

tions promoting the growth and development of fish, the effects of the regulation of watercourses and the affect of the current on the seabed and the transportation of sediments. The project is interdisciplinary, and nine research institutes are at present involved. Led by Martin Mork of the University of Bergen's Geophysical Institute, the project is planned to last five years, although it may continue beyond this time.

It is also planned to map the exchange of water in the fjords along the coast and the influence of the coastal current on climatic conditions. These studies will, it is hoped, provide the authorities with an improved basis for arriving at decisions on such questions as the development and regulation of watercourses. Studies off northern Norway are to be intensified to provide a large body of scientific data before exploration for and exploitation of petroleum reserves begins in these waters.

There will also be cooperation with an international research project involving all the countries bordering the North Sea. The primary aim of this project is the charting of the inflow and outflow of water in the North Sea. The Norwegian researchers are to concentrate in particular on the northern and northeastern parts of the North Sea.

Papua New Guinea Puts Higher Tax Assessment on Foreign Fish Firms

Three Japanese firms and one U.S. firm engaged in experimental skipjack tuna fishing for the Papua New Guinea Canning Company in late 1974 were notified by the government of Papua New Guinea of new tax measures applicable to their catches. Reportedly, the notification called for a 9 percent corporation tax assessment on all shipments of tuna catches taken by those firms since the beginning of their fishing operations in 1970, and a 5 percent export tax on all shipments from 18 November 1974.

At a meeting held in Tokyo on December 12 with Papua New Guinea's Natural Resources Development Minister, the participating Japanese fishery firms (Kyokuyo, Hokoku Suisan, and Kaigai Gyogyo) expressed objection to the tax measure and requested reconsideration, stating they

could not possibly comply with the requirements since the fishing ventures, which are being conducted at huge costs and great risks, are still not producing profits for them. They claimed that the assessments would not only make it impossible to continue the fishing operations but also thwart the planned establishment of a cannery at Madang. The Papua New Guinea Minister was said to have agreed to explain the circumstances of the foreign fishing firms to Papua New Guinea's National Investment and Development Agency and other agencies concerned. Reportedly, the tax assessments against the Japanese firms will total about 300 million yen (approximately US\$1 million).

Sources: Suisan Keizai Shimbun and Katsuo-maguro Tsushin.

FISHERY ASSISTANCE EXTENDED IN CANADA

Canada's Federal Fisheries Minister Roméo LeBlanc announced a \$4 million extension to the Cold Storage and Inventory Financing Costs Assistance Program administered by the Fisheries Prices Support Board late last year. Initially approved for the period 1 July 1974 to 31 October 1974, the program was designed to assure fishermen a market for their 1974 catches at current prices and to assist the secondary industry in the orderly marketing of fishery products.

LeBlanc said this assistance will continue in the then-current form and level until 31 December 1974, and from 1 January 1975 to 31 March 1975 at a sliding rate. The program terminated on 31 March 1975. This extension provided for an orderly disposal of current inventories and prevented competition with the 1975 production. The program of credit extensions for additional inventory terminated on October 31 and was not extended.

Publications

Closed System Salmon Culture Data Issued

A report on a unique aquaculture system, developed at the University of Rhode Island, is available through the University's Sea Grant program. Entitled, **The Technology of Closed System Culture of Salmonids**, the report de-

RUSSIA AND NORWAY INITIAL FISH PACT

An agreement on bilateral cooperation between Norway and the Soviet Union in the fisheries sector was initiated in Oslo on 13 December 1974, the Norwegian Information Service reports. This was one outcome of a week of talks between the Soviet Minister of Fisheries, the Norwegian Minister of Fisheries, and Norway's Minister responsible for law of the sea and fisheries limits questions, Jens Evensen. The agreement, which is intended to further cooperation between the two countries on practical questions connected with the fishing industry, is still to be ratified. The agreement also provides for consultation on these questions with special emphasis on conservation measures and the coordination of fisheries research.

Other results of the talks were a Soviet-Norwegian agreement to propose a total 1975 quota of 800,000 tons for the Northeast Arctic cod fishery at the special meeting of the Northeast Atlantic Fisheries Commission in Bergen next January, and a Soviet acceptance in principle of the Norwegian proposal to create no-trawling areas off the coast of northern Norway. The Soviet Union is reported to have had certain reservations on the question of Norwegian jurisdiction within the zones and on the boundaries of the easternmost of the proposed zones. Questions of detail such as these remain to be settled by later discussions.

At a press conference the Soviet Fisheries Minister stressed the relationship between these three results of the talks. They were all designed to make it possible to conserve fish stocks and conduct a sensible and rational fishery in the waters off Norway and the Soviet Union, he said.

scribes the URI aquaculture system that reuses water. Key to the compact operation is biological filters that convert toxic ammonia to nitrate, a less toxic form of nitrogen.

The study was coordinated by

Thomas L. Meade, associate professor of animal science at URI, and funded by the University's Sea Grant program, part of the Commerce Department's National Oceanic and Atmospheric Administration.

The URI aquaculture system has been tested and has raised Chinook salmon from incubation to market size. It requires a relatively small volume of

water, in comparison to other methods, and eliminates the discharge of nutrient enriched waters.

Smolt production and grow-out facilities are described in the report in addition to typical problems of controlling temperature, water flow rate, and oxygenation. Also described are typical problems related to waste removal—clarification and the control of sulfide

and nitrate toxicity. A major section outlines the URI approach to ammonia control and denitrification.

Copies of the report, number P370, are available for \$1 each from the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882. Checks should be made payable to the University of Rhode Island.

NMFS Scientific Publications

Single copies of papers from *Commercial Fisheries Review* and *Marine Fisheries Review* are available from the National Oceanic and Atmospheric Administration while the supply lasts. Titles of each paper are given below and are cross-referenced by subject. Requests should be addressed to: D83, Technical Information Division, Environmental Science Information Center, NOAA, Washington, DC 20235. Please give identification number and title of the item wanted.

Airborne Sensors

- 850. Feasibility of monitoring west African oceanic front from satellites.
- 897. Airborne low-light sensor detects luminescing fish schools at night.
- 918. Observations on remote sensing in fisheries.

Alaska

- 732. Soviet and Japanese fishing activity off Alaska in 1964.
- 738. Herring fishery in southeastern Alaska.
- 741. Bottom trawling surveys of the northeastern Gulf of Alaska.
- 760. Alaska shrimp explorations, 1962-64.
- * 806. Experimental trawling and pot fishing for giant Alaskan prawn.
- 821. The Dungeness crab fishery around Kodiak, Alaska.
- 825. The role of international agreements in Alaska fisheries.
- 834. Japanese longline fishery in Gulf of Alaska.
- 841. Revisions of international agreements affecting Alaskan fisheries.
- 878. Fishery oceanography—VII. Estimation of flow in Gulf of Alaska.
- 881. Herring roe: Alaska's fast-growing specialty food industry.
- 919. The growing role of interna-

tional agreements in Alaskan fisheries.

- 930. Marine life abundant near site of proposed Alaskan mill.
- 959. Japanese fishing vessels off Alaska.
- 973. Pandalid shrimp life history research at Kachemak Bay, Alaska.
- 974. Studies of spot shrimp, *Pandalus platyceros*, at Little Port Walter, Alaska.
- 980. Preliminary biological survey of log-rafting and dumping areas in Southeastern Alaska.

Alewives

- 511. Damariscotta (Maine) alewife fishery.
- 771. An evaluation of the air bubble curtain as a barrier to alewives.

Anchovy

- 907. Seasonal and geographic characteristics of fishery resources. California Current Region—V. Northern anchovy.

Aquaculture

- 772. Willapa oyster studies—use of the pasture harrow for the cultivation of oysters.
- 798. An evaluation of sampling traps in farm ponds.
- 857. Rearing larval tunas in the laboratory.
- 859. Oyster culture in Long Island Sound 1966-69.
- 976. Shrimp culture in Japan.
- 1015. The technological basis for development of aquaculture to produce low-cost food fish.

Artificial Reefs

- 1002. Effects of an artificial habitat on the marine sport fishery and economy of Murrells Inlet, South Carolina.

Bait

- 824. Rearing lugworms for fish bait.
- * 925. Baitfish scouting in the Trust Territory.

Barges

- 961. Portable barge for estuarine research.

Bathyspheres

- 873. A bathysphere for fishery re-

search.

- 888. Fish behavior studies from an undersea habitat.

Billfishes

- 837. Longlining for swordfish in the eastern Pacific.
- * 950. Longlines and billfish.
- 997. Investigations of billfish biology at the Hawaiian International Billfish Tournament.

Bluefish

- 940. Predation by bluefish on flatfishes.

Breeding

- * 678. Accuracy of the official method of determining breeding percentages of frozen raw breaded shrimp.

California Current

- 871. Seasonal and geographic characteristics of fishery resources. California Current Region—I. Jack mackerel.
- 876. Seasonal and geographic characteristics of fishery resources. California Current Region—II. Pacific saury.
- 880. Seasonal and geographic characteristics of fishery resources. California Current Region—III. Pacific hake.
- 891. Seasonal and geographic characteristics of fishery resources. California Current Region—IV. Pacific mackerel.
- 907. Seasonal and geographic characteristics of fishery resources. California Current Region—V. Northern anchovy.
- 915. Seasonal and geographic characteristics of fishery resources. California Current Region—VI. Rockfish.
- 922. Seasonal and geographic characteristics of fishery resources. California Current Region—VII. Pacific sardine.
- 934. Seasonal and geographic characteristics of fishery resources. California Current Region—VIII. Zooplankton.

979. Seasonal and geographic characteristics of fishery resources. California Current Region—IX. Inshore sportfishes.
- Catfish*
803. New "live car" improves catfish harvesting and handling.
916. Live cars for use in catfish industry.
937. Studies of salmonellae potential in catfish feeds.
- Clams*
756. Ocean clam survey off U.S. middle Atlantic coast—1963.
776. Hard-clam explorations off southeastern United States.
788. Distribution of southern quahogs off the middle Atlantic coast.
789. A clam measuring board.
790. Sleeve for clam jetting hose connection.
791. Clam survey Ocean City, Maryland, to Cape Charles, Virginia.
793. Development of a submersible pumping system for a hydraulic surf clam dredge.
797. The Atlantic surf clam fishery in 1966.
800. Deck equipment layout on M/V "Delaware" for surf clam survey.
804. Clam survey off Virginia (Cape Charles to False Cape).
807. Special small-clam retainer and bottom sampler designed.
829. The 1967 Atlantic coast surf clam fishery.
883. The Atlantic surf clam fishery (1968).
908. Hard clam cleansing in New York.
912. The Atlantic surf clam fishery - 1969.
939. The Atlantic coast surf clam fishery 1965-69.
947. The Atlantic surf clam fishery - 1970.
954. The Atlantic coast surf clam fishery - 1971.
- Cod*
993. Slide rule for predicting shelf life of cod.
1014. Why the cod shortage? What are the alternatives?
- Composition*
613. Composition of commercially-important fish from New England waters.
765. Species composition of the North Carolina industrial fish fishery.
1022. Chemical and nutritive values of several fresh and canned finfish, crustaceans, and mollusks. Part I. Proximate composition, calcium, and phosphorus.
1033. Chemical and nutritive values of several fresh and canned finfish, crustaceans, and mollusks. Part II. Fatty acid composition.
- Crab*
619. Red crab explorations off the northeastern coast of the United States.
637. Soft-crab industry.
655. The blue crab and its fishery in Chesapeake Bay. Part 2 - Types of gear for hard crab fishery.
665. Modifications of Chesapeake Bay commercial crab pot.
680. Mechanizing the blue crab industry. Part I - Survey of processing plants.
698. Mechanizing the blue crab industry. Part III - Strengthening the industry's economic position.
718. Crab industry of Chesapeake Bay and the South—An industry in transition.
821. The Dungeness crab fishery around Kodiak, Alaska.
* 839. Shipping live Dungeness crabs by air to retail market.
892. Movements of tagged blue crabs in North Carolina waters.
* 910. The separation of crab meat from shell & tendon by a centrifugal process.
990. Sonic tags attached to Alaska king crab.
* 1017. The overland shipment of live Dungeness crabs by self-contained van.
1031. Observations on distribution and abundance of red crabs in Norfolk Canyon and adjacent Continental Slope.
- Dams*
840. Research on a system for bypassing juvenile salmon & trout around low-head dams.
999. Collection and transportation system of juvenile salmonids evaluated at Little Goose Dam.
- Economics*
938. U.S. fisheries: A view of their status and potential.
942. Farm Credit Act of 1971, how it affects fishing industry.
943. New England trawlermen struggle to survive.
953. Status of fish stocks off northeastern United States.
964. European demand helps spur New England shrimp catches.
977. The skipjack tuna resource (*Katsuo no shigen ni tsuite*).
981. The U.S. shrimp industry: Past trends and prospects for the 1970's.
* 987. Price spreads of fish products among producers and distributors.
* 989. Procedure for product approval and purchase: Army and Air Force Exchange Service.
* 991. Export opportunities for U.S. fishery products.
994. The American lobster fishery: Economic analysis of alternative management strategies.
1001. The future of the fisheries. I. The Seattle conference. II. The oceans and industry. III. Sounding our ocean future. IV. National fisheries policies and programs for our national needs.
1002. Effects of an artificial habitat on the marine sport fishery and economy of Murrells Inlet, South Carolina.
- Eels*
984. Japan's eel fishery.
985. Elver investigations in the Southeast.
- Estuaries*
827. Are estuaries necessary?
957. Effect of predators on juvenile menhaden in clear and turbid estuaries.
961. Portable barge for estuarine research.
1013. Alterations of estuaries of South Florida: A threat to its fish resources.
- Exploratory Fishing*
659. Progress report on midwater trawling studies carried out off the New England coast in 1961 by M/V *Delaware*.
* 764. Experimental fish trawling survey along the Florida west coast.
* 806. Experimental trawling and pot fishing for giant Alaskan prawn.
844. Searching for tuna.
864. Exploring for schooling pelagic fishes in middle Atlantic bight.
897. Airborne low-light sensor detects luminescing fish schools at night.
921. Underwater fishery studies are valuable.
990. Sonic tags attached to Alaska king crab.
* 1011. A self-contained subsurface light source system for fish attraction.
1016. Fisheries research steamer *Fish Hawk*.
- Farm Credit Act*
942. Farm Credit Act of 1971, how it affects fishing industry.
- Finfish*
795. Incidental catches of finfish in sea scallop dredges on Georges Bank.
- Fish Behavior*
888. Fish behavior studies from an undersea habitat.
- Fish Meal*
462. Pilot-plant fish-meal dryer.
705. Improved rapid method for determining total lipids in fish meal.
- Fish Migrations*
999. Collection and transportation system of juvenile salmonids evaluated at Little Goose Dam.
1000. Aircraft-refueling trailer modified to haul salmon and trout.
- Fish Oil*
676. Present and future market for fish oil.
- Fish Protein Concentrate*
591. Fish flour is primarily a protein

- concentrate—not a substitute for grain flour.
690. MIT-UNICEF studies on the production of fish protein concentrate for human consumption.
832. The U.S. fish protein concentrate program.
851. Experimental production of fish protein concentrate (FPC) from Mediterranean sardines.
895. FPC's quality virtually the same as its raw material's quality.
901. Evidence indicates that—a premix of FPC & wheat flour can be made & transported.
902. FPC: The NMFS experiment & demonstration plant process.
917. Fish protein concentrates.
1034. Using enzymes to make fish protein concentrates.
- Fish Tagging*
884. BCF scientists tag and recover menhaden.
982. Menhaden tagging and recovery: Part I—Field methods for tagging menhaden, genus *Brevoortia*.
983. Menhaden tagging and recovery: Part II—Recovery of internal ferromagnetic tags used to mark menhaden, genus *Brevoortia*.
990. Sonic tags attached to Alaska king crab.
1007. Sonic tags in sockeye salmon, *Oncorhynchus nerka*, give travel time through metropolitan waters.
- Fishery Products*
742. Pasteurization of fishery products with gamma rays from a cobalt-60 source.
747. Reduction process to convert raw fish into thiaminase-free press cake.
757. Identification of species in raw processed fishery products by means of cellulose polyacetate strip electrophoresis.
879. Hurricane Camille: A new experience in reclaiming canned seafood.
905. Fish proteins as binders in processed fishery products.
992. Beefish patties.
998. Improving the supply of minced blocks for the fish stick trade: A progress report.
1019. "Kamaboko"—The giant among Japanese processed fishery products.
1020. Surimi—A semi-processed wet fish protein.
1029. Solubilized fish muscle as a food binding material.
1037. Mushroom culture: A new potential for fishery products.
- Fishing Equipment and Methods*
724. Equipment Note No. 15—Airlift for harvesting oysters.
735. Equipment Note No. 16—An exploratory fishing and gear research buoy.
740. Equipment Note No. 17—
- Long-line gear improvement—Aluminum crimping sleeve prevents hook damage by electrolysis.
743. Construction and operation of the "Cobb" pelagic trawl (1964).
750. Wade seine construction and method of use.
752. Trawl cod-end mesh size selectivity toward yellow perch in Lake Erie.
754. Equipment Note No. 18—A nektun ring net sampler for use aboard oceanographic research vessels.
759. Equipment Note No. 19—Trawl cod-end closing device.
790. Sleeve for clam jetting hose connection.
793. Development of a submersible pumping system for a hydraulic surf clam dredge.
796. Development of the electro-shrimp trawl system.
800. Deck equipment layout of M/V "Delaware" for surf clam survey.
802. A method for tapering purse seines.
812. How Lake Superior gill net vessel was converted to trawler.
815. Parachute-type sea anchor.
817. Recent innovations for trawl net reels.
828. The fish-finding sonar of "Oregon II."
831. A floating trap net for use in reservoirs.
833. A machine for winding trawl cable.
862. Otter trawling introduced to Columbia River smelt fishery.
869. Night lighting for herring—An old technique may have new possibilities.
874. Experimental sablefish fishing off San Diego, California.
886. A removable deck-block mounting pad.
898. Collecting coastal pelagic fishes with artificial light and 5-meter lift net.
900. In the northeastern Gulf of Mexico—harvesting coastal pelagic fishes with artificial light & purse seine.
904. A buoyline coiling device.
909. How to install an echo sounder in a small fiberglass boat.
913. Trapping sablefish.
916. Live cars for use in catfish industry.
923. Pond-raised channel catfish: The design of boom-mounted brailers to move them.
926. Experimental drum seining for wetfish in California.
933. San Pedro wetfish fleet: Major purse-seine gear changes, 1952-1972.
946. Pot fishing in the Virgin Islands.
949. Removing porpoise from a tuna purse seine.
950. Longlines and billfish.
951. Double-rig twin shrimp-trawling gear used in Gulf of Mexico.
962. Tuna: Pole-and-line fishing trials in central and western Pacific.
968. An automatic pumping device for sampling postlarval shrimp (*Penaeus* spp.).
996. Comparison of salmon catches in mono- and multifilament gill nets.
1005. Results of comparative trawl and trap fishing off Oregon for sablefish, *Anoplopoma fimbria*.
1024. The long-haul fishery of North Carolina.
1027. A vertical longline for red snapper fishing.
1036. Variable-mesh beach seine for sampling juvenile salmon in Columbia River estuary.
- Foreign Fisheries*
- Africa*
782. Experimental purse seining for tunas in Portuguese West Africa.
850. Feasibility of monitoring west African oceanic front from satellites.
- Guinea*
707. The Guinean trawling survey.
- Asia*
- Indonesia*
1030. A review of the Indonesian shrimp fishery and its present developments.
- South Vietnam*
877. South Vietnam: A fishery development survey.
- Japan*
732. Soviet and Japanese fishing activity off Alaska in 1964.
920. U.S. & Japan continue cooperative research in North Pacific (1970-71).
927. The Japanese fishing industry: 1971 highlights.
931. Japan's frozen-shrimp imports soar 2,000% in 10 years.
959. Japanese fishing vessels off Alaska.
976. Shrimp culture in Japan.
984. Japan's eel fishery.
1019. "Kamaboko"—The giant among Japanese processed fishery products.
- Caribbean Sea*
971. Shrimp industry of Central America, Caribbean Sea, and northern South America.
- Lesser Antilles*
783. An aircraft and vessel survey of surface tuna schools in the Lesser Antilles.
- Puerto Rico*
866. Puerto Rico's commercial marine fisheries. A statistical picture.
- Central America*
971. Shrimp industry of Central America, Caribbean Sea, and northern South America.

- Mexico*
1035. The Mexican marine sport fisheries.
- South America*
970. Distribution of commercial shrimp off the northeastern coast of South America.
971. Shrimp industry of Central America, Caribbean Sea, and northern South America.
- Argentina*
770. Argentina - Tuna fisheries, 1960-64.
- Chile*
775. Chile - Her riches are just off coast—but far from markets.
- Guianas*
889. Sea bob fishery of the Guianas.
- Peru*
890. Recent developments in Peruvian fisheries.
- Venezuela*
737. Some observations on the distribution of penaeid shrimp in eastern Venezuela.
- South Pacific*
- Samoa Islands*
* 896. Surface tuna-school fishing & baiting around Samoa Islands.
- Tahiti*
813. South Pacific landings of skipjack and yellowfin tuna at Papeete market (Tahiti).
- Trust Territory*
925. Baitfish scouting in the Trust Territory.
- South Vietnam*
877. South Vietnam: A fishery development survey.
- USSR*
714. Soviet Far East fisheries expansion.
715. Overall view of Soviet fisheries in 1963, with emphasis on activities off United States Coasts.
732. Soviet and Japanese fishing activities off Alaska in 1964.
805. FAO study tour in USSR.
948. Shrimp research aboard Soviet ship in Gulf of Alaska.
- Fossils*
774. Rare fossils dredged off Atlantic coast.
- Fuel Shortages*
1003. Fuel shortages and the fisherman.
- Groundfish*
846. Groundfish survey program of BCF Woods Hole.
- Grouper*
* 887. The red grouper of the Gulf of Mexico.
- Gulf of Mexico*
823. The late-summer waters of the Gulf of Mexico.
835. Late-winter waters of Yucatan Straits. A 1968 *Geronimo* survey in Gulf of Mexico.
887. The red grouper of the Gulf of Mexico.
929. Gulf and South Atlantic fisheries.
951. Double-rig twin shrimp-trawling gear used in Gulf of Mexico.
966. Shrimp research at the Galveston laboratory of the Gulf Coastal Fisheries Center.
967. Gulf of Mexico shrimp resource research.
- Haddock*
679. The line-trawl fishery for cod and haddock at Chatham, Massachusetts.
- Hake*
763. Pacific hake (*Merluccius productus*) as raw material for a fish reduction industry.
865. Pacific ocean perch & hake studied off West Coast.
880. Seasonal and geographic characteristics of fishery resources. California Current Region—III. Pacific hake.
- Halibut*
749. New approaches to quality changes in fresh chilled halibut.
- Herring*
738. Herring fishery in southeastern Alaska.
816. The new thread herring fishery in eastern Gulf of Mexico.
869. Night lighting for herring—An old technique may have new possibilities.
872. Brit herring along Maine's coast.
881. Herring roe: Alaska's fast-growing specialty food industry.
1018. San Francisco Bay Area's herring resource—A colorful past and a controversial future.
- Hydrogen Sulfide*
894. Hydrogen sulfide kills.
- Industrial Fisheries*
* 612. Gulf of Mexico trawl fishery for industrial species.
765. Species composition of the North Carolina industrial fish fishery.
767. The industrial fisheries of tomorrow—Charting the course.
- Inspection*
* 693. Five years of voluntary fishery products inspection.
* 711. Weight and measures activities in the USDI fishery products standards and inspection programs.
- International Agreements*
825. The role of international agreements in Alaskan fisheries.
841. Revisions of international agreements affecting Alaskan fisheries.
919. The growing role of international agreements in Alaskan fisheries.
- Lobster*
* 654. Use of environmental and economic factors to check biological fluctuations in Maine lobster population.
* 936. Shipboard procedures to decrease lobster mortality.
994. The American lobster fishery: Economic analysis of alternative management strategies.
- Mackerel*
871. Seasonal and geographic characteristics of fishery resources. California Current Region—I. Jack mackerel.
891. Seasonal and geographic characteristics of fishery resources. California Current Region—IV. Pacific mackerel.
- Marine Organisms*
978. Northwest fishery center research on effects of environmental contaminants on marine organisms.
1032. Notes on the ecology of the oceanic insect *Halobates*.
- Marine Worms*
708. Changes in abundance of the marine worm, *Glycera dibranchiata*, associated with seawater temperature fluctuations.
824. Rearing lugworms for fish bait.
- Marketing, Fishery Products*
987. Price spreads of fish products among producers and distributors.
989. Procedure for product approval and purchase: Army and Air Force Exchange Service.
1005. Results of comparative trawl and trap fishing off Oregon for sablefish, *Anoplopoma fimbria*.
1012. Factors in the fish picture of concern to industry and consumers.
* 1025. Marketing practices of retailers handling fish in the Akron and Cleveland areas.
- Meeting*
768. Third technical meeting on fishing boats.
1001. The future of the fisheries. I. The Seattle conference. II. The oceans and industry. III. Sounding our ocean future. IV. National fisheries policies and programs for our national needs.
- Menhaden*
755. Review of U.S. menhaden industry, 1965.
884. BCF scientists tag and recover menhaden.
957. Effect of predators on juvenile menhaden in clear and turbid estuaries.
982. Menhaden tagging and recovery: Part I—Field methods for tagging menhaden, genus *Brevoortia*.
983. Menhaden tagging and recovery: Part II—Recovery of internal ferromagnetic tags used to mark menhaden, genus *Brevoortia*.
- Mushroom Culture*
1037. Mushroom culture: A new potential for fishery products.
- Mussels*
847. Mussels: A potential source of high-quality protein.
- Oceanography*
809. Oceanography's role in developing marine resources.

843. Fishery oceanography.
 848. Fishery oceanography—II. Salinity front at entrance to Washington's Strait of Juan de Fuca.
 852. Fishery oceanography—III. Ocean temperature and distribution of Pacific salmon.
 854. Fishery oceanography—IV. Ocean salinity and distribution of Pacific salmon.
 861. Fishery oceanography—VI. Ocean food of sockeye salmon.
 878. Fishery oceanography—VII. Estimation of flow in Gulf of Alaska.
 903. Current skipjack oceanography cruises in eastern tropical Pacific Ocean.
 952. Trawl studies based on bottom current measurements.
 988. Rapid assessment of ocean environment aided by new shipboard STD digitizer-computer interface.

Oysters

670. Oyster industry of Chesapeake Bay, South Atlantic, and Gulf of Mexico.
 721. Design and operation of a tray rack for the study of oysters.
 724. Equipment Note No. 15—Airlift for harvesting oysters.
 772. Willapa oyster studies—Use of the pasture harrow for the cultivation of oysters.
 845. Economic effects of regulations in Maryland oyster fishery.

Pelagic Fishes

864. Exploring for schooling pelagic fishes in Middle Atlantic Bight.
 897. Airborne low-light sensor detects luminescing fish schools at night.
 898. Collecting coastal pelagic fishes with artificial light and 5-meter lift net.
 900. In the northeastern Gulf of Mexico—Harvesting coastal pelagic fishes with artificial light & purse seine.
 911. Distribution of some coastal pelagic fishes in the western Atlantic.

Perch

865. Pacific ocean perch & hake studied off west coast.

Porpoise

949. Removing porpoise from a tuna purse seine.

Pollution

899. Thermal pollution of Columbia River might threaten smelt.
 956. How some pollutants affect embryos and larvae of American oyster and hard-shell clam.
 978. Northwest Fishery Center research on effects of environmental contaminants on marine organisms.
 980. Preliminary biological survey of log-rafting and dumping areas in southeastern Alaska.

Prawn

806. Experimental trawling and pot fishing for giant Alaskan prawn.

Processing

819. Vacuum evisceration. A modern method of cleaning fish at sea.
 908. Hard clam cleansing in New York.
 910. The separation of crab meat from shell & tendon by a centrifugal process.
 1021. Gel-forming capacity of washed and unwashed flesh of some Pacific Coast species of fish.
 1026. Home freezing of seafoods.

Preservation

645. Effect of butylated hydroxy toluene and potassium sorbate on development of rancidity in smoked mullet.
 742. Pasteurization of fishery products with gamma rays from a cobalt-60 source.
 769. Heat inactivation of thiaminase in whole fish.
 779. Bacteriological controls for producing high-quality breaded seafoods.
 794. Basic ideas in fishery science. I - Preservation of fish by the use of gamma rays.
 906. Glucose oxidase reduces oxidation in frozen shrimp.

Quality

- * 458. North Atlantic shrimp keeping quality in cold storage.
 * 749. New approaches to quality changes in fresh chilled halibut.
 * 779. Bacteriological controls for producing high-quality breaded seafoods.
 * 801. New tests assess quality changes in fish.
 * 808. Improving and expanding the distribution of fresh (unfrozen) seafoods by means of insulated containers.
 * 849. Fresh fish shipments in the BCF insulated, leakproof container.
 * 993. Slide rule for predicting shelf life of cod.
 * 1017. The overland shipment of live Dungeness crabs by self-contained van.
 * 1038. Effect of draining method on the quality of fish stored in boxes.

Remote Sensing

850. Feasibility of monitoring west African oceanic front from satellites.
 897. Airborne low-light sensor detects luminescing fish schools at night.
 918. Observations on remote sensing in fisheries.

Rockfish

915. Seasonal and geographic characteristics of fishery resources. California Current Region—VI. Rockfish.

Sablefish

744. Distribution, abundance, and

size of sablefish (*Anoplopoma fimbria*) found in deep water off the mouth of the Columbia River.

874. Experimental sablefish fishing off San Diego, California.
 * 913. Trapping sablefish.
 1005. Results of comparative trawl and trap fishing off Oregon for sablefish, *Anoplopoma fimbria*.

Safety

- * 818. Safety for the commercial fishing vessel and crew.

Salmon

710. Comparison of salmon catches in monofilament and multifilament gill nets—Part II.
 726. Experimental trawling for high-seas salmon.
 830. U.S. and Japan conduct successful salmon research cruise.
 840. Research on a system for bypassing juvenile salmon & trout around low-head dams.
 852. Fishery oceanography—III. Ocean temperature and distribution of Pacific salmon.
 854. Fishery oceanography—IV. Ocean salinity and distribution of Pacific salmon.
 861. Fishery oceanography—VI. Ocean food of sockeye salmon.
 996. Comparison of salmon catches in mono- and multifilament gill nets.
 999. Collection and transportation system of juvenile salmonids evaluated at Little Goose Dam.
 1000. Aircraft-refueling trailer modified to haul salmon and trout.
 1007. Sonic tags in sockeye salmon, *Oncorhynchus nerka*, give travel time through metropolitan waters.
 1008. Salmon for New England fisheries. Part I: Historical background.
 1009. Part II: Effect of the ocean environment on the high seas distribution of salmon.
 1010. Part III: Developing a coastal fishery for Pacific salmon.
 1036. Variable-mesh beach seine for sampling juvenile salmon in Columbia River estuary.

Sardines

614. Air-curtain fishing for Maine sardines.
 851. Experimental production of fish protein concentrate (FPC) from Mediterranean sardines.
 922. Seasonal and geographic characteristics of fishery resources. California Current Region—VII. Pacific sardine.

Satellites

850. Feasibility of monitoring west African oceanic front from satellites.
 918. Observations on remote sensing in fisheries.

Saury

- * 876. Seasonal and geographic characteristics of fishery resources.

California Current Region—II.
Pacific saury.

Scallop

630. An interim report of the Cape Canaveral calico scallop bed.
657. A method of predicting fluctuations in the sea scallop populations of Maine.
751. Technical Note No. 2—An inexpensive scallop cleaner built from spare parts.
778. History of scallop and clam explorations in the Gulf of Mexico.
795. Incidental catches of finfish in sea scallop dredges on Georges Bank.
820. Scallop explorations off Oregon.
867. Calico scallop fishery of southeastern U.S. A photo review of latest developments.

Sea Bass

- * 761. Gear and technique of the sea bass trap fishery in the Carolinas.
* 960. A survey of the sea bass fishery.

Sea Bob

889. Sea bob fishery of the Guianas.

Sea Urchin

944. Sea urchins: A new fishery develops in California.

Shrimp

668. Gulf States shrimp canning industry.
673. Fluctuations in Maine shrimp landings.
* 678. Accuracy of the official method for determining breeding percentages of frozen raw breaded shrimp.
737. Some observations on the distribution of penaeid shrimp in eastern Venezuela.
758. A method of forecasting the relative abundance of northern shrimp (*Pandalus borealis* Kr.) in Maine waters.
760. Alaska shrimp explorations, 1962-64.
* 777. Trends in Gulf of Mexico shrimp trawling fleet.
785. Experimental rearing of postlarval brown shrimp to marketable size in ponds.
787. Survey of the sun-dried-shrimp industry of the north central Gulf of Mexico.
* 796. Development of the electroshrimp trawl system.
* 836. A progress report on the development of a shrimp trawl to separate shrimp from fish and bottom-dwelling animals.
906. Glucose oxidase reduces oxidation in frozen shrimp.
964. European demand helps spur New England shrimp catches.
965. Fishery for northern shrimp, *Pandalus borealis*, in the Gulf of Maine.
966. Shrimp research at the Galveston Laboratory of the Gulf Coastal Fisheries Center.

967. Gulf of Mexico shrimp resource research.

968. An automatic pumping device for sampling postlarval shrimp (*Penaeus* spp.).

969. White shrimp (*Penaeus setiferus*) population trends in a tidal marsh pond.

970. Distribution of commercial shrimp off the northeastern coast of South America.

971. Shrimp industry of Central America, Caribbean Sea, and northern South America.

* 972. Status of the California ocean shrimp resource and its management.

973. Pandalid shrimp life history research at Kachemak Bay, Alaska.

974. Studies of spot shrimp, *Pandalus platyceros*, at Little Port Walter, Alaska.

976. Shrimp culture in Japan.

981. The U.S. shrimp industry: Past trends and prospects for the 1970's.

* 1004. Shrimp discarding by the commercial fishery in the western Gulf of Mexico.

Smelt

862. Otter trawling introduced to Columbia River smelt fishery.

Snappers

- * 661. Snapper trawling explorations along the southeastern coast of the United States.
* 860. Snappers of the western Atlantic.
* 1027. A vertical longline for red snapper fishing.

Sonar

- * 811. Detection of fish schools by sonar (eastern tropical Pacific, July-November 1967).
828. The fish-finding sonar of "Oregon II."

Sponge

799. The sponge industry of Tarpon Springs.

Sport Fisheries

1002. Effects of an artificial habitat on the marine sport fishery and economy of Murrells Inlet, South Carolina.

1035. The Mexican marine sport fisheries.

Sport Fishes

997. Investigations of billfish biology at the Hawaiian International Billfish Tournament.

Squids

1023. Northwest Atlantic squids.

1027. A vertical longline for red snapper fishing.

Standards

678. Accuracy of the official method for determining breeding percentages of frozen raw breaded shrimp.

709. A progress report on the development of international food standards.

711. Weights and measures activities in the USDI fishery products standards and inspection programs.

Submarine

786. The submarine "Pisces" as a fisheries tool.

810. Submarine photos of commercial shellfish off northeastern United States.

822. The view from a storied sub—The 'Alvin' off Norfolk, Va.

Surveys

677. Bottom fish survey off the Oregon coast, April-June 1961.

846. Groundfish survey program of BCF Woods Hole.

855. Tropical Atlantic tuna larvae collected during EQUALANT surveys.

* 960. A survey of the sea bass fishery.

Swordfish

837. Longlining for swordfish in the eastern Pacific.

Technology

781. Technology's role in the seafood industry.

1015. The technological basis for development of aquaculture to produce low-cost food fish.

Trout

838. Method for protecting lake trout taken in trawls.

840. Research on a system for bypassing juvenile salmon & trout around low-head dams.

945. The impact of genetics on the trout industry.

1000. Aircraft-refueling trailer modified to haul salmon and trout.

Tuna

728. Review of the development of the Atlantic coast tuna fishery.

739. The yellowfin tuna fishery in the eastern tropical Atlantic.

753. Skipjack tuna (*Katsuwonus pelamis*) resources of the Trust Territory of the Pacific Islands.

766. The South Pacific long-line fishery for albacore tuna, 1954-64.

770. Argentina - tuna fisheries, 1960-64.

782. Experimental purse seining for tunas in Portuguese West Africa.

783. An aircraft and vessel survey of surface tuna schools in the Lesser Antilles.

813. South Pacific landings of skipjack and yellowfin tuna at Papeete Market (Tahiti).

844. Searching for tuna.

853. Tuna purse seine fishery in eastern tropical Atlantic.

855. Tropical Atlantic tuna larvae collected during EQUALANT surveys.

856. Forecasting world demand for tuna to the year 1990.

857. Rearing larval tunas in the laboratory.

* 977. The skipjack tuna resource (*Katsuo no shigen ni tsuite*).