



Assemblyman Hochbrueckner addresses group.

## COAL WASTE ARTIFICIAL REEF PROJECT INAUGURATED

Research which could provide a way not only to dispose of coal wastes at sea but to enhance marine life and productivity was inaugurated at ceremonies held on 28 November 1978 at MSRC. The research program, directed by MSRC Professors Iver Duedall and Peter Woodhead, calls for the use of blocks of stabilized coal wastes in building a pilot-scale artificial reef in the Atlantic, and for the close monitoring of that reef to determine its acceptability for colonization by various forms of undersea life.

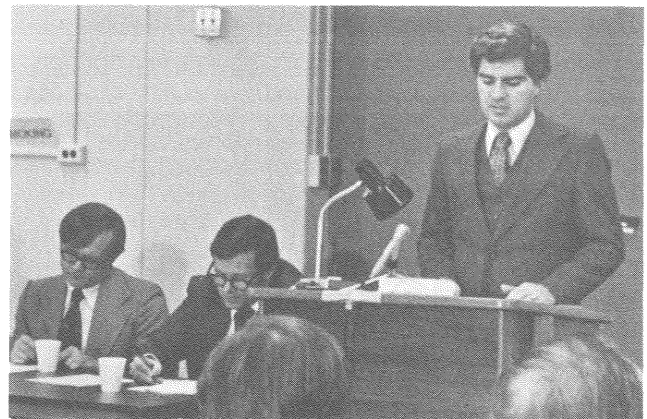
After baseline site data are gathered and other tests performed, the artificial demonstration reef will be placed about three miles off Fire Island in the Atlantic Ocean. The project has grown out of laboratory studies of the chemical behavior of calcium sulfite and calcium sulfate scrubber wastes in sea water made by James Seligman, MSRC graduate student, and laboratory bioassay tests designed by Professor H. B. O'Connors.

The Atlantic reef will be modeled after a smaller one, made of blocks of stabilized scrubber wastes, that was built in May 1977 in Conscience Bay near Stony Brook. The Conscience Bay reef is being studied by Frank Roethel, MSRC graduate student. Initial data from this reef indicate that the blocks are stable, that they maintain their structural integrity, and that they serve quite well as reef building material.

Marine life is flourishing at the Conscience Bay test site and the uptake of metals is similar to that for organisms growing on a control reef made of concrete blocks.

MSRC Director J. R. Schubel said the project exemplifies one of the Center's major roles, which is to "identify potential environmental crises and to develop strategies to avert them." Predicting that the annual production of coal wastes in the United States could exceed 100 million tons by the year 2000, Prof. Schubel observed, "The disposal problems could be staggering, particularly in coastal areas like Long Island." SUSB President T. A. Pond described the project as an "exciting enterprise, full of promise" and George Hochbrueckner, Second District Assemblyman (D), expressed his "delight" with a project that will "take what could have been a damaging waste product and attempt to make it a plus for the environment."

James L. Larocca, Chairman, New York State Energy Research and Development Authority and New York State Energy Commissioner, was one of the speakers at the inauguration ceremonies. Commissioner Larocca stated, "What we seek to do with this project is to illustrate that our energy demand can be brought into harmony with an enhanced environmental quality. If this project is successful, not only will we have demonstrated an environmentally benign alternative to landfill disposal of coal



J. L. Larocca, Chairman, N.Y. State Energy Research and Development Authority, at coal waste inauguration.

waste, but we will have demonstrated an attractive method of enhancing marine life and productivity in the ocean." Other ceremony speakers included Charles McGowan from the Electric Power Research Institute, Bart Chezar of the New York State Power Authority, and Prof. P. M. J. Woodhead of MSRC. Prof. Woodhead outlined the early development of the MSRC's studies of coal wastes in the sea, and described the research to be carried out in conjunction with the Atlantic Ocean reef.

The project, which calls for an estimated \$3 million over the next five years, will be managed by Jeffrey Parker, MSRC staff oceanographer. The program is a joint venture of the MSRC, the College of Engineering and Applied Sciences' Department of Materials Science (Professors F. Wang and H. Carleton) and the Department of Applied Mathematics and Statistics (Prof. D. Dicker), the Institute for Energy Research (Prof. O. Carroll) and IU Conversions Systems, Inc. of Philadelphia.

The project is supported by a consortium of federal and state agencies led by the New York State Energy Research and Development Authority. Other members of the consortium are the Environmental Protection Agency, the Department of Energy, the Electric Power Research Institute, and the Power Authority of the State of New York.

#### **RATES OF SEDIMENT-ASSOCIATED POLLUTANT DISPERSAL IN THE CHESAPEAKE BAY** **D.J. HIRSCHBERG**

In the last decade it has become apparent to environmental scientists that an understanding of the processes that result in the dispersal of anthropogenic pollutants in the marine environment must be based upon quantitative knowledge of the sources and sinks of these substances. It is not sufficient to simply measure the levels of pollutants in a particular environment to assess the implications of man's impact. The formulation of management strategies to control environmental pollution must be based upon a quantitative approach to the routes and rates of pollutant dispersal. Since anthropogenic inputs become mixed with naturally-occurring substances in the environment, relevant "management" studies often have a strong "basic" research component into normal environmental processes. My research is designed to measure the rate of a particular natural process--sediment accumulation--in a large estuary, the Chesapeake Bay. The results are especially relevant to understanding the mode of dispersal of a particular class of pollutants, those attached to sedimentary particles. These pollutants include "heavy" metals (Pb, Cu, Ni, Zn, Hg), certain radionuclides (238-Pu, 137-Cs), and organic compounds (PCBs, DDT, Kepone). The stability of the chemical complexes of these pollutants with sediment particles in rivers and estuaries allows them to be studied as a group. This provides an advantage since

any one element or compound can provide a "tracer" for many substances in the environment. Such an approach is scientifically elegant, and promises to provide better results than "brute force" analyses of large numbers of contaminants.

The tracer chosen for this study is the naturally-occurring radionuclide lead-210. The environmental behavior of this easily measured isotope closely mimics that of the sediment-associated pollutants, but unlike these products of man's activity, the rate and mechanism of its addition to the environment are well known. This is important, because the sources of most pollutants are diffuse and numerous, and only crudely quantified. The radioactivity of lead-210 provides a "clock" that can be used to date sediment cores and to determine the rates of processes that affect sediment-associated pollutants as well.

By lead-210 dating sediments that have been deposited during the last 150 years in the northern Chesapeake Bay, and measuring the temporal and geographical variation in the fluxes of sediment-associated pollutants to the bottom of the estuary during this time, we have reached several conclusions about the dispersal of these substances. First it appears that the addition of sediment and sediment-associated pollutants to the northern estuary is dominated by episodic inputs associated with major floods. Great floods in 1972 and 1936 have contributed half of all the sediment deposited in this region since 1900. Much of the flood deposited sediment had resided in the Susquehanna Riverbed for from 20-50 years before being transported to the estuary, and contained less contamination than "normally" deposited sediment. Second, budgets for lead-210 and sediment associated pollutants show that much larger amounts of these substances are deposited in the central estuary than can be accounted for by simple sediment transport to this region. Preferential transport of the finest fraction of the riverborne sediment load, containing most of the geochemical burden, may be the cause. This result cautions against simple interpretations of pollutant transport by sediment budgets alone. Third, temporal variability in the geochemical characteristics of the Susquehanna River suspended sediment load during the last 150 years can be related to simple variations in the various sources of sediment to the river: soil erosion, bank erosion, and river-bottom resuspension.

It is apparent that many of the processes that control the transportation of sediment associated pollution in the Chesapeake Bay are sensitive to man's activities.

*This is the first in a series of articles by graduate students describing their research.*

## NEWS ABOUT MSRC'S FOREIGN STUDENTS

JOSE ANTONIO ZERTUCHE GONZALEZ came to the State University of New York at Stony Brook in August to study at the Marine Sciences Research Center. He completed his undergraduate work at the Universidad Autónoma de Baja California where he worked with Dr. SAUL ALVAREZ BORREGO, Director of CICESE--Centro de Investigación Científica y de Educación Superior de Ensenada. Zertuche's undergraduate thesis entitled "Series de Tiempo de Variables Fisicoquímicas en Las Bocas de Dos Antiestuarios de Baja California" (Time Series of Physico-Chemical Variables in the Mouths of Two Anti-estuaries of Baja California) was published in the June 1978 issue of *Ciencias Marinas*, Vol. 5, No. 1. The article was co-authored by Saul Alvarez.

## TEACHING LABORATORY OPEN FOR SUNY-WIDE USE

A new "lab away from home" opened this month at MSRC to give students from any of SUNY's 64 campuses a convenient place to carry out their work when researching on Long Island. The lab can easily accommodate 32 students, has two adjoining sample preparation rooms, an oven for drying organisms and sediment samples, and facilities for preserving organisms. Teaching aids will include binocular microscopes and slide and movie projectors.

Those interested in using the lab are encouraged to call the Marine Sciences Research Center at (516) 246-7717 for further information; the MSRC will help to arrange accommodations for visiting groups. The lab, "SUNY's outlet to the sea," was funded by the New York Sea Grant Institute; the SUNY Chancellor's office through Dr. Paul Silverman, Provost for Research and Graduate Education; and the MSRC.

## PEOPLE AND MEETINGS

Dr. EDWARD CARPENTER gave an invited seminar at the City College of New York September 27 on  $N_2$  fixation in the marine environment.

Dr. J. L. MCHUGH attended the August meeting of the Mid-Atlantic Fishery Management Council held in Hershey, Pa., and the September and October meetings of the Council and its Executive Committee held in Philadelphia, Pa.

Drs. D. W. PRITCHARD, J. R. SCHUBEL, and P. K. WEYL, and WILLIAM WISE and KAREN CHYTALO participated in a workshop on "NY Bight Synthesis" 6-10 November 1978 in Williamsburg, Va.

Dr. J. R. SCHUBEL was elected to the Board of Trustees of the Stony Brook Foundation at the Foundation's November 1978 Annual Meeting.

## MSRC HOSTS MEETING OF UNOLS ADVISORY COUNCIL

On 2-3 November 1978, MSRC hosted a meeting of the University National Oceanographic Laboratory System's (UNOLS) Advisory Council. The Council is charged with monitoring UNOLS activities, and in doing so evaluates the performances of member institutions in providing access to federally-supported university facilities for scientists from other institutions. The Council has five elected representatives from full member institutions and four from associate member institutions of UNOLS. The State University of New York at Stony Brook is an associate member of UNOLS. Members of the Advisory Council are G. Anderson (U. of Wash.), R. Barber (Duke), R. Fisher (Scripps), G. Keller (Oregon State U.), J. Martin (Moss Landing Marine Laboratory), A. Richards (Lehigh), W. Ryan (Lamont Doherty), J. R. Schubel (MSRC), T. Treadwell (Texas A&M), J. Zeigler (Virginia Institute of Marine Science).

## MSRC ASSOCIATES

We welcome Ronald and Jeri Schoof, and Charles T. Bainbridge's Sons, Inc. as new MSRC Associates.

## R.B. MONTGOMERY CONDUCTS SHORT COURSE

The distinguished physical oceanographer Dr. R. B. Montgomery, Professor Emeritus of the Johns Hopkins University, led an intensive one-week oceanographic data analysis project as part of Physical Oceanography I. Professor Montgomery, who is well known for his work in descriptive physical oceanography, instructed the students in the presentation, analysis, and interpretation of physical and chemical oceanographic data. The class used data from the 1968 cruise of the R/V Ryufu Maru in the Pacific.

## SOVIET SCIENTISTS VISIT MSRC

Alexei Vladimirovitch Martynov and Vladimir Alexandrovich Uledov of Moscow State University spent a week at MSRC in November. Both scientists are concerned with coastal zone management and coastal oceanography and had extended discussions with MSRC staff on a variety of topics including: oil pollution, dredging and dredged material disposal, eutrophication, and coastal zone conservation and rehabilitation. Martynov and Uledov also lectured in Professor Weyl's course and were briefed by Dr. Lee Koppelman, Executive Director of the Long Island Regional Planning Board, and his staff on their efforts to develop comprehensive regional plans for Long Island. Dr. Martynov and Uledov's visit to Stony Brook was arranged by Dr. Raymond Jones, Director of Stony Brook's Office of International Exchange Programs.

