NOAA Awards Honor Employee Achievements

Five persons were presented 1974 NOAA Awards by National Oceanic and Atmospheric Administration Administrator Robert M. White at a luncheon at Bolling Air Force Base, Washington, D.C., 11 October 1974. The Commerce Department agency also recognized two employees for outstanding achievement in its Equal Employment Opportunity program.

The $1,000 NOAA awards from the nation's civilian air-sea agency honored distinguished accomplishment for direction of U.S. participation in the world's largest weather experiment; automation of the National Weather Service's field operations; world leadership in magnetospheric physics; helping American surveyors toward modern practices; and major contributions to the development of a minority crab processing business.

Recipients were: Douglas H. Sargeant of NOAA's headquarters in Rockville, Md., Director of the U.S. Project Office of GATE—the Atlantic Tropical Experiment of the Global Atmospheric Research Project—for Program Administration and Management; Robert E. Johnson, Chief, Systems Integration Division, Systems Development Office, National Weather Service, Silver Spring, Md., for Engineering and Applications Development; Donald J. Williams, Director of the Boulder, Colo.-based NOAA Environmental Research Laboratories' Space Environment Laboratory, for Scientific Research and Achievement; Joseph Dracup, supervisory geodesist of the NOAA National Geodetic Survey in Rockville, Md., for Public Service; and Burton L. Tinker, food technologist at the Northeast Utilization Research Center of the NOAA National Marine Fisheries Service, Gloucester, Mass., for Public Service.

Sargeant has directed U.S. preparations for and participation in GATE, the field phase of which was recently completed off Senegal, Africa. The experiment involved approximately 4,000 persons from 70 nations, and a wide array of satellites, aircraft, ships and other platforms. Sargeant, more than any other individual, has contributed to the highly successful execution of the observational phase of the GATE program. His resourceful management helped overcome threatened loss of vital satellite information and other equipment difficulties, during the project. His skill in complex international negotiations helped bring agreements acceptable to all nations concerned. "Largely as a result of his keen judgment and diligence," his award states, "this program will be recorded as a monument of scientific accomplishment."

Johnson, affiliated with the National Weather Service since 1966, has pioneered in the application of modern engineering technology to field operations. In 1971, he led in analyzing these operations in terms of their suitability for automation. From his efforts came the NWS' recently-unveiled Automation of Field Operations and Services (AFOS) Program, designed to speed and improve weather forecasts and warnings. He directed the development of an experimental model AFOS station, a system hailed as one of the most advanced applications of minicomputer technology in the Nation.

Williams, Director of NOAA's Space Environment Laboratory since 1970, has organized the best magnetospheric and one of the best interplanetary medium research groups in the United States. An expert in the dynamics of magnetospheric particle populations, he was instrumental in developing detectors for the measurement of ions and electrons at very low energies, and has used the instrumentation of 12 satellites to map the magnetosphere's charged-particle population in space and time. His work has eliminated areas of major ignorance about magnetic storms.

Dracup for many years has devoted much of his own time helping surveyors through the transition to modern methods that use NOAA's products and services. He has organized and participated in many workshops, usually on weekends, instructing surveyors in modern methods. Federal, state, and local surveyors have been assisted by these efforts.

Tinker, in 1970, began counseling a New Bedford, Mass., minority group interested in processing red crab, an underutilized shellfish. His technical assistance included aid in the preparation of proposals and plant design requirements. The group, which eventually became the New Bedford Atlantic Associates, received an Economic Development Administration grant in 1972 to undertake a pilot project. In 1973, Atlantic Associates materially expanded operations and on 30 August 1974 broke ground for a new plant in New Bedford. Tinker's assistance, much of it in off-duty hours, contributed significantly to the success of the venture.

Receiving $500 NOAA Equal Employment Opportunity Awards will be NOAA Assistant Administrator for Administration Theodore P. Gleiter and Jacqueline A. Coit of NOAA's National Marine Fisheries Service.

Gleiter has been cited for continuing aggressive and imaginative leadership in all aspects of EEO. He has pointed out areas in employment where minorities and women tend to be locked into dead-end jobs, and has sponsored and encouraged a number of upward mobility programs to enable lower-level employees to enter new careers. Through various NOAA programs, he has assured that his own division has increased its number of minorities and women at higher grade levels. He has initiated programs in career counseling and race relation seminars to help managers and supervisors, as well as employees, come to a better appreciation and understanding of the problems of minorities and women.

Coit, an Administrative Assistant at NOAA's Southwest Fisheries Center in La Jolla, Calif., was recognized for "exceptional initiative and effort in encouraging the employment of handicapped individuals." She was instrumental in the recruitment of several severely handicapped individuals at the center. She has also contributed to EEO progress in the employment of minority and female candidates at the center, contacting and working with the Neighborhood Youth Corps, Work Incentive Program, Urban League, summer aid program, Upward Bound groups and

others. She has presented lectures on National Marine Fisheries Service job opportunities to minority and school groups, stressing the EEO plan, and maintains contacts with minority and women's organizations to establish continuing relationships and increased recruitment opportunities.

Regulations on Taking Marine Mammals Printed

Commercial fishermen who take marine mammals while fishing were required to be included under a general permit after 20 October 1974, according to the Commerce Department's National Oceanic and Atmospheric Administration.

The Marine Mammal Protection Act of 1972 was passed to protect, maintain, and if necessary rebuild the populations of marine mammals. The Act, among other things, restricts the taking and importing of marine mammals and marine mammal products.

Because there are times when fishermen might unavoidably take marine mammals during their normal fishing operations, it was necessary to make provisions in the Act which would allow fishermen to take marine mammals incidental to their commercial fishing operations.

A system was established by NMFS/NOAA whereby organizations representing fishermen could apply for a general permit to cover fishing operations using five general categories of fishing gear. Once these general permits had been issued, individual commercial fishermen could be included under the general permit by applying for a certificate of inclusion under one of the five categories.

Conditions of the general permits, and the certificates of inclusion under the permits, require, among other things, that commercial fishermen take special measures, and in some cases use special fishing gear, to avoid injuring or killing marine mammals in their fishing operations. If a marine mammal is killed or injured it must be reported to the National Marine Fisheries Service or a State enforcement agency.

NOAA's National Marine Fisheries Service published regulations controlling the incidental taking of marine mammals in the Federal Register on 5 September 1974, to become effective on 30 September 1974. These regulations, as amended, govern the issuance of general permits and certificates of inclusion.

The initial general permits and related certificates of inclusion will be good until 31 December 1975. General permits and certificates issued thereafter will expire 31 December of the year they are issued.

The five general categories of fishing gear are towed or dragged gear; encircling gear, yellowfin tuna purse seining; encircling gear, seining other than yellowfin tuna; stationary gear; and other gear such as trolling, gill nets, and hook and line gear.

Applications for the certificates of inclusion will be accepted at the National Marine Fisheries Service's Regional Offices in Seattle, Washington; Terminal Island, California; Gloucester, Massachusetts; St. Petersburg, Florida; and Juneau, Alaska.

Applications for certificates of inclusion will include the name of the person(s) which is to appear on the certificate, the category of general permit under which the applicant wishes to be included, the species of fish sought and general area of operation, identity and date of expiration of State or local commercial fishing licenses, if any, under which fishing operations are conducted, and the name and signature of person making application.

Cost of the certificates is $10 for everyone applying under all categories except yellowfin tuna purse seining encircling gear, which is $200.

NOAA Dedicates New Great Lakes Facility

Officials from the National Oceanic and Atmospheric Administration dedicated the new Great Lakes Environmental Research Laboratory in Ann Arbor, Mich., 18 October 1974. Representative Marvin L. Esch, U.S. Congressman from Ann Arbor, was the principal speaker at the afternoon ceremony. John K. Tabor, Under Secretary of Commerce; Wilmot N. Hess, Director of NOAA's Environmental Research Laboratories; Charles G. Overberger, Vice-President for Research of the University of Michigan; and Jack E. MaKeever, Executive Director of the Ann Arbor Chamber of Commerce, also participated. Eugene J. Aubert, Director of the new laboratory, discussed some of its objectives and projects.

Formally established on April 25, the Great Lakes laboratory is the newest of the Commerce Department agency's Environmental Research Laboratories, headquartered in Boulder, Colo. It brings together researchers from the limnology and computer divisions of the National Ocean Survey's Lake Survey Center in Detroit and NOAA scientists working on the International Field Year for the Great Lakes (IFYGL). The new laboratory's 30 scientists are investigating the total lake ecology—waters, sediments, life forms, climate, and surrounding terrain.

The main task of the Great Lakes laboratory for the first few years will be continued analysis of the data collected during IFYGL in 1972-73. The project is a joint U.S.-Canada study of Lake Ontario. Aubert estimates that IFYGL will occupy two-thirds to three-fourths of the laboratory's efforts until 1977.

Research at the laboratory will take two directions. Basic research will contribute to the background of general knowledge about the lakes. Other projects are aimed at providing improved environmental information to solve specific problems or meeting specific needs, such as improving navigation or preventing erosion or pollution.

The emphasis will be on interdisciplinary research, says Aubert. The laboratory will also provide environmental information and advisory services to planners and policy makers in government and private organizations.

Among the main long-range goals of the laboratory will be comprehensive models of lake circulation, lake ecology, lake levels, and flows. Studies will focus on waves and currents, design and siting of power plants, pollution of public beaches, lake climatology, winter ice, lake hydrology, the population dynamics of key organisms, and water quality in the various bays, rivers, and harbors.

The facilities at Ann Arbor will include laboratories for studies of water chemistry, sediment, biology, and ice. A lakeside facility at Monroe, Mich., will provide a starting point for field research. For research on the waters of the lakes, the limnologists will use the 65-foot research vessel, *Shenehon,* operated by NOAA's National Ocean Survey.

NMFS IMPORT INSPECTION SERVICE NOW IN USE

Boston Bonnie, Inc., Boston, Mass., one of the country's largest importers of fisheries products, is the first to use the Import Inspection Service offered by the Department of Commerce's National Oceanic and Atmospheric Administration.

The service includes technical assistance in developing purchasing, processing, and end-product specifications; determining compliance with the importers' requirements; and pretesting and analyzing the imported seafoods for wholesomeness, quality, and condition. Assistance is also provided to the importer with product labeling, quality assurance, sanitation, and other problems.

The import inspection service is one of several inspection services administered by NOAA's National Marine Fisheries Service which will help to assure manufacturers that the fisheries products they offer to the consumer are safe, clean, and wholesome. The inspection is provided on a fee-for-service basis to anyone involved in distributing and processing fisheries products.

Boston Bonnie, Inc., employs over 100 people and imports millions of pounds of fisheries products a year for processing and worldwide distribution.

David M. Trilling, Vice President of Boston Bonnie, Inc., points out that inspection protects the foreign shipper as well as the U.S. receiver by providing certificates of the condition of the products at the time of the inspections. He feels that this is a step forward in assuring the processor that the imported fisheries products he uses are of high quality, thus providing a better product to the consumer.

Extensive Gulf of Alaska Ecological Study Is Assessing Probable Oil Lease Impact

What could possibly be one of the richest oil discoveries since Alaska's Prudhoe Bay—the oil-bearing formations beneath the continental shelf in the Gulf of Alaska—could also pose a formidable set of ecological questions.

The National Oceanic and Atmospheric Administration, working with other Federal and State agencies in a major investigation for the Bureau of Land Management, U.S. Department of the Interior, is attempting to assess this risk so that it can be weighed against the national imperatives for developing adequate domestic energy sources.

The $2.5 million project focuses on an area in the northeast Gulf of Alaska between Prince William Sound and Yakutat Bay, a region thought to contain potential petroleum reserves —and to present some difficult environmental problems.

The study is managed by the Marine Ecosystems Analysis (MESA) program office of the Commerce Department agency's Environmental Research Laboratories in Boulder, Colo., and coordinated for the Bureau of Land Management by its Outer Continental Shelf office in Anchorage, Alaska.

"This kind of investigation," says Wilmot N. Hess, director of the NOAA laboratories, "is an absolutely essential prelude to outer continental shelf petroleum development."

"In the view of many environmental scientists in Federal agencies and private institutions alike, baseline environmental studies are needed to quantify our present rather subjective understanding of the risks of outer continental shelf development. Without quantification of these risks—that is, without knowing which action produces which environmental consequences—we cannot compare the probable risks with the probable benefits of development."

Although the project is managed by NOAA, it will draw on the special talents and experience of scientists in NOAA and in such institutions as the University of Alaska, Alaska Department of Fish and Game, and the Interior Department's Geological Survey and Fish and Wildlife Service. Herbert Bruce, of NOAA's National Marine Fisheries Service Auke Bay, Alaska, laboratory, directs the project in the field.

The Council on Environmental Quality, in its April 1974 report, indicated that oil development in the northeastern Gulf of Alaska presented potentially greater environmental risks than in any other continental shelf area studied. Among the special problems of the area cited by the Council were a superficial understanding of the region's rich, complex, and economically important marine ecosystem; the effect on possible oil spills, of tides, currents, and winds; the hazard presented to offshore facilities by the furious maritime storms which parade across the Gulf; and the relatively high level of seismicity (earthquake activity) and the earthquake-generated sea waves called tsunamis.

These crucial unknowns played a key role in shaping the present study, which in its first year will emphasize measurement and analysis of the key environmental factors which must be quantified before oil exploration, drilling, and production can begin.

In the first year's effort, the investigators hope to:

1) Characterize the circulation of the ocean (and estuarine) waters of the region, both over the continental shelf and offshore, identify the dominant dynamic mechanisms involved in flow patterns and mixing processes, describe characteristic waves and weather, and develop numerical models as aids in interpreting results and exploring simple dynamic processes. This will be a cooperative effort of the Pacific Marine Environmental Laboratory (one of the Environmental Research Laboratories) in Seattle, Wash., NOAA's National Ocean Survey, and the Institute of Marine Sciences at the University of Alaska.

2) Develop a comprehensive knowledge of the area's seabed geology and the sediment flow from contributory rivers, assess the earthquake hazard there, and delineate natural oil seeps —the sources of nature's small, chronic "oil spills." This part of the study

will be undertaken by the Interior Department's Geological Survey.

3) Provide baseline characteristics of the seabed and water-column chemistry, with emphasis on establishing natural levels of hydrocarbons and distributions of trace metals (for example, nickel, cadmium, zinc, copper, and mercury) in the marine environment and its life before petroleum development begins there. The chemical program will be conducted by NOAA's Northwest Fisheries Center, Seattle, Wash., and the University of Alaska's Institute of Marine Science, in consultation with the Commerce Department's National Bureau of Standards.

4) Complete a thorough census and description of the micro- and larger organisms which constitute the region's marine and estuarine population, particularly the fragile ecosystems of the intertidal regions, and assess the abundance of marine birds and mammals in the study area and how these populations vary seasonally. The biological program will be carried out by NOAA's Northwest Fisheries Center, the Institute of Marine Science of the University of Alaska, the Alaska Department of Fish and Game, and the Interior Department's Fish and Wildlife Service.

A follow-on program of studies designed to refine further scientific understanding of the study area's marine ecosystem and the possible impacts of oil exploration, production, and transportation, will be proposed early this year. A final report of the project's first-year results will be issued by mid-August.

NOAA Issues Coastal Management Criteria

A key set of criteria to guide the management of the nation's coastal areas has been issued by the National Oceanic and Atmospheric Administration (NOAA), a Department of Commerce component. They outline basic elements that a State coastal management program should contain to qualify for approval by the Secretary of Commerce and were published in draft form in the Federal Register on 21 August 1974.

The criteria were issued in response to the Coastal Zone Management Act of 1972. The Act provides Federal funds to State governments wishing to develop coastal management programs. Participation in the program is voluntary, but all 34 eligible States and territories were expected to take part in 1974.

Under the Act, the 30 coastal States (including those along the Great Lakes) and four territories may submit for Federal approval management programs for protecting, developing, and restoring coastal lands and waters. When the Secretary approves the program, the State becomes eligible for additional funds to assist in its implementation. In addition, Federal activities carried on in the coastal zone, or which may affect the coastal zone—including grants, loans, licenses, and permits—must be conducted in a manner consistent with the program.

Among the new criteria is the provision that the management program describe how the State will exercise control over the use of coastal resources of Statewide interest in cooperation with local governments and regional bodies.

Another criterion provides that States designate areas of particular concern within the coastal boundary. Areas, for example, which are of historical and scenic importance as well as of significant ecological value. Additional consideration should be given to coastal areas vulnerable to natural disasters or of high recreational potential and urban concentration.

Recent proposals to accelerate oil and gas production in the offshore waters of the United States have intensified interest in wise coastal zone management. Oil refineries, beaches, harbors, second homes and condominiums, power plants, wildlife refuges, airports, highways and commercial development all compete with one another for a relatively limited, but extremely critical, strip of shoreline.

Robert W. Knecht, director of NOAA's Office of Coastal Zone Management, says the new criteria "represent a major step forward in building the kind of 'shared partnership' between the Federal, State and local governments that is visualized in the Coastal Zone Management Act." He added, "Coastal States are encouraged to submit coastal zone management programs meeting the criteria established by the Secretary of Commerce. In exchange, the Federal Government is committing itself to conform Federal actions to the approved State program." Knecht emphasized that the basic coastal resource management decisions would continue to be made by State and local governments.

Marine Pollutant Data Available

Environmental data from a study to assess the potential effects of man-generated substances and activities on the marine environment is now available from the Commerce Department's National Oceanic and Atmospheric Administration.

According to NOAA's Environmental Data Service the data are from the Prediction of Ocean Pollutants Study conducted by the Ocean Affairs Board of the National Research Council which began in May 1973 with the identification of six substance types for study.

The substances were chosen because of their persistence, and abundance in the marine environment. They include nuclear wastes, synthetic organic chemicals, marine litter, metallic processing wastes from industrial operations, organic sludges, and medical and agricultural pharmaceuticals.

Information on each substance's basic chemical and physical properties, U.S. and foreign production, major uses, environmental leakages, routes through the environment, and potential effects on the environment were collected by ten NRC research associates during the summer of 1973. The collection of information, consisting of papers from scientific journals, tables, data, status reports from industry and government agencies, formal and informal reports, and referenced personal communications, has been indexed and is available through the Environmental Science Information Center, Marine and Earth Sciences Library (Fisheries Branch), 3300 Whitehaven Street, N.W., Washington, DC 20235.

Monitor Nominated As A "Marine Sanctuary"

The remains of one of the nation's most historic warships, the ironclad U.S.S. *Monitor,* and the ocean area where it has rested for more than 100 years have been nominated to become the country's first Marine Sanctuary.

Robert W. Knecht, Director of the Office of Coastal Zone Management of the National Oceanic and Atmospheric Administration, announced receipt of the nomination last fall from North Carolina Governor James E. Holshouser, Jr. The *Monitor* rests 220 feet beneath the surface of the ocean some 16 miles off Cape Hatteras, N.C.

In nominating the *Monitor* and its site as a Marine Research Sanctuary, Governor Holshouser cited both the historic and technological value of the Civil War gunboat. The *Monitor* is best known for its celebrated encounter with the Confederate ironclad ram, C.S.S. *Virginia,* popularly known as the *Merrimac.*

To ship builders, however, the *Monitor* represents a revolutionary concept in 19th century naval technology, symbolizing both the end of the wooden, sail-powered fighting ships and the beginning of the development of the modern capital ship.

Designation of the wreck site as a Marine Sanctuary will help to ensure that the *Monitor* is safeguarded and that archaeological research will be controlled, Governor Holshouser pointed out in his nominating letter.

Under the Marine Protection, Research and Sanctuaries Act of 1972, the Secretary of Commerce is authorized to designate marine sanctuaries to preserve or restore such areas for their conservation, recreational, ecological, or esthetic values. NOAA's Office of Coastal Zone Management is the government agency through which evaluations of marine sanctuaries nominations are conducted.

A discussion paper on the *Monitor* nomination was reviewed by the Department of Commerce, and a draft environmental impact statement—required for marine sanctuary sites—was developed for public release. A public hearing was also scheduled later in the year.

The *Monitor* foundered during a gale off Cape Hatteras on the last day of December, 1862, and sank with 16 of her crew onto treacherous Diamond Shoals. There the 172-foot warship rested, upside down and uncharted, for almost 111 years until the summer of 1973 when the wreckage was discovered by a marine research team using sonar and underwater photography techniques.

Early this year a more elaborately-equipped scientific expedition operating aboard the *Alcoa Seaprobe* confirmed the earlier find, obtaining hundreds of photographs of the wreckage and eliminating all doubt that it was, indeed, the *Monitor.*

Discovery and positive identification of the *Monitor* was a team effort on a large scale. Among those involved thus far have been scientists from Duke University's Marine Laboratory, the North Carolina Department of Cultural Resources, the National Science Foundation, the National Geographic Society, the U.S. Navy, Massachusetts Institute of Technology, the University of Delaware, and Aluminum Company of America.

Research Associate Will Study Squid Behavior

Brian J. Rothschild, Director of the NMFS Southwest Fisheries Center, La Jolla, Calif., has announced that Ann Hurley, animal behaviorist, is the latest recipient at the La Jolla Laboratory of a National Research Council Senior Research Associateship, awarded by the National Academy of Sciences and funded by the National Marine Fisheries Service, an agency in the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. According to Rothschild, the annual award at the Center provides an opportunity for postgraduate scientists to work on basic research problems with professional staff at the laboratory.

During her 12 months at the La Jolla laboratory, Hurley plans to examine the importance of various types of visual stimuli on the schooling behavior of squid *(Loligo opalescens)* and will attempt to examine the development of schooling behavior using the facilities of the La Jolla Laboratory's saltwater aquarium where squid can be maintained. According to Hurley the squid is important in the pelagic food web off the California coast. It is a predator on many species of small fish and crustaceans and is itself a food item in the diet of larger fish, and marine mammals; the squid also increasingly serves as an abundant and nutritious protein source for man. The squid forms large schools in open water and migrates to shallow water to spawn, often in the vicinity of the La Jolla Laboratory. There is a small commercial fishery for squid in California and most biologists agree that it is presently an underutilized fisheries resource.

The mechanisms which cause squid to form large schools and to maintain their orientation within a school have not been studied, Hurley said. She thinks that vision probably provides the primary sensory input for schooling behavior and also appears to be important in other social interactions. She also noted that the survival value of schooling in fish has been considered but its use to squid or other pelagic invertebrates is unknown. Schooling in squid may be important as a mechanism to escape predators, or its main function may be to form breeding groups which migrate inshore to spawn. Hurley hopes that her work on comparisons of schooling in fish and squid may give clues to physiological mechanisms involved in schooling and the ecological importances of schooling to both groups of animals.

The first woman to receive a National Research Council Fellowship at the La Jolla Laboratory, Hurley, 27, is a graduate of Stanford University and received her Ph.D. in biological oceanography from the University of California, San Diego in 1972. Recently, Hurley held a position as a postgraduate research neuroscientist at the University of California, San Diego, where she conducted experiments to determine the feasibility of experiments on squid both on board ship and in the laboratory at the Scripps Institution. While on a three-week cruise aboard the University of California research vessel, *Alpha Helix,* she examined the mating behavior of *Loligo,* and has also observed spawning squid during scuba dives.

Malins, Stansby Get New NWFC Positions

Donald C. Malins has been appointed Director, Environmental Conservation Division, Northwest Fisheries Center, National Marine Fisheries Service, NOAA, Seattle, Wash. He succeeds Maurice E. Stansby who, as advisor to Center Director Dayton L. Alverson, now is Scientific Consultant on Contaminants Research, concentrating on petroleum hydrocarbons and their effects on marine life. Malins will supervise research in the fields of biology, biochemistry, physiology, and pathobiology.

NOAA Sea Grant Assists University of California Marine-Related Research

Continuing work to develop a commercially feasible lobster aquaculture program, commercial exploitation of the California squid fishery and further development of a dynamic floating breakwater for dissipating wave energy are major parts of the University of California Sea Grant program for which Commerce Secretary Frederick B. Dent announced a $1,631,000 grant last fall.

Headed by Jeffrey D. Frautschy of UC-San Diego, the program involves investigators from the University of California campuses at San Diego, Berkeley, Santa Cruz, Davis, and Santa Barbara; the Moss Landing Marine Laboratory; the California State University campuses in San Diego, San Jose, and Northridge; and the University of San Diego.

The grant was made by the National Sea Grant Program of the National Oceanic and Atmospheric Administration. Purpose of the program is to enhance the development of America's marine resources in the oceans, the Gulf of Mexico, and the Great Lakes. At least one-third of the funds for each Sea Grant project must come from non-Federal sources.

The major aquaculture work will continue to focus on the American lobster. Investigators at Davis and Bodega are concentrating on the development of closed systems using both natural and artificial seawater in order to obtain good control of all factors affecting the animals. The use of temperature control to achieve rapid growth, and research on problems of mass larval rearing and disease identification, control, and immunization will be emphasized at San Diego. The economic study for a scaled-up commercial venture will also be continued.

The breeding and growth cycles of the crab, *Scylla serrata,* will also be studied as a potential candidate species for aquaculture. It is a tasty, disease-resistant crab that grows to one and a half pounds in ten months and breeds and grows in confined spaces.

Rounding the aquaculture program are projects dealing with seaweed production, the ecology of the kelp forest, and the biology and breeding of salt-tolerant land plants possessing a potential for commercial crop raising in saline environments.

Commercial exploitation of the California squid fishery is the objective of a project new last year. Improved harvesting gear, better knowledge of spawn areas, and determination of sustainable yields are included in this many-faceted investigation. Continuing efforts for developing quick chemical assays of "red tide" toxins, improving seafood preservation methods, and determining impacts of various schemes for restricting entry to fisheries are planned.

Under the marine products program, the University will continue its efforts in the chemistry of marine-derived compounds which are active against marine bacteria and which demonstrate algae-inhibiting properties for application in antifouling agents. A new project will assess the interference that naturally halogenated compounds produce in present analytical techniques for determining pesticide levels. Since current pesticide analytical methods are incapable of distinguishing between natural and unnatural substances, many of the reported high levels of PCB's may in fact be due to high levels of naturally occurring compounds.

Two ocean energy related projects are included in the program. One, a continuing development of a dynamic floating breakwater for dissipating wave energy, may provide a less expensive way of protecting ships in harbors from wave damage. The second is a determination of the biological effects of waste heat effluent from the large electric power plant at Morro Bay.

Under the education program a practical on-the-job course will be continued in the technology of marine science at California State University, San Diego. The California advisory service program will employ a variety of methods to communicate research results to those who will apply them in properly utilizing the marine resources for managing the marine environment. Arrangements have been made for cooperation with other Sea Grant programs in the State under the joint designation of a California Marine Advisory Program.

U.S., France Extend Oceanic Cooperation

The United States and France have agreed to continue this year cooperative ocean programs begun in 1970, according to Robert M. White, Administrator of the Commerce Department's National Oceanic and Atmospheric Administration.

Plans were revealed by White on his return from a meeting of the U.S.-French Cooperation in Oceanography last fall at the Brest Center of Oceanology, the major laboratory of France's National Center for the Exploitation of the Oceans (CNEXO).

White and Yves LaPrairie, Director-General of CNEXO, termed the sessions a major step forward in international scientific cooperation. In a joint statement, the oceanic leaders described as a highlight of the year the French-American Mid-Ocean Undersea Study (Project FAMOUS), whose field phase was recently completed.

In Project FAMOUS, after three years of planning and preparation, some 50 manned investigations to depths of 3,000 meters in the Mid-Atlantic Ridge southwest of the Azores were conducted by the U.S. submersible *Alvin* and France's *Cyana* and *Archimede*. The dives provided, for the first time, direct observations

by man advancing the concepts of continental drift and the scientific theories of plate tectonics. The scientific data acquired will be analyzed, and a bilingual report prepared.

New exchange activities have been initiated in marine pollution investigation. The nations will examine techniques for controlling oil discharges from ships. Another joint effort will study remote surveillance systems for response and enforcement against ships discharging oil, as prohibited by national and international conventions. Working with CNEXO to develop technical symposia and demonstrations in airborne surveillance systems will be the U.S. Coast Guard.

A new area of cooperation initiated at Brest provides for research in coastal processes. Industrial development along the coasts has accelerated greatly in recent years, and the U.S.-French research will be designed to help assure environmentally acceptable patterns of development.

Other significant continuing efforts concern the development of buoys and associated sensors for monitoring the ocean environment, aquaculture, instrumentation standardization and comparability, and such vital aspects of man-in-the-sea as diving safety and physiology.

White and LaPrairie also agreed to examine possibilities for cooperation in additional plate tectonics studies involving further use of submersibles, and methods of converting wind and temperature differences, currents and tides to useful energy.

Foreign Fishery Developments

Japanese Foreign-Based Skipjack Fishery Develops in South Pacific

Japanese fishery firms conducting skipjack tuna fishing in the South Pacific jointly with foreign partners had good catches last year.[1] Taiyo's vessels based in the British Solomons, and the Papua New Guinea-based fishing fleets, operated by Kyokuyo (which was having Daido Suisan manage the operations), Hokoku Suisan and Kaigai Gyogyo, were expected to attain their catch targets set for 1974. The good fishing experienced brightened the outlook for establishing a skipjack fishery in the southwest Pacific. The Papua New Guinea-based fishing operations were conducted experimentally in accordance with the plan to establish a fish cannery at Madang, for which the Papua New Guinea Canning Company was formed in 1972 jointly by the Japanese fishery firms, a U.S. tuna packer, and an investment firm in Papua New Guinea.

Solomon Taiyo is a jointly operated fishing venture based in the British Solomons. This company, formed one and one-half years ago, operated ten pole-and-line vessels (mostly of wooden construction). The fleet, based in Tulagi, fared well, as can be seen from its catch of 1,200 tons in June, 1,500 tons in July, and 1,200 tons in August. The catch goal for 1974, set at 10,000 tons, was expected to be easily surpassed. Most of the catch was frozen for export to the United States. Two ferro-concrete boats of 50 gross ton size were scheduled to be added to the fleet by March 1975. These boats, being built in Japan at a cost of 50 million yen (US$166,700 at 300 yen = US$1) each, will be the first Japanese-built fishing boats of ferro-concrete construction.

At Tulagi, the joint company operates an 800-ton capacity cold storage, built in August 1973, and a tuna cannery with production capacity of 1,300 cases/day, constructed in October that year. While the cannery was packing 500 cases a day in mid-1974, production was expected to increase as the local employees gained experience. "Katsuobushi" (dried skipjack loin) production, temporarily suspended earlier in 1974, was resumed in July and the daily output in September was 5 tons (converted to raw fish).

Gollin Kyokuyo was established in Kavieng jointly by Kyokuyo and Australian interests. This venture operated 11 Okinawan pole-and-line boats (39 gross ton in size) which, as in 1973, experienced good fishing. Their combined three-month catch to 31 July was over 5,000 tons. At that rate, it was expected that they would soon reach their catch goal of 10,000 tons set for 1974. Fifteen percent of the landings were processed into "katsuobushi," and 85 percent were frozen and exported to the United States.

New Guinea Marine Products is a joint skipjack fishing venture formed in Madang by the Japanese fishery firm Hokoku Suisan and an Australian firm. Fishing by this venture was reported to be good in 1974 compared with 1972 and 1973, when results were unfavorable. Fish landings by two motherships and nine catcher vessels had reached 5,200 tons in September and the catch goal for 1974 was 6,000 tons.

Carpentaria Kaigai is a joint venture company based in Rabaul. This company was operating 14 skipjack vessels (mostly 39-ton Okinawan pole-and-line vessels) in September 1974. Favored by good fishing conditions, the fleet, which began fishing conditions, the fleet, which began fishing in April, was catching 1,200-1,300 tons/month. The skipjack landings were frozen and exported to the United States. Until the cannery planned for construction in Madang is completed, all the skipjack catch will be frozen for export to the United States.

Source: *Suisan Keizai Shimbun, 18 Sept. 1974.*

[1]See also, Kearney, R. E., "Skipjack Tuna Fishing in Papua New Guinea, 1970-73," page 5.

VIBRIOSIS HITS NORWEGIAN FISH

Many thousands of young saithe were found dead or dying along the coast of western and central Norway in mid-October 1974 reports Norinform. The fish, most of which belong to the 1973 class, are victims of the bacterial disease vibriosis. It is reported to be too early to say what effect these deaths will have on the stocks of saithe, an important fishery in Norway. Although the 1973 class is large, it is feared that considerable losses may nevertheless be recorded. There have also been reports that other fish species have been hit by the disease, but the Institute of Marine Research in Bergen has so far been unable to confirm this. Species