

## Schoning Sees Fishery Export Opportunities

Economic growth and rising personal income in many countries have sent foreign buyers in search of new sources of fisheries products, and the United States is one of the sources, according to the Commerce Department's National Oceanic and Atmospheric Administration. A number of species found off the U.S. coasts are not fully utilized by U.S. consumers, yet the demand for these products is growing in foreign markets.

Robert W. Schoning, Director of NOAA's National Marine Fisheries Service, holds that much of the export opportunity lies in fish resources currently underutilized by this country. Examination of Japanese fish consumption data, for example, reveals that some of the major species consumed in Japan are listed as underutilized in the United States. Among these species are eel, squid, sea urchin, and croaker. The approximate annual per capita consumption of edible fish and shellfish in the United States in 1972 was 12.2 pounds, the highest in 45 years. Japan, on the other hand, had a per capita consumption of 70.8 pounds, down slightly, according to the latest available data (1970).

Schoning added that the growing world demand for fisheries products, the upward revaluation of foreign currencies, plus the devaluation of the U.S. dollar have combined to enhance U.S. export opportunities.

NMFS economists say that U.S. exports of fishery products have increased considerably in the past decade. Since 1962 the poundage of exported edible fishery products rose about 11 percent annually while imports were up about six percent annually. Still the dollar value of U.S. fishery products imported greatly exceeds the value of exports. In 1972 total U.S. imports of both edible and industrial fishery products were valued at about \$1.5 billion. The total value of exports (edible and industrial)

produced domestically was only \$158 million.

Squid, known to scientists as one of the cephalopods, offers an estimated peak allowable annual harvest of about 1.6 million pounds off the east coast of the United States, and is particularly popular in Mediterranean countries. The domestic market is limited. Atlantic herring has a high demand throughout Europe, and the U.S. export potential for herring fillets has been only partially realized, according to NMFS fisheries scientists.

The roe (eggs) of many fish is highly desired in some countries. Japan buys all herring roe produced in Alaska at present, as well as the majority of salmon roe from Alaska and the Pacific Northwest. A new market has been developed in Japan for sea urchin roe produced in California where that organism has long been considered a pest. NMFS economists believe that export values of Florida mullet could be tripled if the finished product (roe) were processed in the United States rather than selling the raw material, or whole fish, to Japan. Potential sales of processed mullet roe to Japan could reach 100 tons a year, according to the economists.

## Coastal Zone Management Advisory Committee Established, Members Named

Secretary of Commerce Frederick B. Dent has announced the establishment of a Coastal Zone Management Advisory Committee and the appointment of fifteen distinguished persons to serve as members.

Purpose of the committee, as provided by the Coastal Zone Management Act of 1972, is to advise, consult with, and make recommendations to the Secretary on matters of policy concerning the coastal zone. It may draw upon the expertise of its members, or upon other individuals and groups, in the course of its work. Coastal zone matters relative to the Act that the

Moves are also being made by at least one important U.S. processor to divert part of the U.S. croaker production, most of which currently goes into pet food, into a high value human-consumption market abroad. In Japan, croaker surimi, a minced raw-fish product, is a delicacy, and Japanese croaker production is believed to have peaked.

Eels, little used in the United States, are imported in quantity by Italy and Japan. Silver and Pacific hake, heavily fished by foreign fleets, also probably have room for increased U.S. harvesting and export. Additional species with potential for expanded U.S. export opportunities are mussels, Pacific herring, Atlantic mackerel, and Alaska pollock.

NMFS Director Schoning points out that the fact that the foreign market exists does not mean that the U.S. fishing fleet is prepared to meet the demand immediately. He says that while the demand exists, there are possible problems of gear conversion, harvesting, and processing that must be overcome. The price that foreign buyers will pay for certain products also will help determine whether U.S. fishermen will expand their present fisheries to seek the currently underutilized species.

committee may deal with include implementation and administration of the Act; proposed legislation or revisions to the Act that appear to involve coastal zone policy; public awareness and concerns about specific management issues such as conservation, protection, and resource development; and Federal activities in the coastal zone related to administration of the Act.

The Committee will report to the Secretary through the Administrator of the National Oceanic and Atmospheric Administration. NOAA is



the action agency within the Department of Commerce for coastal zone management activities under the Act, and has established an Office of Coastal Environment to carry out this responsibility. Robert W. Knecht, Director of NOAA's Office of Coastal Environment, will serve as Chairman of the Coastal Zone Management Advisory Committee.

The Committee will meet twice a year, or more frequently if called upon by the Secretary or the Chairman of the Committee. Members of the Committee serve two-year terms, except that seven initial appointments are for one-year terms.

Members appointed for terms expiring in September, 1974 are:

**Edward Bertrand** of St. Thomas, U.S. Virgin Islands, General Manager of the Lagoon Marina in St. Thomas. He has been active in matters relating to the local port authority, and also served as Deputy Commissioner of the Department of Health.

**Dr. William H. Fisher**, Director, Bureau of Economic Geology, University of Texas. A well-known administrator associated with natural resource development and research, he has served on many Texas advisory bodies on the environment and natural resources.

**Charles E. Fraser**, President of the Sea Pines Company, a land development firm located on Hilton Head Island, South Carolina. He was a member of the President's Citizens Advisory Committee on Recreation and Natural Beauty from 1966 until 1969.

**Dr. Charles E. Herdendorf III**, Director of Ohio State University's Center for Lake Erie Area Research. He has spent a number of years working on the resources and problems of the Great Lakes, is a consultant to the Great Lakes Basin Commission, and is the author of numerous scientific publications.

**Dr. Y. R. Nayudu**, a marine geologist, Director of the Division of Marine and Coastal Zone Management of Alaska's Department of Environmental Conservation. He is a

## NMFS Biologists Assist Science Students

Biologists from the National Marine Fisheries Service's Auke Bay (Alaska) Laboratory are assisting students of the Auke Bay Elementary School in a science project involving the field testing of gravel incubation of pink salmon eggs. The fourth, fifth, and sixth grade classes of the Auke Bay school have installed a 1/4-inch pipeline in a small spring-fed stream near the school, and each class has a 1-cubic-foot NMFS-style incubator connected to the water supply.

With the help of the Laboratory biologists, the students collected eggs from Auke Creek on September 17, 1973 and buried about 2,000 in each incubator. One of the incubators, a transparent model, will be inspected periodically to

follow the process of embryo development in the gravel. The students hope to keep the pipeline flowing all winter and to observe the emergence of live, healthy pink salmon fry this spring.

As an orientation for the project, nine classes of about 30 students each, with their teachers and their principal, Hal Vrooman, visited the Auke Bay Laboratory's experimental incubation station at Auke Creek on September 14. Coordination of this and similar projects at other schools in southeastern Alaska is under the Alaska Department of Fish and Game's Division of Fisheries Rehabilitation and Enhancement. The NMFS biologists are providing technical guidance to the teachers and students.

Science Advisor to the Governor of Alaska, and was designated by the Governor's Office as the Alaskan point of contact for the Coastal Zone Management Program.

**John Spellman**, County Executive of King County, Washington, the county surrounding Seattle. He is an attorney who has been admitted to practice before the U.S. Supreme Court, and the Washington State Supreme Court. He was formerly Vice President of the Seattle-King County Economic Development Council.

**Scott C. Whitney**, a Professor of Law and Director of the environmental law program at the College of William and Mary in Williamsburg, Virginia. He is also a practicing attorney, specializing in environmental law.

Members appointed for terms expiring in September, 1975, are:

**Harry C. Brockel**, retired Director of the Port of Milwaukee and currently a lecturer at the University of Wisconsin's Great Lakes Study Center. He has served in numerous capacities associated with ports and shipping in

the Great Lakes for the city of Milwaukee and the State of Wisconsin.

**Robert Bybee**, Operations Manager of the Exxon Company's Exploration Department. He has had considerable experience in geology and oceanography, and has been active in and an officer of numerous organizations and societies associated with oceanography and petroleum.

**William B. Hannum, Jr.**, President of Sea Farms, Inc., of Key West, Florida. In addition to business involvement in fisheries, he recently served on the Department of Commerce's Marine Fisheries Advisory Committee, which addresses the national problems and needs in the area of marine fisheries.

**Ellen Stern Harris**, Vice Chairman of the California Coastal Conservation Commission. She serves on the Task Force on the Environment for the California Attorney General, and is a consumer advocate columnist for the Los Angeles Times. She has served on numerous boards and committees concerned with the environment and conservation.



**Dr. Lee Koppelman**, Executive Director of the Nassau-Suffolk (N.Y.) Regional Planning Board. He holds adjunct professor posts in planning and political science at two local universities. A well-known regional planner, he has published text books on planning and is a member of several professional organizations on planning.

**Dr. Lyle S. St. Amant**, Assistant Director of the Louisiana Wildlife and Fisheries Commission. He is nationally recognized for his efforts to bring balanced utilization to the coastal environment of Louisiana and is Chair-

man of the Louisiana Advisory Commission on Coastal and Marine Resources.

**W. Reid Thompson**, President of the Potomac Electric Power Company and formerly General Counsel and later executive Vice President of Carolina Power and Light Company.

**Peter Wilson**, mayor of San Diego and a former member of the California Assembly. He authored the first coastal protection legislation to be introduced in the California legislature. Mayor Wilson also served on the President's Citizens' Advisory Committee on Environmental Quality.

## U.S., USSR Opt for Joint Marine Monitor

United States and Soviet marine scientists have signed an accord aimed at the establishment of a joint marine environmental monitoring network, according to the Environmental Protection Agency. The network, when established, will make it possible to measure the effects of pollution on marine organisms on a continued basis and to disseminate the related data rapidly.

The pact was signed in Moscow on October 27, 1973 following almost two weeks of discussions held by the U.S.-USSR Joint Working Group on the Effects of Pollutants on Marine Organisms. An earlier meeting of the two teams of marine experts was held in the U.S. in May 1973.

The cooperative program between the two countries is being carried out under the terms of the environmental pollution accord signed by President Nixon and Soviet Chairman Podgorny in May 1972.

The protocol sets forth the first two steps that both sides will undertake in developing the proposed marine monitoring system. The first step calls for a marine journal to be published simultaneously in the U.S. and USSR in English and Russian, respectively. To be issued bimonthly, this will be the first scientific journal to be pub-

lished simultaneously in the two countries, and will contain articles reflecting the highest level of marine research being conducted in the U.S. and USSR.

The second step provides for the establishment of a scientist exchange program. Under this program, as many as 10 marine scientists from each of the two countries will exchange visits each year to lecture and to become acquainted with the state of the art in marine research in the host country. During the early stages of the program, emphasis will be placed on research methodologies.

The American delegation that participated in the discussions which led to the protocol was headed by Dr. Eric D. Schneider, Director of EPA's National Marine Water Quality Laboratory at Narragansett, Rhode Island. The Soviet experts were headed by Dr. V. D. Fedorov, Chairman, Department of Hydrobiology at Moscow State University.

## Federal Funds Help Restore Gulf Oysters

Funds totaling \$213,620 for the restoration of oyster resources in Alabama, Louisiana, and Mississippi were made available to those States

last fall under the provisions of the Commercial Fisheries Research and Development Act (PL 88-309) as amended.

The funds were awarded by the Commerce Department's National Oceanic and Atmospheric Administration to assist the three States in the rehabilitation of coastal oyster beds heavily damaged by the disastrous spring floods last year in the Gulf States.

Apportionment of the funds was on the basis of the extent of the destruction of oyster reefs in each of the three States. Alabama received \$79,040, Louisiana \$85,448, and Mississippi \$49,132. Funds are administered through NOAA's National Marine Fisheries Service under grant-in-aid awards from the NMFS Southeast Regional Office, St. Petersburg, Florida. Additional funding, requested in the amount of \$482,396, is under consideration by Federal authorities.

The oyster resources involved in the natural disaster represent a \$5 million contribution to the economy of the three States, and are an important part of the national supply of marine food. Flooding by muddy fresh water entering the grounds on which the oysters are cultivated resulted in heavy deposits of silt and growth of marine organisms on the material (called "cultch") which furnishes points of attachment for baby oysters, or spat. Unless new cultch is promptly planted, growth and development of new oyster generations can be seriously inhibited and future supplies of the valuable crop endangered.

To qualify for funds specifically authorized under Section 4 (b) of PL 88-309 to alleviate resource disasters, a State must clearly demonstrate that a commercial fishery failure has occurred owing to natural or undetermined causes. A declaration of eligibility concerning the three-State need for assistance in disaster was published in the Federal Register on September 14, 1973. The funds were released to the State fishery agencies on October 2, 1973.







## Favorite Awarded Commerce Medal

Felix Favorite, a supervisory oceanographer with the National Marine Fisheries Service's Northwest Fisheries Center, Seattle, Wash., has received the Department of Commerce Silver



Favorite

Medal for his major contribution to fishery and oceanographic science particularly in relation to the Alaskan Stream. Secretary of Commerce Frederick B. Dent presented

the award in a ceremony in Washington, D.C.

Favorite was cited for his extraordinary organizational ability and technical competence in the planning and execution of oceanographic programs that have done much to interpret the marine environment in the North Pacific. Oceanographic investigations conducted by personnel at the Center under his supervision have provided a rational basis for explaining the relationship between fish (particularly salmon) and their environment. His ability to integrate biological and environmental observations was of major value to planners of underground nuclear testing in the vicinity of Amchitka Island in the Aleutians.

Born in 1925 at Quincy, Mass., Favorite was graduated from the Massachusetts Maritime Academy in 1944 and earned his B.S. in marine science at Boston University in 1950. He received another B.S. (oceanography) from the University of Washington in 1956 and his M.S. from the same university in 1966. He was awarded his Ph.D. by Oregon State University in 1968.

Favorite entered the Federal service in 1953 after serving as a ship's officer with an unlimited Master's license while working for a private steamship line. He has been stationed at the Center since 1956, when the Center's

oceanographic investigations of the North Pacific began under his direction. Performing as a teaching and research assistant at the University of Washington during 1956-57, Favorite was named to his present position as oceanographer in 1957.

## INPFC Concludes 20th Annual Meeting

The International North Pacific Fisheries Commission, whose members represent Canada, Japan, and the United States, concluded its 20th Annual Meeting at Tokyo, Japan, on Nov. 9, 1973. The meeting extended over three weeks, with two weeks of scientific sessions preceding the week of plenary sessions. Mr. Kenjiro Nishimura of Japan was chairman of the Commission at this meeting.

The Commission reviewed the results of conservation programs and scientific research on North Pacific fishery resources. Approximately 100 administrators, scientists, and industry advisers took part in the discussions, which dealt primarily with the general problem of ensuring the continued orderly development of the North Pacific fisheries resources with a view to maintaining maximum sustainable yields. As in past years, the Commission was assisted in certain of its discussions by consultants from the International Pacific Halibut Commission.

The Commission adopted a resolution recommending that the governments of the Contracting Parties give full consideration to the conservation needs of salmon stocks in areas of intermingling when preparing fishing regulations for future operations. The resolution also pointed out the necessity of giving special attention to the implementation of adequate conservation regulations with regard to salmon, as reflected in the patterns of fishing activities.

In the case of certain fishery resources which are exploited by fishermen of two or more of the member countries, such as king crab and tanner crab resources of the eastern Bering

Sea and groundfish other than halibut in the northeastern Pacific Ocean, scientific studies are being continued.

Conservation measures for halibut fishing in the eastern Bering Sea for 1974 were again considered by the Commission. Such recommendations have been made annually since 1963. However, the three national sections did not reach agreement and no recommendations were forthcoming from this meeting.

The Commission reviewed progress in publication of scientific research results and preparation of joint comprehensive reports on salmon as well as compilations of historical salmon and groundfish statistics. Tentative plans for research in 1974 were exchanged between the national sections.

The annual meeting in 1974 will be held in Seattle, Washington beginning on November 4. Officers elected for 1974 are Mr. Elmer E. Rasmuson of the United States, Chairman; Mr. C. R. Levelton of Canada, Vice-Chairman; and Mr. Kenjiro Nishimura of Japan, Secretary.

Source: International North Pacific Fisheries News Release, Nov. 9, 1973.

## NMFS Scientists Receive National Publication Awards

Scientific papers written by three National Marine Fisheries Service biologists, have won two of six top national fisheries publication citations including the American Fisheries Society's 1973 Best Paper Award. In all, 65 full-length papers were considered by the AFS Awards Committee.

"Reduction in Stocks of the Pacific Ocean Perch, an Important Demersal Fish Off Alaska," a paper by Jay C. Quast, was chosen as the best scientific paper published in the 1972 Volume (Vol. 101, pp. 64-74) of the *Transactions of the American Fisheries Society*. Quast is a biologist at the NMFS's Auke Bay (Alaska) Laboratory.

Two other NMFS scientists, Fred M. Utter and Harold O. Hodgins, at the Northwest Fisheries Center, Seattle, Wash., received one of the five



AFS Honorable Mention awards for their paper, "Biochemical Genetic Variation at Six Loci in Four Stocks of Rainbow Trout," (*Transactions* pp. 494-502).

Quast, in his paper, states that stocks of Pacific ocean perch have been steadily declining since 1963 when

the species began to be heavily exploited by foreign trawl fisheries, particularly those of the Soviet Union and Japan. He detailed the need for international efforts to preserve the stocks and suggested that it may already be too late for successful rehabilitation.

## ICNAF Pact is Hailed as a Major Step in Northeast Atlantic Fisheries Stewardship

Secretary of Commerce Frederick B. Dent has said that an international agreement reached last fall brings new hope for the gravely-depleted fishing grounds off the northeastern United States.

The pact, at an October 15-20 meeting in Ottawa of the International Commission for the Northwest Atlantic Fisheries, not only represents a major step in fisheries stewardship but substantially improves the prospects of the hard-pressed New England fishing industry, he said.

"This agreement reverses a perilous trend toward further depletion of the stocks and institutes a policy which should permit the fishery not only to survive but to recover to a state of health," the Secretary said. "Further, it is notable in that, for the first time in marine fisheries history, an agreement encompasses an entire ecosystem instead of being limited to individual species."

Last June Secretary Dent, disturbed at foreign over-fishing and the lack of progress in the ICNAF, called in urgent terms for major reductions in foreign fishing off our shores, and recommended that unless that organization moved to end over-exploitation the U.S. should seriously reconsider whether it should retain ICNAF membership.

He extended congratulations to the United States Commissioners to ICNAF—Ambassador Donald McKernan of the State Department, David H. Wallace, Associate Administrator for Marine Resources of the Commerce Department's National Oceanic and Atmospheric Administra-

tion, and Ronald Green of Maine, industry representative. "Their dedicated and persuasive negotiation accomplished a tremendous victory for conservation," Secretary Dent said. "We are also highly appreciative of the cooperation and understanding shown by all member states of ICNAF. We are convinced the agreement will benefit all nations which fish these grounds—not just the United States."

The participating nations agreed unanimously (with Romania abstaining) to a three-year series of reductions from current levels, estimated at a total catch of 1,180,000 metric tons for 1973. The 1972 catch was 1,188,000 metric tons.

The total catch in 1974 would be reduced to 923,900 tons; the 1975 catch to 850,000 tons; and the 1976 catch will be set on the basis of information gathered in 1974 and 1975. The third-year figure is anticipated to bring the ecosystem to total recovery.

It was further agreed that vessels over 145 feet long (few of which are U.S.-operated) will refrain from bottom-fishing between July and December of each year in an area off

New England. The practice will allow stocks of yellowtail flounder, a major Massachusetts fishery, and young haddock, which are seriously threatened, to regenerate.

It was agreed that the reductions would not be at the expense of U.S. fishermen. The total quota for fishing, in the area off the East Coast between Canada and Cape Hatteras, allows for a small increase in catches for the coastal fisheries of the United States and Canada. The U.S. quota for 1974 will be approximately 195,000 tons. In recent years, the U.S. catch has declined dramatically, while those of foreign nations have ballooned.

The 1974 overall catch in metric tons, by nation, will be:

United States	195,000
USSR	342,500
Poland	152,200
Bulgaria	29,100
Canada	25,000
EED. Rep. Germany	27,000
Italy	4,700
Japan	24,300
Romania	4,300
Spain	17,200
German Dem. Rep.	97,600
Others	5,000
Total	923,900

The United States' share of individual species will be: cod, 25,267; redfish, 24,747; silver hake, 38,300; red hake, 15,000; pollock, 12,000; yellowtail, 24,000; other flounders (except yellowtail), 21,700; squids, 5,600.

The USSR's share will be: cod, 2,463; redfish, 1,725; silver hake, 113,056; red hake, 32,000; pollock, 2,100; other flounders (except yellowtail), 2,600; squids, 8,500.

Canada's share is: cod, 4,820; redfish, 414; pollock, 34,000.

## NMFS Researcher Identifies 20 Previously Unknown Free-Living Marine Amoebas

A Commerce Department scientist conducting the first major study of marine amoebas in almost a half century has identified 20 previously unknown species.

Marine amoebas may prove highly useful as environmental indicators of

oceanic pollutants.

Amoebas are microscopic one-celled animals that exist primarily in water or soil, or as parasites in other animals and plants. While the majority of them are harmless, some cause diseases in humans such as amoebic



dysentery and certain kinds of brain damage. Others may infect animals or plants. Little is known of marine amoebas.

Thomas K. Sawyer, a marine biologist with the National Oceanic and Atmospheric Administration, conducted a year-long study of free-living (non-parasitic) marine amoebas in Chincoteague Bay, Virginia, to provide baseline data for future comparative studies in marine habitats that have specific pollutant problems. Studies of amoebas in the essentially unpolluted waters of Chincoteague Bay, Sawyer believes, will provide information on natural diversity and types of amoebas against which later studies of polluted waters can be measured.

The total number of species of marine amoebas presently known is about 75. Sawyer, who is a staff member of NOAA's National Marine Fisheries Service Laboratory at Oxford, Md., concludes from his study that:

1. Amoebas are extremely abundant in the ocean, both crawling on seaborne vegetation and floating in surface waters;

2. The diversity of species of marine amoebas is poorly known and needs intensive study, particularly with respect to such aspects as the role they play in the biodegradation of pollutants and as consumers of marine bacteria;

3. Of the known marine amoebas, about half the species probably are unable to tolerate the pollution caused by man's effluents.

In his study, Sawyer identified 35 species of free-living amoebas from Chincoteague Bay, of which 20 were new species. Among the known species were several that are believed to cause diseases in aquatic plants or animals. As yet there is no evidence to show whether any of the newly-identified species are potentially harmful.

Sawyer points out that there are two approaches to the use of amoebas as oceanic environmental indicators. Where it is known that a widespread species of free-living amoeba cannot tolerate certain kinds of pollutants, the absence of such amoebas in particular waters would point to the presence

of such pollutants. Conversely, some species of amoebas thrive on certain kinds of pollutants—for example, some are found in superabundance in freshwater sewage sludge—and the presence of these species would point to the presence of certain pollutants.

In the latter case, the amoebas accompanied by bacteria, fungi, and other protozoans serve a highly useful function as agents for biodegradation of the pollutants—that is, for decomposing them and thus rendering them less harmful.

Protozoa, a classification of one-celled animals that includes amoebas, have been studied intensively in sewage in freshwater. The studies of the National Marine Fisheries Service are extending the work into the marine environment. Protozoa are among the first organisms in the food web that use bacteria for food.

The last major study of marine amoebas in this country was undertaken by Prof. Asa Schaeffer, who published his findings in a monograph of the Carnegie Institution of Washington in 1926. Subsequently a number of studies of specific problems have added somewhat to the sparse knowledge of marine amoebas. In 1969, Victor Sprague and Robert L. Beckett of the Chesapeake Bay Biological Laboratory, Solomons, Md., and Thomas Sawyer of NMFS carried out a cooperative study of an unusual parasite found in the blood and internal organs of blue crabs. It was found in dead or dying crabs, said by the watermen who found them to have "gray crab disease." The parasite, identified as a new species of amoeba, was an important factor in crab mortality and caused an appreciable seasonal economic loss to the industry. This crab parasite did not present a human health problem.

Two years later, Sawyer participated in a cooperative study of amoebas living on the gills of fingerling trout and salmon. In some cases, the fish showed evidence of suffocation, apparently suffering from amoebic

gill infection. Attempts to control the loss of fish in State hatcheries were successful after diluted Formalin was added to the water. Further work on marine amoebas is now being undertaken in conjunction with NOAA's Marine Eco-Systems Analysis (MESA) program.

## Open-Mouth Swim Mechanism Is Studied

Some fishes such as the sea bass actively move their gill covers to obtain oxygen from the water. Other fish such as the sockeye salmon can suspend active breathing movements when swimming at speeds just under one mile per hour or higher and switch to "over-drive", which is open-mouth swimming, or what fishery biologists call ram-gill ventilation. Once tunas and their close relatives, the mackerel-like fishes, reach adult size, however, they can only survive in the "over-drive" method of ventilating their gills by maintaining continuous swimming activity at speeds near one mile per hour to save energy and improve efficiency.

What mechanisms control the transfer to open-mouth swimming in fishes? This is the question which John Roberts, physiologist and Professor of Zoology at the University of Massachusetts is trying to answer this year at the National Marine Fisheries Service (NMFS) laboratory at La Jolla, California.

Roberts, 51, is a recipient of a National Research Council Senior Research Associateship, awarded by the NMFS, an agency of the National Oceanic and Atmospheric Administration in the U.S. Department of Commerce. According to Brian J. Rothschild, Director of the NMFS Southwest Fisheries Center in La Jolla, the annual award at the Center provides an opportunity for postgraduate scientists to work on basic research problems with professional staff at the laboratory. Roberts, author of many papers on gill ventilation in fishes, plans initially to record activity



from respiratory centers in swimming fish, such as mackerels, as the animals reach a speed at which the change from active to ram-gill ventilation occurs.

At the La Jolla facility, Roberts has access to one of the largest and best-equipped sea-water research aquarium laboratories in the world. Under Reuben Lasker, physiologist at the La Jolla Laboratory, a broad program of research on the physiology of marine fishes and their food organisms is in progress. Staff scientists there are measuring the effects of such environmental factors as salinity and temperature on the growth and survival of larval fishes, exercising large fishes in special tanks to observe physiological and behavioral changes, and developing successful techniques for spawning and rearing a variety of marine fishes for experimental work and mariculture. Lasker explained that Roberts' study will contribute important information on the effects of environmental factors on the survival, metabolism, and growth of fishes, particularly the family of fishes that includes the mackerels and tunas.

#### *Foreign Fishery Developments*

### **Canada Sets Atlantic Fishing Fleet Policy**

A new fishing fleet development policy for Canada's Atlantic coast, aimed at matching fleet size to fish stocks by instituting a more selective subsidy program for vessel construction and by establishing a new license control program, was announced in mid-November by Fisheries Minister Jack Davis. The new policy ended a three-month freeze on construction subsidies and new vessel licenses announced by the Minister on August 13.

The three-month freeze was intended to give federal authorities time to fully assess the situation, in consultation with provincial governments, industry and fishermen. The consultations produced the decision to match more

closely the size of the fishing fleet to the stocks of fish available to Canadian fishermen. Where the fisheries resources are already fully exploited, the fishing effort will be controlled. Where it is in Canada's interest, as in the international fishery off the coast, expansion will be encouraged.

"Our share of international quotas in these areas will further increase only as our catch increases," Davis said. "Therefore, we must ensure that our catching capacity is encouraged and allowed to expand to provide us with larger shares of the available resources."

The new policy calls for special committees, representative of all fishery interests, to advise the management authority on all licensing matters. The committees will involve fishermen directly in the management of local fish resources.

### **U.S., Mexican Shrimp Prices Affect Japan**

The high price of U.S. and Mexican shrimp of November 1973 was expected to affect the market price in Japan according to World Wide Information Services, Inc. Inspectors from the Tsukiji Fish Market went to Mexico City and Los Angeles to inspect the markets there. Full utilization of available supplies in those markets would reportedly make it difficult for the Japanese to import shrimp from there. Other sources of supply are being developed.

Of the 10,185 short tons of frozen shrimp imported by Japan in September, 1,936 short tons came from India, 347 short tons from Cuba, 293 short tons from Brazil, 709 short tons from Taiwan and 151 short tons from New Zealand. The trend of imports shows a decrease from Indonesia and an increase in shrimp from Brazil and Cuba. Japan had imported 55 tons of a type of shrimp (taisho-ebi) from China since August. The largest sizes were reported to sell for \$8.23 per pound. Frozen shrimp from Mexico brought \$2.96 per pound.

### **Japanese Fishermen Begin To Lease Boats**

The Fishery Agency of Japan has started a system of leasing boats to fishermen in Yamaguchi Prefecture on a trial basis, reports World Wide Information Services, Inc. If successful, fishermen throughout the country may start using boats under lease instead of investing a large sum for building them.

The agency said the lease system was begun because the financial burden had increased owing to rising costs of building and incessant demand for modernization of fishing craft. It hopes the system will speed up the modernization of fishing technology and improve working conditions. The boats will be leased to fishermen under contracts valid from three to nine years. The boats will be made with fiberglass reinforced plastics and will be less than 10 tons each.

### **Norway's Fishery Exports Increase**

Norway's Ministry of Fisheries estimates that Norwegian exports of fish and fish products for 1973 would be worth 3,100 million kroner (about \$554 million), an increase of 600 million kroner compared with 1972, according to a report in Norway Trade News. The increase is chiefly due to exceptionally high prices for fish meal, oil, and hardened fats, but prices for fish generally have also shown marked improvement.

#### *Publications*

### **New Editions of NOS Charts Are Available**

New editions of charts cancel former editions. Mariners are warned against the use of obsolete charts as new editions contain information essential to safe navigation. Charts