



# noaa week

U. S. Department of Commerce  
NOA  
National Climate Center

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Volume 7

Number 29

July 16, 1976

## Hawaii Estuarine Sanctuary To Be Established

NOAA has awarded the State of Hawaii a \$199,600 grant to establish an estuarine sanctuary in uninhabited Waimanu Valley, an area of trees and waterfalls that stretch into a river on the valley floor.

The grant will be supplemented by \$384,600 in State matching funds to buy 347 acres of land in the pristine river valley. The area will be preserved in its natural state for scientific research, educational study, and as a means for measuring human impacts on similar estuarine areas.

The proposed Waimanu estuarine sanctuary will consist of about 5,900 acres (all but 347 acres of which already belong to the State), and will include the upper edge of the valley, the lower river and marsh areas,

*(Continued on page 3)*

## Meteorological Research Tower Contract Let

A South Carolina firm has been selected to build a 300-meter (984-foot) meteorological research tower in Colorado.

Kline Iron and Steel Company of Columbia was awarded a contract for \$1,384,100 to design, manufacture, and erect a tower which will be the heart of a Joint Meteorological Observing Facility operated by the Environmental Research Laboratories and the National Center for Atmospheric Research, both in Boulder, Colo.

In addition to the tower, the joint facility is planned ultimately to include a 21,000-square-foot NCAR laboratory building employing 30 to 40 permanent scientific personnel. Expected to become a major national scientific re-

*(Continued on page 5)*

## Study Underway Of Recreational Marine Fishing

The effects of marine recreational fishing upon this country's economy will be studied under a \$70,329 contract awarded recently by the National Marine Fisheries Service.

The contractor, Centaur Management Consultants, Inc., of Washington, D.C., will gather information on the value of goods and services generated by the sport—fishing equipment, boat rentals, motors, camping equipment, food and lodging. The survey will identify and evaluate the commerce created by the sale of these items, and divide the economic impact into four regional areas: northeast, southeast, northwest and southwest.

Sources of information will include sampling surveys of supplies of goods and services from origin to point of sale. Other data may be supplied by state and

*(Continued on page 2)*

## Taylor Named To Head PMC

R. Adm. Eugene A. Taylor has been appointed Director of the National Ocean Survey's Pacific Marine Center in Seattle, Wash. For the past four years he has been Associate Director of the Office of Fleet Operations at NOS Headquarters in Rockville, Md.



Adm. Taylor

PMC has jurisdiction over NOAA's Pacific fleet of 13 oceanographic, hydrographic and

*(Continued on page 8)*

## OCSEAP Study Expanded To Cover Oil Lease Areas Off N.W. Alaska

NOAA's Outer Continental Shelf Environmental Assessment Program (OCSEAP) is expanding to cover prospective oil-lease areas off Alaska's northwest coast.

The \$8 million, multiyear study of life forms and environment in Alaska's Norton Sound and Chukchi Sea is part of a

continuing investigation conducted by the Environmental Research Laboratories for the Interior Department's Bureau of Land Management. It extends work already underway in the Bering Sea, the Gulf of Alaska, and the Beaufort Sea, which links Alaska to the Arctic Ocean.

Emphasis in the program will be on conducting reconnaissance work to identify the crucial biological and physical elements

*(Continued on page 2)*

## Five States Receive CZM Grants

Grants awarded by the Office of Coastal Zone Management to assist states in development of their coastal management programs that were announced this week were:

—To Massachusetts, a \$465,000 grant, its third, to which the State will add \$232,500 in matching funds. The bulk of the grant will be used to summarize the activities of the first two years for incorporation into a draft management program; prepare the draft program, including general guidelines, policies for implementing the program, and a listing of priority uses within the coastal zone; expand its effort with the general public, citizen advisory committees, and local, regional and state agencies to ensure the program serves the public interest; and develop the structure, organization, and authorities for implementing the approved management plan.

Also, an important aspect of the third-year program will be a demonstration project, to which CZM will contribute \$25,000

and the U.S. Department of Housing and Urban Development will contribute \$50,000, to establish a model relationship

*(Continued on page 4)*



A NOAA Unit Citation was presented to the personnel of the National Weather Service Meteorological Observatory at Chatham, Mass., "in recognition of outstanding individual and collective contributions in furthering NOAA's mission."

(From left) Meteorologist in Charge William Turner; Bernard M. Tuohy, Jr.; Anthony E. Tancreto, MIC at WSFO Boston, who presented the Award; John P. Kerrigan; William Lockhart; and David E. Plante. Not in photo, but sharing in the Award were Stanley A. Smith, who has transferred to WSO Huntington, W. Va.; Michael L. Joseph (deceased); Melvin S. Fulcher; Frank Perry, Jr.; Mary E. Earley; John H. Barter; and Merrill D. Anthony.

## Blake Named Chief, Labor Management Relations Branch

Charles A. Blake recently was selected for the position of Chief, Labor Management Relations Branch, NOAA Personnel Division. He succeeds Perry E. Walper, who recently retired.

Mr. Blake has been with NOAA and its predecessor, the Environmental Science Services Administration, since 1966. During that time he has been an integral part of the Labor Relations program. His responsibilities have included acting as a negotiator for several of NOAA's

*(Continued on page 8)*

A DEPARTMENT OF COMMERCE BRONZE MEDAL has been awarded to George F. Berner (left), Publication Distribution Officer in the Distribution Division of the National Ocean Survey's Office of Aeronautical Charting and Cartography, in recognition of his innovative management ability and expertise in formulating distribution systems.

His contributions included implementation of ADP statistical systems, faster methods of addressing products, and postage saving procedures, and resulted in savings to both the Government and NOS product consumers.

The Award was presented by NOS Director R. Adm. Allen L. Powell.



## McArthur Locates Missing Buoys In Puget Sound

After a series of severe low tides in April, two markers of the U.S. Coast Guard's Vessel Traffic System disappeared at the northern entrance to the traffic system into Puget Sound, Wash.

The 8-by-26-foot lighted buoys—the Sierra Alpha and Bravo—were found by the NOAA Ship McArthur, which discovered that the buoys, anchored to the bottom by 1½-inch chain, had literally twisted themselves underwater on their chains as a result of the low tides.

Two buoy tenders salvaged the markers, and they are back afloat today, guiding mariners. In the meantime, the Coast Guard will soon insert lengths of three-inch nylon line in the chains that tie them to their sinkers in hopes of correcting the problem.

## Recreational Fishing

(Continued from page 1)

public agencies, private organizations, and trade associations.

Among Federal agencies, the NMFS is responsible for the development of conservation and management policies for marine fisheries resources for both commercial and recreational purposes. A considerable body of knowledge has accumulated on the economics of commercial fisheries, but relatively little on recreational fishing.

The end product of the study will be a comprehensive document of the socio-economic scope and value of marine recreational fishing in the United States. The study, to be completed in the spring of 1977, will assist the NMFS, state agencies, and regional management councils in evaluating the relative merits of recreational and commercial fishing in the management of marine resources and in administering the Fishery Conservation and Management Act of 1976.



A GROUP OF FOREIGN JOURNALISTS whose normal beats are New York City and Washington, D.C., recently were invited to participate in a tour with the theme "Resources From the Sea," as part of the U.S. Information Agency effort to develop in-depth and positive coverage of American life and know-how by representative foreign media. They visited Woods Hole, Mass., the Grand Isles off the Gulf Coast, the National Marine Fisheries Service and the Scripps Institution of Oceanography in La Jolla, Calif.

Shown here in La Jolla, they are (crouching) Yoshio Uchida, Japan Broadcasting Corporation; (standing, from left) Tu Pei-lin, Hsinhua News Agency, People's Republic of China; Stathis Eust, To Vima, Greece; Maud Wester, Aftenposten and Bonnier, Norway and Sweden; Alfred von Krustenstern, Springer Foreign News Service, Federal Republic of Germany; Jacqueline Demornex, France Soir, France; Mark Dowdney, London Daily Mirror, Great Britain; Roger Grant, Australian Broadcasting Commission, Australia; Kim Young-hi, Joong-Ang Daily News, Seoul, Korea; Mary Shen, USIA, tour coordinator; Kim Dae-jong, Chosun Ilbo, Korea.

## OCSEAP Study in Alaska Is Expanded

(Continued from page 1)

of the Alaska marine ecosystem. These findings will be used to establish scientific baselines for the regions, against which petroleum-connected impacts can be detected, assessed, and monitored.

Design of the Chukchi Sea-Norton Sound study has been guided by more than a year and a half of such investigations in other outer continental shelf areas off Alaska, according to OCSEAP Director Dr. Rudolf J. Engelmann.

"Given the time constraints of oil leasing and development schedules," he explains, "we've had to narrow our investigation. Our first year and a half up here taught us that we're not going to obtain a full statistical description and explanation of the envi-

ronment in a reasonable time, at tolerable cost. The natural variability of the ecosystem is too great, the species are too mobile, and the environment is too hostile to accomplish that.

"Instead, we are doing reconnaissance to identify key species and habitats and then placing high priority on determining how they will be affected by petroleum development. We are also doing our best to incorporate those items needed for assessment and environmental protection.

"This type of selective investigation is cutting the time it takes to develop the data, models, and methods needed for assessment of environmental impact."

As in the other Alaskan study areas, much of the Chukchi Sea-Norton Sound research will be performed by scientists in other government agencies, universities, and private industry, working as NOAA subcontractors.



PARTICIPANTS IN A NOAA INTERAGENCY SUPERVISORY TRAINING COURSE held recently in Asheville, N.C. included (front row, from left) Ken Alford, National Forestry Service, North Carolina (NFSNC); Carl R. Anderson, National Climatic Center (NCC); Robert C. Arrowood, General Services Administration (GSA); Neal Barnett (NFSNC); Donald E. Beck, South East Forestry Experiment Station (SEFES); Bruce H. Blankenship, NCC; Howard S. Edwards NCC; (back row, from left) Gail Effler, NFSNC; Charles W. Frady, SEFES; James D. Fisher, GSA; Henry G. Hall, NCC; Mike Hopson, NFSNC; Kathleen C. Liner, SEFES; George P. McClure, NFSNC; Carol L. Shipman, NCC; Leslie A. Watson, NCC; Ray I. Worley, NCC; and Dan Bella, NOAA Personnel, Coordinator.

## noaa week

Published weekly at Rockville, Md., by the Office of Public Affairs for the information of employees of the Commerce Department's National Oceanic and Atmospheric Administration.

Articles to be considered for publication should be submitted at least a week in advance to NOAA Week, Room 221, WSC-5, Office of Public Affairs, National Oceanic and Atmospheric Administration, Rockville, Md. 20852.

NOAA Week reserves the right to make corrections, changes or deletions in submitted copy in conformity with policies of the paper or the Administration.

Catherine S. Cawley, Editor  
Warren W. Buck, Jr., Art Director

# U. of Arizona Is Awarded First Sea Grant

Two scientists at the University of Arizona's Environmental Research Laboratory in Tucson will study the nutritional requirements and disease prevention of aquacultured shrimp under a \$32,900 grant from the Office of Sea Grant.

The funds mark the first such grant to the institution, and make Arizona only the second land-locked state to receive a Sea Grant. The University has pledged an additional \$51,420 in matching funds for the project.

The Sea Grant-supported researchers, Dr. Donald V. Lightner and Dr. L. Benard Colvin, will concentrate their efforts on the role that vitamin C plays both in nutrition and disease prevention in shrimp raised in tanks or raceways not exposed to direct sunlight.

The Sea Grant project will be part of the university laboratory's existing research and development program in intensive shrimp culture. That program, begun in 1972 and funded annually by private industry, is conducted at a coastal experiment station on the Gulf of California at Puerto Penasco, Mexico, a facility shared by the University of Arizona and the University of Sonora in Mexico.

# GOES Data Collection System Users Meet

A GOES (Geostationary Operational Environmental Satellite) Data Collection System (DCS) users conference was held recently at the World Weather Building in Camp Springs, Md. The 40 people who attended included users from Canada and some potential users of GOES DCS.

National Environmental Satellite Service personnel presented information on the experience gained with the operational system, and explained the salient features of the next generation processing and dissemination system, scheduled to be operational in 1977.

# Hawaii Estuarine Sanctuary (Continued from page 1)

nearshore waters, plus the trail corridor—or access route—leading from nearby Waipio Valley.

Establishment of the sanctuary follows a two-part environmental impact public hearing conducted in May by the Office of Coastal Zone Management in cooperation with State representatives, under terms of the Coastal Zone Management Act of 1972. The Act authorizes NOAA grant assistance to states to develop coastal management programs for minimizing destruction of coastal ecosystems, and to create outdoor field laboratories, such as the Waimanu sanctuary, for scientific examination.

The Waimanu sanctuary is expected to provide baseline information essential to coastal man-

# CSU Honors Capt. Lawrence W. Swanson

Capt. Lawrence W. Swanson, former Assistant Director for Physical Sciences of the Coast and Geodetic Survey (predecessor of the National Ocean Survey), received the Colorado State University Honor Alumnus Award during the school's recent commencement ceremonies. Capt. Swanson, who received his degree in civil engineering from CSU in 1926, was recognized for his achievement in his chosen profession, and for service to the University, community, state and Nation.

The award was presented by Kay Fowler Wallace, First Vice President of the CSU Alumni Association.

Captain Swanson, who retired in 1964 after more than 37 years in the commissioned corps, lives in Kensington, Md. His son, Cdr.



R. Lawrence Swanson, is Project Manager of the Environmental Research Laboratories' Marine Ecosystems Analysis New York Bight Project at Stony Brook, N.Y.

# ESIC Notes OASIS User Statistics

Among the services provided by the Environmental Data Service Environmental Science Information Center (ESIC) to NOAA major line components is its Oceanic and Atmospheric Science Information System (OASIS), which gives on-line access throughout the country to

over 30 major files of technical literature. Statistics through March of this year show the National Marine Fisheries Service to be, by far, the largest user, followed by the Environmental Research Laboratories, EDS, the National Environmental Satellite Service, the National Ocean Survey, and the National Weather Service.

As part of OASIS, ESIC last year sponsored the automated retrieval of information contained in *Oceanic Abstracts and Meteorological and Geostrophical Abstracts* through contract with the Lockheed Corporation, without restricting access to these two data bases to NOAA users. According to latest reports, twice as many requests have come from non-NOAA as from NOAA users. Among them have been institutions in Mexico, Canada, and France, the last gaining online access to the system via satellite.

# Wind Shear Contract Let

A \$57,244 contract to help develop new technology for remote measurement of wind shear at airports has been given to Ball Brothers Research Corporation in Boulder, Colo., by the Environmental Research Laboratories.

The contract supports a joint agreement between ERL's Wave Propagation Laboratory and the Federal Aviation Administration for construction, installation, and acceptance testing of a wind-shear detection system at Dulles International Airport near Washington, D.C.

A system for detecting and warning of the existence of hazardous wind shear conditions near airports has been under development at the WPL for the past three years.

Recent wind-shear-related aircraft accidents have led to an accelerated effort by NOAA to produce operational detection equipment in the shortest possible time. The intent of the present contract is to reduce the time normally required for transferring new technology to industry, by involving industrial engineers at a sufficiently early stage of development.

Engineers from Ball Brothers will work closely with WPL staff members during the later phases of the wind shear detection program, participating in the laboratory assembly and checkout of the system components. They will handle most of the field installation, system testing, and preparation of engineering specifications for production units.

Both Ball Brothers engineers and NOAA scientists will be involved in the transfer of equipment and the final installation at an airport this summer. The engineers will remain at the site during the test period.

Dr. Donald W. Beran, head of the NOAA's Remote Sensor Applications program area, will monitor the contract work.

Speakers included Dr. Clifford A. Spohn, Deputy Director of NESS, and Merle Nelson, GOES DCS Project Coordinator, who also organized and coordinated the meeting.

DCS platform operators presented data on their experiences, and talks on their respective applications of the GOES DCS were presented by representatives of Water Resources, Canada; the U.S. Army Corps of Engineers; the National Bureau of Standards; NOAA Headquarters; the National Weather Service; and the NOAA Data Buoy Office.

agement decisions.

Dr. Robert Kifer, OCZM estuarine sanctuaries coordinator, said that under proposed State regulations for the Hawaii sanctuary, prohibited activities will include mining, logging, dredging and filling, site clearing, construction, water pollution, and the introduction of exotic flora or fauna to the area or the removal of native species.

Controlled uses would include camping, hunting, swimming, horseback riding, and temporary anchoring of vessels in Waimanu Bay to land or unload game or supplies. Permitted uses include fishing in saltwater areas, hiking along interpretive trails, and research which would not alter the environment.



DEPARTMENT OF COMMERCE BRONZE MEDALS were presented to William Chapman, Meteorologist in Charge of the Salt Lake City National Weather Service Forecast Office, and Glade Gerber, Assistant Chief of the Facilities Engineering Branch for the NWS Western Region, at the recent annual banquet of the Utah Chapter of the American Meteorological Society in Salt Lake City. The Awards were presented by U.S. Senator Frank E. Moss (left) of Utah.

Mr. Chapman (center) was cited for his outstanding leadership in providing special weather forecast service for the State of Utah, such as winter sports and avalanche forecasting.

Mr. Gerber (right) was cited for his more than 14 years of dedication to duty, the high standard he has set for himself and his employees, and his ability to master difficult construction problems.

# Navy Oceanographic Unit Five Expresses Appreciation to NDBO

The following is the text of a letter received by James W. Winchester, Director of the NOAA Data Buoy Office, from the Commanding Officer of the Navy's Oceanographic Unit FIVE:

Dear Mr. Winchester:

Oceanographic Unit FIVE, with its four 36' Hydrographic Survey Launches (HSL), recently completed a period ashore as the result of its host ship having been placed in a Reduced Readiness Status. It was the task of the Unit during this period to maintain its technical/operational proficiency and to overhaul the HSLs.

Due to the relocation of the Naval Oceanographic Office, the National Space Technology Laboratories (NSTL) was selected for the Unit's working site. As the Unit arrived at NSTL in late November 1975, proper facilities had not yet been developed for such advanced work as required by the HSL overhaul. It was through your outstanding cooperation that space

suitable from the standpoint of location and facilities was provided in Building 3203. Because of your contribution of this space, the Unit was able to immediately commence its overhaul work on this most important aspect of its mission.

To be singled out for special recognition among your staff is Commander Carl Snyder, USCG. He was quick to recognize areas where he could provide help and advice. His efforts and those of his department were instrumental in the orderly accomplishment of the work at hand.

You and your staff's extraordinarily fine spirit of friendship and cooperation has left the officers and men of this Unit with a deep sense of gratitude. It was certainly a fitting beginning for what I am sure will be a mutually rewarding and pleasant relationship between NDBO and the Navy's oceanographic efforts at NSTL.

Sincerely,

John L. Hammer, III



NOVAC (NOAA VOLUNTARY ACTION, INC.) OFFICERS AND AREA VICE PRESIDENTS, who will be spearheading NOVAC's 1976 membership drive between July 15 and August 15, are (seated, from left) Helen Young, Main Commerce; Sydney Smith, Senior Vice President; Meredith Beeg, President; Doris Taylor, Riverdale; (standing, from left) Charles Cotten, Page 1 and 2; Barbara Suto, WSC-5 and Wilkins Avenue; Robert Demaris, FB4 Suitland; Joyce Thomas, NBOC 1 and 2; Jim Williams, WSC 1 and 2; and (not in photo) Ruth Davis, Gramax; and Robert Hirano, World Weather Building.

NOVAC's projects include helping provide day care for children of NOAA families; granting short term loans in cases of missing pay checks or sudden serious illness; contributing to community charity drives, such as the Salvation Army Christmas food basket program, Children's Hospital, and "camperships" for mentally retarded children; helping provide prosthetic devices to needy inner city children with hearing and sight impairments; and helping NOAA student employees solve housing problems.

When you are contacted, please join NOVAC—and help NOVAC continue to help others.

## Massachusetts, Ohio, Minnesota, Florida and New York Receive CZM Grants

(Continued from page 1)

among various levels of government in determining the onshore needs of energy development on Georges Bank.

—A \$419,000 grant to Ohio to continue developing a coastal management program for the Lake Erie shoreland. Ohio will provide an additional \$220,000 in State matching funds—over \$10,000 more than required by law. The second-year program (the State received its initial program planning grant for \$200,000 from OCZM in May 1974) will include determining permissible coastal land and water uses; designating geographic areas of particular concern; expanding the public participation process for collecting and considering citizen views on the de-

velopment of the program; and establishing the legal authorities and organizational network for implementing the management program.

—A grant to Minnesota was amended to give the State more time and a supplemental \$190,000 to complete its second year work program. Minnesota will add \$95,000 in State matching funds, and will have six additional months to complete the work schedule. As part of the second-year work program, the State will prepare a summary of the first year's findings; complete special studies on shore erosion and coastal area soils and geology; map alternative coastal zone boundaries; and develop alternate

management policies for geographic areas of particular concern after the areas are identified.

Also part of the program will be a demonstration project, funded jointly by OCZM and HUD, to develop a comprehensive plan to allocate land resources of the Duluth-Superior Harbor to meet industrial, commercial, transportation, residential, open space, and environmental requirements.

Minnesota received a \$150,000 second-year grant from OCZM in June 1975.

—A \$67,000 grant to Florida, \$50,000 of which will go to the Jacksonville Area Planning Board to assemble and analyze en-

vironmental data for locating future industrial facilities in the Jacksonville area, and \$17,000 to the Metropolitan Dade County Planning Department to assess the impacts of urban expansion in Dade County. The latter proposal will involve the U.S. Environmental Protection Agency, also.

To develop Florida's coastal management program, OCZM has awarded the State \$1.2 million in two annual grants, and the State has provided an additional \$600,000.

—A second year grant for \$753,000 awarded to New York in May by OCZM was amended to give the State a supplemental \$26,666 to coordinate Federal planning for improving the New York waterfront. HUD will co-sponsor the project by adding \$50,000 through a cooperative agreement with OCZM.

Under the OCZM-HUD project the New York Department of State will contract with New York City officials and the Tri-State Regional Planning Commission to coordinate the redevelopment plans for the New York waterfront currently under way by EPA's 208 Program (for area-wide waste treatment planning), HUD's Comprehensive Planning Program, and NOAA's OCZM program. The project, scheduled for completion in June 1977, will include a final report for public distribution on all waterfront-related planning programs and a technical document analyzing waterfront problems and describing the study.



PARTICIPANTS IN A RECENT HURRICANE WORKSHOP held at the National Weather Service National Hurricane Center in Miami, Fla., were (front row, from left), Bill Frank, Meteorologist in Charge, Lake Charles, La.; Fred Cramer, MIC, Apalachicola, Fla.; Richard Shenot, MIC, Providence, R.I.; Jim Travers, ERH; Andy Anderson, SRH; Jack Schnabel, MIC, Jacksonville, Fla.; Richard Hagan, MIC, Savannah, Ga.; Richard Urbanak, Key West, Fla.; Glenn Taylor, NHC; (back row, from left), Bob Cole, NHC; Al Dreumont, MIC, Brownsville, Tex; Larry Mooney, MIC, Corpus Christi, Tex.; Michael Oliver, Patrick Air Force Base; Marion Renfrew, MIC, Wilmington, Del.; G. S. Mandal, India; John McClain, MIC, Raleigh, N.C.; Ralph Walker, Principal Assistant, Key West, Fla.; Dave Barnes, MIC, New Orleans; Neil Frank, Director, NHC; (not in photo) Robert A. Case, NHC; Rita Sherrill, National Hurricane and Experimental Meteorology Laboratory; Frank O'Leary, NHC; Ron Wooten, Tampa, Fla.; Jay Hull, Cape Hatteras; Herbert Groper, NWSH; Bob Derouin, New Orleans, La.; and Millie Kirkland, NHC.

# Gulf Coast Area Storm Evacuation Maps Are Issued

The National Ocean Survey has issued nine storm evacuation maps for the area along the Gulf of Mexico from New Iberia, La., to Beaumont, Tex.

The maps show emergency evacuation routes, areas subject to flooding from hurricanes and other storms, and elevations which might afford "safe islands" for storm evacuees.

The New Iberia to Beaumont maps have been distributed to state and local officials and community emergency preparedness committees.

The nine maps include parts of the Louisiana parishes of Iberia, Vermilion, St. Martin, Cameron, Calcasieu, Jefferson Davis, and Acadia, as well as Newton, Jasper, Orange, Liberty, Hardin, and Jefferson Counties in Texas. In addition, numerous communities are covered by the maps, including Beaumont, Port Arthur and Orange, Tex., and Winton, Sulphur, Lake Charles, La. Jennings, and Abbeville. Numerous beaches and other points of public interest along the Gulf Coast also are covered.

Storm evacuation maps have been issued also for six other Gulf coast areas—New Orleans, La. to Mobile, Ala.; New Orleans to the Mississippi Delta; Houston to New Iberia, La.; Galveston to Houston, Tex.; Corpus Christi, Tex.; and the Tampa Bay, Fla., area; the Atlantic coast region from Charleston, S.C., to Savannah, Ga.; the Greater Tidewater area of Virginia, including Norfolk; and New York-New Jersey coastal areas, including all of Long Island.

The maps are available to the public for \$2.00 each from the NOS Distribution Division (C44), Riverdale, Md. 20840.

A DEPARTMENT OF COMMERCE BRONZE MEDAL was presented recently to Melvin W. Usimaki, (left) Electronics Technician at the National Weather Service Office in Sault Ste. Marie, Mich., for his innovative abilities in maintaining NWS equipment, particularly on the lake islands.

According to Don Whitman, NWS Central Region Chief of Data Acquisition, who presented the award, Mr. Usimaki's personal efforts and devotion to duty have done much to contribute to the public and private shipping interests in the Great Lakes.



# NOS, USCGAUX Make Chart Updating Flight

A chart updating flight, the first of its kind, was conducted recently in the Los Angeles, Calif., area in a joint effort by members of the NOAA Ship Fairweather and the United States Coast Guard Auxiliary.

The USCGAUX is a volunteer organization of interested private boaters who provide valuable charting information to the Na-

tional Ocean Survey to help maintain up to date nautical charts. Usually conducted by boat, the joint inspection by plane of a stretch of California coastline between Newport Beach and Santa Barbara examined an area in a matter of hours which normally would have required several weeks by boat.

This inspection was the first such joint effort ever conducted by both NOS hydrographers and USCGAUX personnel and proved extremely valuable to both organizations.

The Fairweather was employed in the area conducting a routine hydrographic survey project along the same coastal waters at the time of the flight.



(From left) William Shakespeare, Captain of Division 13, USCGAUX; Capt. Richard Alderman, Commanding Officer, NOAA Ship Fairweather; Fred Button, Commander of Flotilla 6, Division 13, USCGAUX, Pilot; Ens. Neal Millett, NOAA Ship Fairweather, flight participant; and Lt. Col. Lester Brown, Assistant District Staff Officer, Operations, District 11, USCGAUX.

## Meteorological Research Tower (Continued from page 1)

source, the facility will be used by scientists from NOAA, NCAR, universities, and other organizations to evaluate new scientific instruments and study the atmosphere. It will be located on a 611-acre site two miles from the town of Erie, on the plains some 200 miles east of the Rockies.

Crammed from top to bottom with meteorological instruments, the tower will be a testing ground for remote-sensing instruments that NCAR and ERL's Wave Propagation Laboratory, under the direction of Dr. C. Gordon Little, have been developing. These remote sensors, the tools for a new style of meteorology, use radio, optical, or acoustic waves to measure the atmosphere. The instrumented tower and remote sensors will also constitute a unique site for studies of convection, evapora-

tion, precipitation, turbulence, wind shear, and other processes of the lower atmosphere. A new research program aimed at improving weather predictions in the Denver vicinity is planned as well.

The tower, which Kline has agreed to complete by August 1, 1977, will resemble a giant television tower in appearance. There is a significant difference, however: it will be much sturdier than most television towers. Specifications require that it should be able to withstand a wind loading of 65 pounds per square foot when covered with half an inch of ice—a highly unlikely combination of circumstances even along the windy front range of the Rockies.

An interior elevator to carry scientists and technicians, and an instrument carriage that will crawl up the outside of the tower will have rack-and-pinion drive instead of the usual cable system. The rack-and-pinion drive, explains Dr. Little, works like a cog railway, with a motor on the carriage itself that climbs and descends on a track. This system, he says, is much safer, and will allow the operators to stop the carriage precisely where they want and, once stopped, to stay put. Elevator cables would sway in the wind, causing the carriage to jiggle—a condition inconducive to successful operation of precision instruments.

The tower will also be equipped with high-intensity lights to warn away aircraft pilots. But the lights will be louvered to reduce illumination at the ground. NOAA scientists estimate that at Boulder, 16 miles away, the lights will be invisible by day and at night somewhat dimmer than the planet Venus.

## M.I.T. Researchers Probe Causes Of Red Tides

Research underway at the Massachusetts Institute of Technology on red tides is looking for the causes of these destructive blooms of marine algae that have plagued the New England coastline during the past several years.

Civil engineers in M.I.T.'s Ralph M. Parsons Laboratory for Water Resources and Hydrodynamics are seeking a better understanding of the chemical and physiological mechanisms causing red tides in the complex environments of offshore waters. Their study, supported by the M.I.T. Sea Grant Program and the International Copper Research Association, may indicate that one key to the onset of red tides could be trace metals such as copper that are found dissolved in seawater.

Dr. Francois M. M. Morel, associate professor of civil engineering and leader of the M.I.T. project, and his colleagues are studying how the concentration and chemistry of copper will promote or inhibit the growth of phytoplankton, the seas' one-celled, floating algae; *Conyaulax* (one alga that causes red tide) appears to be much more sensitive to copper's toxicity than other species.

The researchers are now testing their hypothesis that an influx of organic substances into the seawater can bind up, or chelate, the dissolved copper, thus preventing its toxic effect on *Conyaulax* and allowing the red tide organisms to increase rapidly in number.

# notes about people

**Dr. Harris B. Stewart**, Director of the Environmental Research Laboratories' Atlantic Oceanographic and Meteorological Laboratories in Miami, Fla., has been elected Councilor-at-large by the Florida Academy of Sciences. **Dr. Robert Sheets**, a Supervisory Meteorologist at ERL's National Hurricane and Experimental Meteorological Laboratory in Coral Gables, was chosen chairman of the organization's section on Atmospheric and Oceanographic Science.

**Bernard H. Chovitz**, Director of the National Ocean Survey Geodetic Research and Development Laboratory, has assumed the office of President-Elect of the Section on Geodesy of the American Geophysical Union. He will become the President of the Section on July 1, 1978.



**Mr. Chovitz**

He has been with the NOS and its predecessor since 1964, and is currently also President of the Section of Space Techniques of the International Association of Geodesy.

**Dr. Edward T. Pierce**, an atmospheric scientist specializing in lightning and thunderstorm research, has joined the Environmental Research Laboratories' National Severe Storms Laboratory in Norman, Okla.



**Dr. Pierce**

Dr. Pierce was associated with the Stanford Research Institute at Menlo Park, Calif., for the past 15 years, and recently received a patent for a trichel pulse corona gas velocity instrument—a device which measures fluctuations in wind velocity and turbulence.

He is currently engaged in the integration of lightning and storm electricity measurements into ongoing research programs at NSSL. He also is one of the two-man Secretariat of the Thunderstorm Research International Research Program involving cooperative principal investigators at Kennedy Space Center this summer.

A native of the United Kingdom, Dr. Pierce received his bachelor of science degree in pure and applied mathematics from the University of Wales in Bangor, and his Ph.D. in atmospheric and radio physics from Cambridge University.

He is a member of the Royal Meteorological Society, the

American Geophysical Union, the American Meteorological Society, and the Society of Geomagnetism and Geoelectricity of Japan. He also is currently honorary president of the International Commission on Atmospheric Electricity.

**Dr. Herman E. Kumpf**, of the National Marine Fisheries Service Southeast Fisheries Center in Miami, Fla., will serve for three months during the summer and fall, as a consultant to the Food and Agriculture Organization of the United Nations. He will prepare a review, covering the western North Atlantic and Gulf of Mexico, of the available information on the quantitative impact on marine fishery resources of pollution and other human activities, excluding fishing.



**Dr. Kumpf**

Dr. Kumpf was on the faculty of the University of Miami prior to joining the Bureau of Sport Fisheries in 1966 as a Fishery Biologist in Washington, D.C. In 1971 he joined NMFS at Miami, and presently is a manager in the Environmental Investigations Division of the Ecological Investigations of the Southeast United States-Effects of Environmental Alteration Program. He graduated from St. Lawrence University and received his master's degree and Ph.D. in marine sciences from the University of Miami.

**Pat Jeffers**, Secretary to the Chief of the Facilities Engineering Branch in the En-

**SPECIAL ACHIEVEMENT AWARDS** for their outstanding contributions during the 1975 field season of the NOAA Ship Miller Freeman were presented recently to Operations Officer Lt. Col.

**Warren Taguchi**, Chief Marine Engineer **William E. Peck** and Chief Cook **Robert Blanks** (who is presently Steward on the Fair-weather).



In the photo, Chief Peck is receiving his award from Cdr. S.R. Petersen, the ship's Commanding Officer. The ship is presently participating in the Outer Continental Shelf Environmental Assessment Program (OCSEAP) in the Bering Sea, Alaska.

gineering Division of the National Weather Service Office of Technical Services, is the new focal point for the NWS School Lecture and Visitation Program. She has replaced **Daisy McKelly Alsop**, Operations Research Analyst in the NWS Systems Development Office, who has served as focal point for the program since its inception in 1971. Mrs. Alsop, who has discontinued her key role in the program because of increased job responsibilities, has been cited for her outstanding performance in promoting it.

The School Lecture and Visitation Program was initiated as part of the SDO Equal Opportunity Program and was turned over to the NWS EEO Committee for coordination in 1975. The aim of the program is to promote interest in the sciences and to encourage a greater number of students from minority groups to consider careers in science. During the last five years, more than 8,000 students from the Washington Metropolitan Area have participated

either in a school lecture presented by NWS professionals with expertise in various scientific disciplines or in a tour of an NWS facility.

NWS personnel interested in participating as lecturers in the program should contact their NWS EEO Committee representative.

The Environmental Research Laboratories Outstanding Paper Awards for 1975 were announced recently. The winners were:

—**Dr. John R. Apel**, Director of the Pacific Marine Environmental Laboratory (PMEL), Seattle, Wash.;

—**Hugh M. Byrne**, Research Oceanographer in PMEL;

—**Robert L. Charnell**, Research Oceanographer in PMEL;

—**Michael D. Cox**, Senior Research Associate in Ocean Circulation at the Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, N.J.;

—**Dr. Paul J. Crutzen**, Consultant to the Director of the Aeronomy Laboratory (AL) in Boulder, Colo.;

—**Dr. Earl E. Gossard**, Chief of the Meteorological Radar Program Area of the Wave Propagation Laboratory (WPL), Boulder;

—**F. James Holitzka**, Physicist in the Atmospheric Electricity Group in the Atmospheric Physics and Chemistry Laboratory (APCL), Boulder;

—**Dr. William H. Hooke**, Chief of the Geoacoustics Program area in WPL;

—**Dr. Lawrence R. Lyons**, Physicist in the Magnetospheric Physics Program of the Space Environment Laboratory (SEL), Boulder;

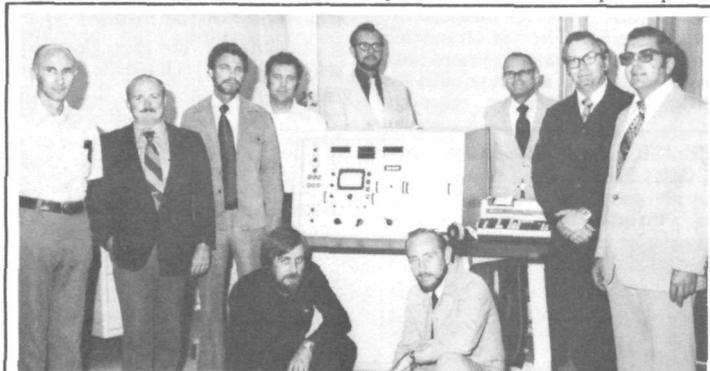
—**Dr. Heinz W. Kasemir**, Program Leader of the Atmospheric Electricity Group in APCL;

—**Dr. Isidoro Orlanski**, Research Scientist in Mesoscale at GFDL;

—**Dr. John R. Proni**, Oceanographer in the Sea-Air Interaction Laboratory of the Atlantic Oceanographic and Meteorological Laboratories, Miami, Fla.;

—**Dr. George C. Ried**, Deputy Director of AL; and

—**Dr. Donald J. Williams**, Director of SEL.



**PARTICIPANTS IN A RECENT FACTORY TRAINING COURSE** on the new WF-100-4 windfinding radar system, held by the Enterprise Electronics Corporation (EEC) in Enterprise, Ala., were the National Weather Service Overseas Operations Division Voluntary Assistance Program installation team. The new WF-100's will be used in the tropical areas and are scheduled to be installed and operational before the First GARP Global Experiment begins in 1978.

(Kneeling, from left) **Buddy Rogers**, EEC Engineer, Instructor; **Phil Gale**, Chief, Facilities and Maintenance Section, Engineering Branch, OOPS; (standing, from left) **Charlie Hoffman**, EEC Engineer, Instructor; **Doran Platt**, VAP Electronics Technician; **Herb Hart**, VAP Electronics Technician; **Roger Ford**, EEC Engineer, Instructor; **Ken Martinsson**, VAP Electronics Technician; **Mark Brooks**, Chief, Engineering Branch, OOPS; **Fred Weldon**, VAP Electronics Technician; and **Bob Buchholz**, VAP Electronics Technician.

**John W. Eason**, Leading Forecaster at the National Weather Service Forecast Office in Birmingham, Ala., has been selected to head the NWS program at the FAA Academy at Oklahoma City, Okla. He replaces **John W. Zimmerman**, who is retiring.



Mr. Eason

Mr. Eason entered the NWS at Huntsville, Ala., in 1967 after serving in the Navy during WW II and in the Air Force from 1950 to 1967. From 1950 to 1956 his primary duty was as military pilot and pilot-instructor. Later he was assigned to teach in the USAF Reserve Officers Training Corps at Rutgers University. He has a B.S. Degree in pharmacy, and also a B.S. Degree in meteorology.

**Malcolm Rigby** of the Environmental Data Service Environmental Science Information Center chaired a meeting of the International Federation for Documentation Committee on Computers and the Universal Decimal Classification (UDC) in Copenhagen, Denmark, recently. A data bank of 250,000 terms in the UDC in English, French, and German, and the equivalent UDC numbers, is well on the way to being completed at the Eidgenossischen Technische Hochschule in Zurich for international use in technical university libraries. Demonstration of the operational system developed over the past decade for use in Danish documentation centers

**THE NATIONAL MARINE FISHERIES SERVICE EMPLOYEE OF THE YEAR** for the Tampa Bay, Fla., Area is **Sandra J. Lamer**, Secretary to the NMFS Regional Director. She was selected because her performance was superior, she demonstrated personal leadership qualities through training new professional/derical personnel, and introduced new office procedures.

Mrs. Lamer received her award at the Ninth Annual Recognition Dinner honoring Federal Employees of the Area for their high standards of performance from **Don Ofte**, President of the Tampa Bay Federal Executives Association.



and in Scandinavian libraries occupied one day of the three-day conference.

**Chaire Jensen**, Meteorologist in Charge of the National Weather Service Office in San Diego, Calif., since 1972, is the new Principal Assistant at the Weather Service Forecast Office in Phoenix, Ariz. He succeeded **Nick Ropar**, who has joined the Public Weather Branch at NWS Headquarters in Silver Spring, Md. Mr. Jensen previously served as Supervising Aviation Forecaster at WSFO San Francisco.



Mr. Jensen

**Dr. Francis J. Merceret**, Research Meteorologist with the Environmental Research Laboratories National Hurricane and Experimental Meteorology Laboratory in Coral Gables, Fla.; has graduated cum laude from the University of Miami Law School and was admitted to the Florida Bar in June 1976.

Four National Weather Service men were among the officers elected recently for 1976-1977 by the District of Columbia Chapter of the American Meteorological Society.

**G. Stanley Doore**, Procedures Control Program Leader in the Technical Procedures Branch of the Meteorological Services Division at NWS Headquarters, Silver Spring, Md., was elected Chairman;

**H. Michael Mogil**, Meteorologist in the Public Services Branch at NWSH, was elected Corresponding Secretary;

**Arthur R. Thomas**, Meteorologist and Quality Control Officer for the Communications Division, Office of Technical Services, at the World Weather Building, was elected Recording Secretary; and

**Billy R. Rice**, Meteorologist in the Forecast Division's Quantitative Precipitation Branch at the National Meteorological Center, Camp Springs, Md., was elected Treasurer. Membership information is available from Mr. Rice at W335, 410 WWB, Washington,

D.C. 20233.

**Robert Ellingson** of the University of Maryland is the new Vice Chairman, and **Robert Abbey** of the Nuclear Regulatory Commission was elected Representative-at-Large.

**Walter Wojcik**, Office of Management and Computer Systems, was awarded a Certificate in processing (CDP) from the Institute for Certification of Computer Professionals (ICCP) for successfully completing the 1976 examination. ICCP is a non-profit organization composed



Mr. Wojcik

of eight computer societies for the purpose of testing and certifying knowledge and skills of computer personnel. It annually administers the examination in more than 100 controlled testing centers at colleges and universities across the U.S., Canada and throughout the world.

The examination establishes a method of recognizing a corps of individuals who have the knowledge considered important to data processing and information management. The CDP helps lay a foundation for the continued growth of the data processing field and for the personnel within the field seeking to attain a position of leadership.

Mr. Wojcik, a Systems Analyst in the Systems and Application Division, was one of the 929 successful candidates out of 2,481 who took this year's examination. A total of 16,039 CDP's have been awarded since the first examination was given in 1962.

The Washington Science Center Toastmasters Club officers for 1976-77 are: President - **Walter Cottrell**; Educational Vice President - **Jean Cardona**; Administrative Vice President - **Rose McClyde**; Secretary - **Esther Coleman**; Treasurer - **Michael Mogil**; and Sgt. at Arms - **John Davies**.

Information about the club is available from Mr. Cottrell at 427-7862.



**PARTICIPANTS IN A SUBSTATION NETWORK SPECIALIST CONFERENCE** held recently at National Weather Service Southern Region Headquarters in Fort Worth, Tex., were (front row, from left) **Harold Hutchison**, SNS, San Antonio, Tex.; **Malcolm Moreau**, SNS, Baton Rouge, La.; **Charles Ridge**, Chief, Regional Substation Management Branch (RSMB), Fort Worth; **Doris Randles**, Quality Control Specialist, RSMB, Fort Worth; **Maxie Brown**, SNS, Jackson, Miss.; **Vernon Hudson**, SNS, Lubbock, Tex.; **Tom Clarke**, SNS, Lakeland, Fla.; (second row, from left) **Pete Peterson**, SNS, Waco, Tex.; **Jack Brown**, SNS, Old Hickory, Tenn.; **Dick Snyder**, SNS, Albuquerque, N. Mex.; **Carlos Noboa**, SNS, San Juan, P.R.; **Ralph Funderburk**, SNS, Macon, Ga.; **Bob Manning**, SNS, Fort Worth; **Hugo Lehrer**, Cooperative Data Branch, National Climatic Center, Asheville, N.C.; **Jack Sewell**, SNS, Montgomery, Ala.; (back row, from left) **Woody Currence**, SNS, Little Rock, Ark.; **Bill Pogerman**, Substation Program Manager, NWSH, Silver Spring, Md.; **John Harrison**, SNS, Oklahoma City, Okla.; **Keith Shoun**, Substation Program Specialist, NWSH; and (not in photo) **Earl Clark**, Chief, Data Acquisition Division, SRH, Fort Worth.

**H. N. Bhalme** (right), World Meteorological Organization Fellow from India, recently completed an eight-week training assignment at the Environmental Data Service National Climatic Center. His training emphasized the application of statistical methods to tropical cyclone climatology, especially for the north Indian Ocean. He received his training certificate from NCC Director Dr. T. D. Potter.



THE RECENT DEDICATION of the new facilities of the National Weather Service Forecast Office in Cheyenne, Wyo., was attended by many State and city officials, including Mayor Bill Nation (right), and representatives of Governor Ed Herschler and U.S. Senator Clifford P. Hansen. Meteorologist in Charge Robert Beebe reports that the new office was hailed as an excellent result of friendly relations between a Federal Agency and a local government.



A NOAA UNIT CITATION has been awarded to the NOAA Ship Oregon in recognition of the outstanding individual and collective contributions of the officers and crew to NOAA's mission during 1975. Despite mechanical problems and adverse weather conditions, according to National Ocean Survey Director R. Adm. Allen L. Powell, "Personal sacrifice and devotion to completion of mission objectives contributed to a successful field season and excellent relations with the general public, local officials, and other Government agencies."

Those honored were Wendell Schneider, Master; Louis T. Radine, Chief Engineer; Allen Komedal, 1st Officer, and Russel E. Hammond, who served as 1st Officer after Mr. Komedal retired during the season; Torval Steen, 1st Assistant Engineer; Daniel Kulusich, Lead Fisherman; Skilled Fishermen Ivar C. Hestad and Martin Morin; and Chief Steward Arthur W. Ericson and Robert Lyons, his replacement while he was unable to work because of an injury.

(From left) Charles Martin, Temporary Chief Steward; John Station; 1st Officer; Paul Anderson, National Marine Fisheries Service; Rich MacIntosh, NMFS; Mr. Kulusich; R. Adm. H. R. Lippold, Jr., former Director of the NOS Pacific Marine Center, who presented the Award; Mr. Hestad; Mr. Schneider; Alan Spalinger, NMFS; Jerry Reeves, Assistant Director, NMFS Northwest Fisheries Center Kodiak Facilities; Sandra Wakefield, NMFS; Mr. Radine; Roland McBride, NMFS; and Mr. Steen.

**Blake** (Continued from page 1) MLC's, serving as a subject matter expert for labor relations, most recently in the Wage Marine area.

Previously, he was an Investigator with the U.S. Civil Service Commission.

Mr. Blake is a graduate of Duquesne University and in 1971, as a recipient of a NOAA scholarship, he entered into a

program of intensive study in Labor Management at the University of Maryland.

## Brooklyn College Is Awarded Research Grant

A \$30,220 grant for research on determining the origin of organic-rich muds in near-shore areas bordering public beaches has been given to Brooklyn College of the City University of New York by the Environmental Research Laboratories.

The award was made to Professors John C. Stewart and William H. Harris of the college's Geology Department.

Principal purpose of the research grant is to resolve both the natural and man-related sources of accumulated organic-rich muds and sediments, including sewage sludge, dredge material, and other contaminant sources.

Another objective of the research is to assess the environmental impact of the ocean outfall, created by the Cedar Creek Wastewater Treatment plant at Seaford-Wantaugh, N.Y., two and a half miles off Jones Beach. The facility is expected to reach full discharge capacity during the research period.

Because the ocean outfall may become a source for organic material dispersal in the inner New York Bight, and, possibly, near-shore mud patch formation, the Brooklyn College researchers will monitor suspended sediments from the outfall, and from the Jones, Fire Island, and East Rockaway tidal inlets. They also plan to sample sediments from near the Rockaway-Sandy Hook transect and near the effluent stream of the Cedar Creek plant.

All areas will be monitored quarterly to enable the scientists to study the sediments under variable conditions imposed by seasonal changes in temperature-salinity structure, and currents.

The Brooklyn College research will provide field data that can

be used in a model of sediment transport being prepared by NOAA scientists with the Marine Ecosystems Analysis (MESA) New York Bight Project, an environmental study being conducted off the New York-New Jersey coast.

**Taylor** (Continued from page 1) fishery research vessels based in Seattle, San Diego, Calif., Auke Bay, Alaska, and Honolulu, Hawaii. Nine are based in Seattle and approximately 275 civil service and commissioned personnel are employed at PMC.

Adm. Taylor joined the old Coast and Geodetic Survey in 1950 following graduation from the University of Massachusetts with a civil engineering degree. At the University's recent Engineering Honors Day Program, he received its 1976 Engineering Alumni Association Award.

During his more than two decades of service he has served in the South Pacific and off the east and west coasts of the United States aboard five oceanographic and hydrographic survey ships; and as Commanding Officer of the NOAA Ship Pathfinder. He was in charge of the International Geophysical Year Astronomic Observatory in Hawaii during 1957-58; and Chief of the Satellite Triangulation Division from 1961-67. For his work in satellite triangulation—involving worldwide measurements of the earth—he was awarded a Commerce Department Gold Medal.

Adm. Taylor received his master's degree in geodetic science from Ohio State University in 1968.

## calendar of events

- July 26-30 "Coastal Wave Hydrodynamics - Theory and Engineering Applications" course at Massachusetts Institute of Technology sponsored by M.I.T. Sea Grant Program and M.I.T.'s Summer Session Office. (Director of the Summer Session, Room E19-356, M.I.T., Cambridge, Mass. 02139. 617-253-2101.)
- Aug. 29-Sept. 3 Chapman Conference on State of Stress in the Lithosphere. Sponsored by the American Geophysical Union. (Cynthia Beadling, AGU, 1909 K St., N.W., Washington, D.C. 20006. 202-331-0370.)
- September 10-14 Chapman Conference on Partial Melting in the Earth's Upper Mantle, cosponsored by the American Geophysical Union and the Oregon Department of Geology and Mineral Industries. (Cynthia Beadling, AGU, 1909 K St., N.W., Washington, D.C. 20006. 202-331-0370.)
- September 12-17 International Conference on Photochemical Oxidant Pollution and Its Control, sponsored by the U.S. Environmental Protection Agency and the Triangle Universities Consortium on Air Pollution (TUCAP). (Mrs. Ernestine McIver, Administrative Secretary, TUCAP, P.O. Box 2284, Chapel Hill, N.C. 27514. 919-966-1515.)
- September 13-15 OCEANS 76—Annual Conference-Exhibition of Marine Technology Society and Council on Oceanic Engineering of the Institute of Electrical and Electronics Engineers. (Mrs. Mary Ann Paturis, Marine Technology Society, 1730 M Street, N.W., Washington, D.C. 20360. 202-659-3251.)
- Sept. 30 - Oct. 1 Twenty-Third Pacific Northwest Regional Meeting of American Geophysical Union. (John T. Weaver, Dept. of Physics, University of Victoria, Victoria, B.C., Canada V8W 2Y2.)
- October 5-8 Second Magnetospheric Cleft Symposium; An AGU Chapman Conference, cosponsored by the National Research Council of Canada and Canadian Association of Physicists. (R. W. Dolan, National Research Council of Canada, Ottawa, Ontario, Canada K1A 0R6.)
- October 21-23 Joint meeting of the Midwestern Region of American Geophysical Union and the Eastern Section of the Seismological Society of America. Deadline for abstracts is July 27. (Cynthia Beadling, AGU, 1909 K St., N.W., Washington, D.C. 20006. 202-331-0370.)



# **National Oceanic and Atmospheric Administration**

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