS M. CROCKER, A Two-Dimensional, Vertically Integrated Numerical Model of Tidal and Residual Circulation in the Peconic Estuary (Professor Robert E. Wilson).

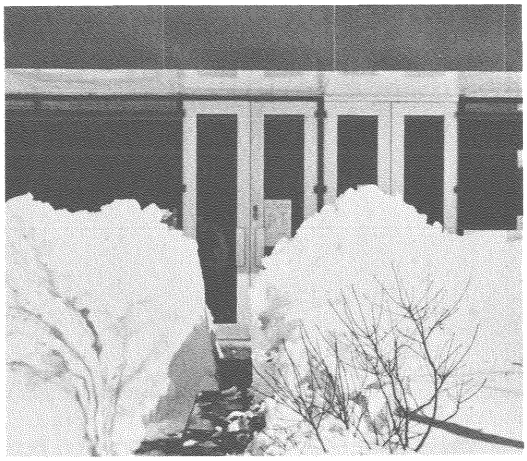
NATHANIEL A. GREENHOUSE, Analysis of the Radiological Implications of Several Marine Food Organisms for Marshallese People Returning to Bikini Atoll (Professor Peter K. Weyl).

JAMES D. SELIGMAN, Chemical and Physical Behavior of Stabilized Scrubber Wastes and Fly Ash in Sea Water (Professor Iver W. Duedall).

CAROLYN D. TUTHILL, Growth of Some German and North African Salt Marsh Plant Species in Relation to Soil Compaction (Professor Orville W. Terry).

NEW 5 YEAR B.S. / M.S. COURSE OF STUDY IN GEOLOGICAL OCEANOGRAPHY

President John S. Toll announced that a 5 year course of study in geological oceanography would begin this fall at SUSB. The course of study to be offered jointly by the Department of Earth and Space Sciences and the Marine Sciences Research Center, is designed to attract outstanding undergraduate geology majors to geological oceanography. It couples two existing programs in an effective way to offer an exciting new opportunity to Stony Brook's students. Well-prepared students could obtain a B.S. in Earth and Space Sciences and an M.S. in Marine Environmental Sciences in five years, including the two summers following the B.S.



The big February 6 snow storm left Long Island buried under a blanket of up to 70 cm of snow. This is the entrance to one of MSRC's buildings two days after the storm.

MSRC ASSOCIATES

We welcome Northville Industries and the Long Island Lighting Company (LILCO) as new Industrial Associates, and Mr. Walker J. McKinney who renewed his membership in the MSRC Associates. For information concerning membership contact Mrs. Jeri Schoof at (516) 246-6543.

SPRING 1978 SEMINAR SCHEDULE

Mar.
27 — Chemical Aspects of Hydraulic Dredging and Open-Water Pipeline Disposal in Estuaries
Mr. M. HEATON, MSRC

Apr.
10 — Chemistry of Pelagic Marine Sediments
Dr. T. DONNELLY, SUNY at Binghamton

17 — Hard Clam Management--A Beginning
Mr. C. SMITH, MSRC

24 — Ecology of Bacteria in Aquatic Ecosystems
Dr. J. E. HOBBIE, Massachusetts Marine Biological Laboratory

May
1 — Depuration of Heavy Metals by Hard Clams
Mr. W. BEHRENS, MSRC

8 — Master Planning Constraints on Fire Island, N.Y.
Dr. P. A. BUCKLEY, National Park Service

15 — Geochemical Implications of Episodic Sedimentation in Upper Chesapeake Bay
Mr. D. HIRSCHBERG, MSRC

All seminars are held at the Marine Sciences Research Center in Building F, Room 163 at 3:00 p.m.

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