# REPORT OF THE

# BUREAU

# OF

# COMMERCIAL FISHERIES

## FOR THE

## CALENDAR YEAR 1958



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

# National Oceanic and Atmospheric Administration

## Report of the United States Commissioner of Fisheries

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Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES


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# Report of the Bureau of Commercial Fisheries for the Calendar Year 1958

This is the second report of the Bureau of Commercial Fisheries, an agency established in 1956 within the United States Fish and Wildlife Service of the Department of the Interior. The first report (for the calendar year 1957) reviewed in considerable detail the organization of the Bureau and the history of fishery administration and operations of the Bureau's predecessor organizations—the U.S. Fish Commission and the U.S. Bureau of Fisheries. The purpose of this second report is to present an annual account of the activities of the Bureau, together with a record of its administrative actions, as required by section 9(a) of the Fish and Wildlife Act of 1956.

The Fish and Wildlife Act created the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife within the Fish and Wildlife Service of the U.S. Department of the Interior. The Bureau of Commercial Fisheries was given the responsibility for carrying out a national fishery policy that recognizes that fish and shellfish are living, renewable resources capable of making a continuous contribution to the national economy, food supply, and health, recreation, and well-being of our citizens.

The Bureau activities are aimed towards encouraging a strong, prosperous, and thriving commercial fishery industry based on well-utilized resources. To accomplish the objectives, programs of research, development, and services have been carried out with increasing intensity during 1958.

## Condition and Trends of the Fisheries

In 1958 the commercial fishermen of the United States and Alaska caught 4.7 billion pounds of fish valued at $371 million (Appendix A). Compared with the previous year, the volume of the catch was down 42 million pounds or 1 percent; however, the value was up $20 million or 6 percent. The average price paid to the fishermen in 1958 was 7.8 cents per pound, nearly one-half a cent more than in 1957. The decline in the catch was caused by reductions in the

production of menhaden, Pacific and jack mackerel, Alaska herring, anchovies, whiting, and unclassified species taken for reduction for industrial uses and animal food. Fish taken in considerably greater volume than the previous year were Pacific sardines, salmon, tuna, and alewives.

The Atlantic Coast States accounted for 53 percent of the catch, followed by the Pacific Coast States with 19 percent; Gulf States, 17 percent; Alaska, 8 percent; Mississippi River States, 2 percent; and the Great Lakes States, 1 percent. San Pedro, Calif., which has been the leading fishing port of the United States for many years, was again in first place in 1958 in both volume and value. Other leading ports in volume of fish caught were Lewes, Del.; Reedville, Va.; and Gloucester, Mass. San Diego, Calif., was in second place with respect to value, followed by New Bedford, Mass.

In 1958 on the high seas off foreign coasts, U.S. fishermen took 481 million pounds of fish and shellfish valued at about $59 million. This was 10 percent of the total catch taken during the year and 16 percent of the total value. High-seas fishing was mainly for bottomfish in the North Pacific, tuna off the Pacific coasts of Central and South America, shrimp from the Gulf of Mexico, and groundfish and ocean perch from the waters off the eastern coast of Canada.

About 55 percent of the 1958 catch was used for human food. Most of the remainder was used in the manufacture of industrial products—fish meal for chicken food and fish oil for industrial use or export to Western Europe for the production of margarine. It is estimated that the 1958 catch was marketed as follows: 1,541 million pounds as fresh or frozen products, 1,210 million pounds for canning, 85 million pounds for curing, and 1,900 million pounds for manufacture into industrial products. About 680 million pounds of waste from filleting, canning, and otherwise preparing fish for market were also used in the manufacture of industrial products.

Over 36 percent of the U.S. supply of fishery products in 1958 was obtained from imports. Receipts from foreign countries accounted for 39.4 percent of the supply of edible products and 32.4 percent of the supply of industrial fishery commodities. Imports of edible fishery products were a record 991 million pounds (import weight). The estimated round weight of these products was 1,717 million pounds.

The per capita consumption in the United States of fishery products amounted to 10.4 pounds (edible weight basis) in 1958. This was six-tenths of a pound more than in the previous year. A greater con-

sumption of canned fishery products, principally tuna, salmon, and sardines, was responsible for the increase.

Some of the highlights of the 1958 fisheries were:

1. Menhaden continued to rank first in volume with landings of over 1.5 billion pounds—nearly 33 percent of the total catch of all species taken by United States and Alaskan fishermen.

2. Shrimp continued to support the most valuable fishery, yielding $72.9 million—nearly 20 percent of the total amount received by United States and Alaskan fishermen for all fish and shellfish taken during the year.

3. The 1958 pink salmon catch was more than double the 1957 yield. This was due to a gain of nearly 67 million pounds in the Alaska pink salmon fishery. Even in Bristol Bay where this species is seldom taken in volume, there was a surprisingly large run.

4. The catch of red salmon in Western Alaska, the principal source of these fish, fell to 19.1 million pounds—less than 12 percent of the record 1938 catch. The Alaskan catch of red salmon was the smallest since the turn of the century.

5. The total Pacific salmon catch for the five species was 307 million pounds, valued at nearly $46 million—an increase of 42 million pounds and $6 million over the 1957 catch.

6. The run of Fraser River red (sockeye) salmon, fished jointly by the United States and Canadian fishermen, was the largest since 1913. Instead of approaching the Fraser River through the Strait of Juan de Fuca, their normal migratory route, the fish came around the north end of Vancouver Island through Johnstone Strait. This permitted Canadian fishermen to take about two-thirds of the total catch instead of the usual one-half.

7. Pacific sardines returned to Southern California waters in 1958, and a catch of 207 million pounds was made. This was 4½ times the 1957 production.

8. Only 66 million pounds of oyster meats were taken from U.S. waters in 1958—probably the smallest quantity taken in any year for well over a hundred years.

9. The 1958 canned tuna pack of 277 million pounds set a new record. Over 46 percent of the pack consisted of tuna canned from imported fish.

10. Production of fish solubles and homogenized-condensed fish established a record of 260 million pounds in 1958. The value of these products was $11.5 million—nearly as great as that of fish oils.

11. Shrimp imports were 85.4 million pounds, the largest ever received. This amount, together with a domestic production of 214 million pounds (heads-off weight), totalled 299 million pounds, a new record for U.S. consumption.

# Developments in the Fisheries

## Domestic Fisheries

The fisheries are continually undergoing change, sometimes slowly, sometimes dramatically. A few of the more noticeable developments are mentioned here.

The U.S. tuna fishery went through a period of considerable change in 1958, and the California tuna seiners had a record year. The use of mechanical power blocks was an important factor in improving the efficiency of seining operations. Seines were lengthened up to 50 fathoms, and more nylon was used in place of cotton, especially in parts of the seine requiring maximum strength. Cork floats were replaced with more satisfactory synthetic floats. Seven tuna clippers converted to seining in 1958. Despite the high conversion cost, tuna boat owners felt that seining was more profitable than fishing with live bait. The California tuna clipper fleet operated without costly tieups for the first time in a number of years. This was attributed largely to the fact that members of the American Tuna Boat Association in San Diego used the auction system for selling their own catch of tuna.

The U.S. shrimp catch increased substantially during 1958, largely as the result of the increased supply of white shrimp in the central Gulf of Mexico and the development of a new ocean fishery for small cocktail-size shrimp off Washington, Oregon, and Alaska.

The return of sardines to California waters after a partial absence since 1951 provided excellent fishing for purse seines and lampara rigs. Although the fish were consistently smaller than in 1957, they were acceptable for canning. Conversely, Pacific and jack mackerel were scarce, with small, widely scattered schools present but not in quantities for good purse seining.

The 1958 California anchovy catch was a distinct disappointment to canners. The shortage came as the fish were winning increased acceptance as a canned product and at a time when the demand was good for use in pet food. In addition to being scarce, the fish averaged below the desirable size for packaging.

To encourage utilization of halibut stocks west of the Shumagin Islands and in the Bering Sea, the International Pacific Halibut Commission permitted fishing in these waters during April and again in the autumn. This action was responsible for the increase in the total North Pacific halibut catch by United States and Canadian vessels. Canadian fishermen continued the trend toward landing part of their catch at Alaskan ports and Seattle.

The 1958 U.S. oyster harvest was the lowest in a century. It was caused by poor setting of spat and extensive damage by pred-

ators in New England, extensive oyster mortality in middle Atlantic waters, and a sharp decrease in Maryland and Louisiana production.

During 1958 the groundfish industry as a whole rallied somewhat from its depressed state. In the haddock fishery, however, landings of scrod (small) haddock fell below those of large haddock for the first time since 1949. This was the result of small year classes entering the fishery. Bureau biologists indicated that relief could not be expected before 1960. To add further to the problems of the New England groundfish industry, imports of groundfish fillets continued to grow and reached a new record. In an effort to revitalize the groundfish industry in Boston, a group of Fish Pier leaders made plans to sponsor the construction of 20 steel trawlers within the next 10 years. A corporation was formed among dealers on the Pier to finance this construction and to operate the vessels.

The surf-clam fishery underwent extensive changes. The entrance into the fishery of larger vessels, fishing on more distant, highly productive grounds, brought in catches in excess of the market demand. As a result, catch quotas were established early in 1958, and many vessels—about three-fourths of the 1957 fleet—returned to their former fisheries. As supply was brought in line with demand, normalcy was restored to this fishery late in 1958.

Menhaden landings declined in 1958. This was, in part, due to lower water temperatures off New England which made the fish unavailable to the fishermen there. The impact of this decline was, however, partly offset by increased catches in the Gulf area. This gain was attributed to better fishing weather, greater availability of menhaden supplies, and the trend toward using larger vessels equipped with refrigeration, resulting in longer trips and greater cruising range.

In the Great Lakes area, landings of the more desirable food fish, such as lake trout, blue pike, whitefish, and yellow pike, continued to decline. Changes in fish stocks, which may be partially caused by selective fishing, progressive changes in environmental conditions, and the introduction of such species as carp, smelt, alewife, and the sea lamprey, have lessened the abundance of the higher priced species while many of the lower priced and sometimes unmarketable fishes have grown more plentiful—a few almost excessively abundant. These new conditions dictate the need for drastic changes in the character of the Great Lakes fisheries. The fishermen must rely to a far greater extent on these less desirable species for a livelihood. Thus there is a trend toward the development of industrial fisheries to offset losses in food fisheries.

## Federal Legislation

In 1958 the Congress passed seven bills that concerned our fish resources and the fishing industry. Of the seven bills, four had been

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introduced in Congress in 1957 but failed to pass. Another bit of legislation was the Bureau of the Budget's determination with respect to the Fish and Wildlife Act of 1956.

The Alaska Statehood Act is the most prominent of the new laws and has a strong effect upon the Bureau of Commercial Fisheries. One of its provisions transfers from the Federal Government to the State of Alaska the management and administration of the fish and wildlife resources of Alaska. The act provides that the transfer shall take place upon a designated length of time after the Secretary of the Interior certifies to the Congress that the State of Alaska has made proper provisions to carry on these responsibilities. It further provides that the Federal Government shall retain the management and administration of the seal herd of the Pribilof Islands and other marine mammals but shall pay to the State of Alaska 70 percent of the net proceeds derived each fiscal year from the sale of sealskins or sea-otter skins.

Also of importance to the fisheries is the Act of September 2, 1959, which increases the fisheries loan fund from $10 million to $20 million.

The Fish and Wildlife Coordination Act provides for the conservation of the fish and wildlife resources of this country in areas of Federal water-resource development programs—building of dams and reclamation, irrigation, and navigation projects—or such programs of any public or private agency under Federal permit or license. The act requires that any such agency, in the planning stages of a program, is to consult with the Fish and Wildlife Service and with the head of the State fish and wildlife agency in order to prevent loss of and damage to the resources.

One of the acts authorizes grants to nonprofit institutions of higher learning and to nonprofit organizations for the support of basic scientific research, providing such research will further the objectives of the Federal agency or department making the grant. It further authorizes the agency or department, at its discretion, to give to the institution or organization the title to any equipment purchased by such grant or contract funds for use in its research.

The other acts authorize the Secretary of the Interior to conduct research on specific subjects. One of these authorizes the establishment of a station or stations for the purpose of carrying on research and experimentation to determine the methods and species most suitable for commercial production of fish in shallow reservoirs and on flooded rice lands in rotation with rice and other crops commonly grown on rice farms. It also authorizes the acquisition of lands through purchase or other means and of equipment and apparatus, construction of buildings, and employment of officers and employees that are necessary to carry out the objectives of the program.

Another act authorizes comprehensive continuing studies on the effects of insecticides, herbicides, fungicides, and pesticides upon the fish and wildlife resources of the United States. The investigations are to determine the amounts, percentages, and formulas of these chemicals that can be used for spraying, dusting, or other treatment without injury to or loss of fish and wildlife.

Another act authorizes, for a period not to exceed 4 years, investigations on the abundance and distribution of dogfish sharks, experiments for their control, and a program for their elimination and eradication or for the development of their economic uses. In carrying out these objectives, it further authorizes cooperation with the official conservation agencies of the Pacific Coast States, the commercial fishing industry, and governmental or private agencies or organizations or individuals having jurisdiction over or an interest in the fisheries of the Pacific Coast.

The Bureau of the Budget determination of March 22, 1958, in accordance with the Fish and Wildlife Act of 1956, transfers from the Secretary of Agriculture to the Secretary of the Interior certain functions concerning surplus fishery products, fish, and shellfish. Also transferred are certain functions pertaining to Federal ship mortgage insurance for fishing vessels and direct loans for construction of fishing vessels heretofore performed by the Secretary of Commerce.

A list of the legislation is given in Appendix B.

## International Developments

The United States is a party to a number of international fishery treaties, and the Bureau is partially responsible for enforcing the laws and regulations implementing their terms. In 1958 developments pursuant to two treaties, the Interim Convention on Conservation of North Pacific Fur Seals and the North Pacific Fisheries Convention, were significant to the Bureau as well as to the fur seal industry and the North Pacific salmon fishery.

The North Pacific Fur Seal Commission was established by the Interim Convention on Conservation of North Pacific Fur Seals. The first annual meeting of this Commission was held in Washington, D.C., January 13–17. Fur seal biologists of the Bureau and representatives of the three other governments involved—Canada, Japan, and the U.S.S.R.—participated. Although it was primarily an organizational meeting, research programs for 1958 were adopted for all four countries. A spirit of close cooperation prevailed between the parties.

In accordance with the terms of the Interim Convention on Conservation of North Pacific Fur Seals, the sealskins taken on the

Pribilof Islands in 1956 and 1957 were redistributed on the basis of 70 percent to the United States, 15 percent to Canada, and 15 percent to Japan. Previously, since 1942 when Japan withdrew from the original 1911 Fur Seal Convention, these skins had been shared between Canada and the United States on a 20–80 percent basis. Distribution of the 1958 take of Pribilof Islands sealskins was also consummated. The Japanese Government arranged with the Fouke Fur Company of St. Louis, Mo., to process and sell its sealskins under arrangements similar to those in force between that Company and the United States.

The Canadians, as well as the Japanese, shared the concern of the United States over the large number of female sealskins which so far had proved unsatisfactory for processing by the method long used for the pelts of male seals. Studies to determine other possible uses of these female skins were undertaken by the United States.

During 1958 international exchanges of scientific personnel, as outlined by the Fur Seal Convention, were arranged. For 3 months a Bureau scientist observed research operations by the Japanese Government during the spring fur seal migration in the Pacific Ocean along the east coast of Japan. A biologist from Japan and one from Canada visited the Pribilof Islands during the summer to observe the fur seal research activities of the United States on those islands.

The second annual meeting of the North Pacific Fur Seal Commission convened in Washington, D.C., December 8, 1958, and continued through December 13. Fur seal biologists of the Bureau participated again. Results of the fur seal investigations conducted during 1958 by the four party governments were reviewed, and plans for continued research during the 1959 season were approved. The next annual meeting of the Commission was scheduled to be held in Moscow in January 1960.

Under the terms of the North Pacific Fisheries Convention between Canada, Japan, and the United States, the Japanese agreed to abstain from fishing for salmon on the high seas of the North Pacific Ocean east of a provisional line established at longitude 175° W. The convention provided that the provisional line would remain in effect while research was being carried on to determine whether a different line or lines would more equitably divide the stocks of salmon of Asian and North American origin in the North Pacific Ocean. Tagging by U.S. scientists in 1957 clearly indicated that very substantial numbers of red salmon of Alaskan origin were harvested by Japanese fishermen in waters immediately west of the provisional line. Recognizing the serious threat posed to the runs to Bristol Bay, Alaska, the United States recommended moving the abstention line farther westward. Negotiations with the Japanese for a westward shift in the abstention line were unsuccessful; however, during the 1958 sea-

son, the Japanese fished farther to the west and south than in other recent years and consequently captured fewer fish of North American origin. The problem of determining the line or lines that most equitably divide red salmon of Alaskan and Asian origin continues to receive careful consideration by the International North Pacific Fisheries Commission (INPFC), the organization established by the convention.

Many problems arising from developments in foreign fishing industries continued to trouble the U.S. fisheries. Recognizing the need to assist the domestic industry in solutions to these problems, the Bureau expanded services in the international field. Our trade and tariff activities enabled us to participate in preparations for trade agreement negotiations, determine positions on legislation pertaining to foreign trade, and study the competitive position of domestic and similar foreign-produced products.

In March 1958 the first United Nations Conference on the Law of the Sea was held in Geneva. Prior to it, the Bureau prepared background documents on the fisheries of the United States and the world for the use of the U.S. delegation.

In May 1958 a report on trends in the domestic yellowfin, skipjack, and bigeye tuna fisheries was submitted to the President and the Congress by the Secretary of the Interior. This report was the first prepared, under provisions of Section 9(b) of the Fish and Wildlife Act of 1956, concerning trends in tuna imports and production, employment, and prices in the domestic tuna fisheries. The report was made upon request of the industry for use in connection with tariff legislation introduced into the Congress to control imports of tuna.

In connection with the Bureau's foreign news service, the basic reporting instructions to foreign posts throughout the world were amplified to provide for more intensive reporting of foreign fishery developments. To provide more complete coverage of the fisheries in Japan, a fishery-attaché post was established in Tokyo in conjunction with the State Department Foreign Service Program. A series of briefings was initiated for State Department Foreign Service economic officers to inform them—prior to an assignment to a new post—of problems in the U.S. fishing industry. Reports received from embassies and consulates were appraised on a regular basis in an effort to guide reporting officers in the assembling of information useful to the domestic industry.

Through Bureau actions, the foreign markets for domestic canned salmon and sardines were expanded. More liberal British import restrictions on canned salmon were obtained, and instructions were sent to the American Embassy, Manila, whereby canners were assisted with trade problems in marketing canned sardines in the Philippines.

# Accomplishments and Operations

## Principal Accomplishments

During the year 1958 the Bureau of Commercial Fisheries continued to add to its list of accomplishments. The principal ones are listed here.

### North Pacific

*Fur seal and whale resources management and research.*—In connection with the whale resource of the North Pacific area, licenses were issued to U.S. whaling firms, reporting to the International Whaling Commission, and Bureau policy on whale research was drafted.

On October 15, 1959, the Interior Department signed an amendment to its contract with the Fouke Fur Company of St. Louis, Mo., to cover the processing of skins by shearing. This new process for female sealskins was developed as a result of the research carried on in cooperation with the company and the U.S. Department of Agriculture and should provide less expensive skins at much lower costs of processing. Because costs cannot be identified prior to further experimentation and experience, the amendment permits renegotiation of the formula of payment to the Company at the end of prescribed intervals of 12 months.

Fur seal biological research was conducted on both land and at sea in conformance with Bureau policy and the objectives of the Interim Convention on Conservation of North Pacific Fur Seals. Pelagic research began in January with 3 chartered vessels and 12 biologists, and continued until late June. Some 1,500 seals were taken from waters of the Channel Islands, Calif., to the Pribilof Islands, Alaska. On land, in addition to basic work on population, reproduction, and mortality studies, 50,000 seal pups were tagged. Bull counts indicated the presence of 12,589 harem and 12,540 idle bulls, and the count of dead pups was calculated at 37,740 animals. The small loss of pups promises improved returns of seals of a killable size in 1961 and 1962.

*Fur seal harvesting.*—Below normal returns of 3- and 4-year-old seals to the Pribilof Islands permitted a take of 47,860 male and 31,059 female fur seals during the summer of 1958. Killing of female seals, as a part of the herd management program begun in 1956, was restricted as much as possible to younger animals by prescribing a size limit of less than 46 inches in total length.

At two semiannual sealskin sales, the Fouke Fur Company sold a total of 47,168 sealskins for the account of the United States. Sales totaled $3,648,763, of which the United States netted $2,302,710. In

addition, the United States gained $3,728 at special company sales involving 96 skins. Public sales of seal meal produced in 1958 totaled $34,987, and the production of seal oil brought $25,214 at a public sale.

*Shrimp exploration.*—Excellent commercial quantities of shrimp were located by the Bureau's vessel *John N. Cobb* in the lower Cook Inlet and Kodiak Island areas of Alaska during the summer of 1958. This exploration showed that large concentrations of shrimp are available in Central Alaskan waters. In contrast to the shrimp grounds off Washington and Oregon, which yield only "cocktail-size" pink shrimp, the newly found areas had good quantities of larger sized side-stripe and coon-stripe shrimp species.

*Alaska fisheries.*—Until the State will assume control, the Bureau is responsible for the management of the commercial fisheries in Alaska. During 1958 the Alaska fisheries regulations were completely recodified. They include a description of each type of fishing gear, the use of abbreviations and symbols, and a regrouping of the various parts of the regulations. Salmon products prepared for market amounted to 155,835,000 pounds valued at $72,442,000 as compared with 135,849,000 pounds valued at $68,157,000 in 1957.

Research effort was expanded both by the Bureau and by cooperating agencies under contracts financed by funds from the Act of July 1, 1954 (68 Stat. 376), known as the Saltonstall-Kennedy Act.

*Red salmon studies.*—Considerable progress was made toward determining the range and distribution of North American and Asiatic red salmon in the North Pacific Ocean. Bureau scientists caught red salmon with gill nets over a wide expanse of ocean. Subsequently these salmon were examined in minute detail to determine their continent of origin. Several techniques were used, involving examination of scales, meristic characters, serology, and parasitology. In addition, salmon were tagged and released at various localities on the high seas as another method of determining their origin from locality of recovery. Results of the studies show that red salmon of North American type appear to predominate in the North Pacific as far west as longitude 175° E.

*Migratory habits of chinook salmon.*—Knowledge of the migratory habits of chinook salmon near dams has increased since the development and use of the unique sonic tag. This small tag, attached behind the dorsal fin of salmon, emits a weak signal which can be picked up by sensitive receiving equipment in a boat. By keeping in range of the signal, biologists can follow salmon and chart their detailed movements.

In the Columbia River above Bonneville Dam sonic tagged salmon were followed as far as 10 miles upstream and for periods as long as 17 hours. The results demonstrated that chinook salmon migrate within 50 feet of the shore and seldom in water more than 30 feet deep.

The mean upstream migration rate was 1.2 miles per hour. Another significant finding was that 70 percent of the salmon traveled some distance downstream from the release point before commencing their upstream migration. This may mean that some salmon passing fish ladders may subsequently drop downstream over spillways.

The first tunnel fish ladder was placed in operation in the autumn. This was the 18th major fishway constructed under the Columbia River program. Electronic fish counters, designed and developed by the Division of Biological Research, were placed in operation at six of the program fish ladders and proved to be successful.

*Chinook salmon spawning survey.*—Aerial surveys were conducted on the main Columbia River between the John Day Dam site and McNary Dam to ascertain the extent of spawning utilization by fall chinook salmon. An estimated 10,000 fish spawned in the area. There is an obvious need for mitigative measures to compensate for the loss of this natural production area when the John Day Reservoir is filled.

*Columbia River Fishery Development Program administration.*—The Columbia River Fishery Development Program, a cooperative endeavor with the State fish and game agencies of Washington, Oregon, and Idaho, and financed by the Federal Government, entered its 10th year of operation. The construction of 2 new fish hatcheries during the year brought to 17 the total number of hatcheries constructed or rehabilitated under the program. The increase in artificial propagation practices resulted in the release of approximately 76 million migrant-size salmon and steelhead trout at State and federally operated hatcheries, an increase of 11 million over the preceding year. Coincident with this, nearly 97 million eggs were taken from returning adult fish.

Over 3 million young salmon and steelhead trout were marked by excision of fins and released from hatcheries as a part of the evaluation of artificial propagation and its methods. Analysis of returns from marked adults indicates that substantial numbers of salmon from the program hatcheries are contributing to the offshore fishery all along the West Coast, and also to the Columbia River commercial gill net fishery.

*Albacore survey.*—In July and August the MV *Paragon* was chartered to determine the feasibility of gill netting on a commercial basis for albacore in the North Pacific. The total catch of 13 tons was not up to expectations on the basis of previous surveys. Surface temperatures in parts of the fishing area were 8°–10° F. colder than observed previously; the productivity of the area, as evidenced from the standing crops of plankton and forage organisms, was considerably less than in earlier years. These differences probably account, at least in part, for the poor albacore catch.

California

*Thirty-two-year wind indices completed.*—The Bureau's Biological Laboratory at Stanford, Calif., has obtained indices of air circulation over the North Pacific for a period of 32 years (1926–57). Preliminary analyses for two fixed shore stations have shown that part of the variations in temperature can be related to the wind circulation. The wind indices indicate that in some regions during the decade 1947–56 average circulations differed from those of the two previous decades. Stronger winds from 1947–57 caused increased upwelling and a stronger California Current and resulted in below-normal sea temperatures along the coast. This may have been a factor in the disappearance of the California sardine from the northern portions of its range during this decade.

*Changes in sea temperatures.*—During 1957 and extending into 1958 there was a marked rise in sea temperatures along the eastern Pacific Coast from the Gulf of Alaska to the coast of Peru and a lowering in sea temperatures adjacent to northern Japan. Oceanographers and meteorologists believe these unusual conditions were due to an abnormally strong and persistent development and eastward translocation of the Aleutian atmospheric low pressure area in the winter of 1957–58. The change in sea temperatures produced interesting changes in the distribution of marine animals, with representatives of tropical fauna appearing far to the north of their usual range along the coast.

The unusually warm conditions in the eastern North Pacific during 1958 were more nearly like those existing before the decline of the California sardine fishery. Evidence from the live-bait fishery and from other sources suggests that the 1957-class of sardines is much larger than other recent year-classes. Sardine spawning was early in the year 1958 and extended further to the north than in recent years. Similarly, anchovy spawning was more widespread than usual off central California. Round-herring eggs, normally found off of or to the south of central Baja California, were taken off San Diego.

*California sardine studies.*—An inverse correlation has been demonstrated between population size in the sardine and both fish length and condition factor (fatness). High population levels are associated with low condition factors and small average length of fish, while, conversely, low population levels are associated with higher condition factors and greater average lengths. The inverse correlation between population size and condition factor is interpreted as a cause and effect relationship. When the population is small there is more food per fish; when the population is large there is less food per fish. The inverse correlation between population size and fish length, however, is only apparent. Population size increases when a large, new year-class

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enters the population. Since fish of an entering year-class are small, average fish size is reduced.

A new investigation on the physiology of sardines was initiated at the Bureau's Biological Laboratory in La Jolla, Calif., in September 1958. It supplements the studies already underway on fecundity, feeding, and nutrition of sardines.

*Sardine marketing assistance.*—Late in 1958, the California sardine packers requested assistance in moving the heavy California sardine pack. The 1958 pack of almost 2 million cases was about 1½ million above that of the previous year, and most of this excess was unsold in inventory. Movement was very slow both in this country and abroad. The Bureau pledged its support, and a national, joint, industry–Bureau, market–promotion plan was developed to reach a peak during the 1959 Lenten sales period.

**Hawaii**

*Ten years' operation-Biological Laboratory, Honolulu.*—In 1958 a decade of exploratory oceanography by the Biological Laboratory at Honolulu came to an end. Four general areas of the Pacific were investigated during this period:

1. Central and eastern equatorial Pacific, with particular emphasis on oceanographic features at or near the Equator.
2. North-central and eastern, subtropical and temperate Pacific waters.
3. The waters of French Oceania, particularly those near the Marquesan and Tuamotuan Archipelagos.
4. Hawaiian waters.

Each of the four investigations followed a similar pattern. Exploratory cruises were carried out during midsummer and midwinter in order to observe maximum seasonal variations in oceanographic conditions. Subsequent cruises and observations investigated conditions during periods of seasonal change and studied those oceanographic features within the area which were of particular biological significance.

*Kewalo Basin fleet headquarters opened.*—In August 1958 the new fleet headquarters of the Biological Laboratory at Honolulu, including office space, machine shops, electronic laboratory warehouse for ship stores, and adjoining berthing space for the Bureau's research vessels, was opened at Kewalo Basin. Land adjacent to the building is being used for tanks and equipment for experiments in rearing tilapia as a live bait and for studies in tuna behavior.

*Tuna behavior studies.*—During the latter part of 1957, the Biological Laboratory at Honolulu initiated a program for studying the behavior of tuna in their natural environment. A bucket constructed of steel and plastic in which an observer equipped with a breathing

device could watch the actions of a school of tuna during fishing operations was mounted on the Bureau's vessel *Charles H. Gilbert.* Early in 1958 a new bucket was constructed in which the observer, without being submerged in the water, could both directly observe and photograph the behavior of tuna. Several experiments were successfully completed in which a single variable affecting fishing was modified and the results were clearly observed and documented. The usefulness of this method of direct observation was thoroughly demonstrated.

*Tuna identification research.*—Research was initiated on the use of paper chromatography as a means for identifying adult tunas and tuna larvae. The flesh of adult tuna and tuna larvae were tested in one-dimensional and two-dimensional chromatograms. The results indicated that species of adult tunas could be segregated by this method, but quite inconsistent results were obtained with the larval tunas.

*Study on distribution and abundance of skipjack and yellowfin tuna.*—A 2-year study of the distribution and abundance of surface schools of skipjack and yellowfin tuna in the waters of French Oceania was completed. The results of the survey will be analyzed, and estimates made of the commercial potentialities of the area.

*Cromwell Current.*—The Biological Laboratory, Honolulu, cooperating with Scripps Institution of Oceanography and as a part of the International Geophysical Year program, intensively studied the Pacific Equator Undercurrent (Cromwell Current). Measurements showed that this newly discovered easterly flowing current positioned beneath the Equator transports water at a rate of approximately 30 million cubic meters a second. Furthermore, the undercurrent is symmetrical about the Equator (lat. 2° N. 2° S.) with maximum speeds between 2 and 3½ knots, centered at a depth of 100 meters. The top and bottom of the undercurrent, measured at the Equator, (long. 140° W.) were at about 30 and 300 meters, respectively. From the surface to a 30-meter depth, the waters are transported to the west in the South Equatorial Current.

**Gulf of Mexico**

*New resources of commercial fish.*—Investigation of midwater- and surface-schooling fish in the Gulf of Mexico indicated that at least six little-utilized or nonutilized species are present in possible commercial quantities. Experiments with several types of gear are being made to determine the most practicable method of capturing these fish.

*New shrimp-tagging method.*—At the Biological Laboratory, Galveston, Tex., one of the significant events of the year was the first successful use of a newly developed technique for marking shrimp

with vital stains. In contrast with other tagging methods, young shrimp may be stained by this technique and, as they grow, molt without losing the mark. Results of this method have shown that the protected bays of the Everglades National Park are an important nursery area for the Tortugas pink shrimp, which support an important fishery in the Gulf. Juvenile pink shrimp marked in the Park were recaptured after traveling over 100 miles to the Tortugas commercial fishing grounds. The juvenile shrimp tripled their weight in 4 months.

*White and brown shrimp studies.*—Studies on the early life history of the white and brown shrimp in the bays and sounds of the Gulf Coast show that the two species reach a peak in abundance at different seasons of the year. This sharply reduces the interspecific competition on the nursery grounds.

**Atlantic Coast**

*Index for predicting commercial catch of menhaden.*—The staff of the Biological Laboratory, Beaufort, N.C., developed a method for estimating the relative abundance of each new year-brood of menhaden prior to its entry into the commercial fishery. From this index very accurate predictions can be made of the commercial catch of each year class. Such information is of great value to the menhaden industry.

*Hard clam survey.*—A survey was made of hard clam resources in Nantucket Sound, Mass. The Atlantic States Marine Fisheries Commission had requested this survey to determine (1) the location, abundance, and size composition of the large clams being fished in that area and (2) the existence of small clams that could support a future fishery. The survey showed that the abundance of hard clams was extremely low, no small clams were available, no new areas of commercial abundance were discovered, and the future of the fishery appears uncertain because of unfavorable spawning and setting conditions.

*Method for determining age of scallops.*—The staff of the Bureau's Biological Laboratory, Woods Hole, Mass., has developed a method for determining the age of scallops. Marks on the shell and ligament of sea scallops have been interpreted as annual rings. The method has been validated by deriving independent growth rates from reading annual rings and measuring the growth increment on scallops which had been tagged, released, and recaptured.

*Scallop growth studies.*—The whereabouts of sea scallops during their first few months of life has long been a mystery. It is known that scallops are spawned about the first of October, pass a few weeks in the plankton, and then settle to the bottom to grow until they are big enough to be caught. Scallops of less than 5 mm., however, have

only been collected on a single occasion, although they have been searched for in many localities with many different kinds of gear. This year a Bureau biologist, in examining a cluster of fouling organisms taken from a Coast Guard buoy base, found about 10,000 tiny sea scallops ranging from 0.2 to 15 mm. in size. This collection has made it possible for Bureau biologists to describe the early development and changes in shape of the shell.

*Cod mesh regulation.*—Although the 4½-inch mesh regulation has been applied to cod in the North Atlantic for several years, it has had little effect on the fishery because there have been so few small fish on the fishing grounds. The increase in abundance of small cod in 1958 markedly changed this picture. It has been calculated that the 4½-inch mesh permitted over half a million small cod to escape this year. This escapement is not a loss to the fishery, however, since a great many of these fish will be recaptured later at larger sizes.

*Redfish growth and migration studies.*—Commercial stocks of redfish occur in deep water, and the fish cannot easily be brought to the surface alive. Consequently up to now, knowledge of migrations and delineations of stocks has been extremely limited. Concentration of effort this year on a shallow-water stock at Eastport, Maine, has provided information on growth rate and migrations, or lack of migration in this case. The increased knowledge obtained from the study of this stock has been extremely valuable in understanding the nature of the deep-sea stocks exploited by the commercial fleets.

The growth rate of tagged redfish was found to be extremely slow, averaging only about 1 mm. per year. Studies of the otoliths revealed that the tagged fish had a lower growth rate than the untagged fish. There is no explanation as yet for this phenomenon, although it is possible that the more active, faster growing redfish leave the area after being tagged and are not recaptured.

*Passamaquoddy investigations.*—The Biological Laboratory at Boothbay Harbor, Maine, took an active part in the International Passamaquoddy Fisheries Investigations to assess the effect of proposed tidal power dams on commercial fisheries. Field studies, conducted jointly with the Fisheries Research Board of Canada, began in 1957 and were terminated in December 1958. They included observations on swimming speeds of herring, distribution of herring populations, migrations and behavior of herring, statistics, economics, plankton, and oceanography. Work was started on a final report to the International Joint Commission.

*Telemeter useful in tuna explorations.*—More precise information on seasonal distribution and availability of tuna in North Atlantic offshore waters was gathered by the Bureau's exploratory vessel *Delaware* during several fishing operations. The simple electrical tele-

meter has been refined to supply continuous subsurface temperature data as well as to define the depth of the net.

*Air-bubble curtain gear used for herring fishing.*—In the Diamond Island Roads area of Casco Bay, near Portland, Maine, the air-bubble curtain gear was successfully used in conjunction with commercial fishing operations for sardine-size herring. These fish would not have been available to the commercial gear without the use of the air-bubble curtain.

*Market-development plan for New England groundfish.*—At the request of the New England Committee for Aid to the Groundfish Industry, the Bureau prepared a special report, "A Market Development Plan for the New England Groundfish Industry." This report was based upon a study made for the Bureau by Tradeways, Inc., a prominent marketing-management consultant firm.

**Great Lakes**

*Chemical control of sea lamprey.*—Advances were made toward controlling the sea lamprey in the Great Lakes. A fluorinated nitrophenol chemical was used to treat eight lamprey-producing streams. This chemical, discovered the preceding year, effectively killed all the developing lamprey larvae in the gravels of these streams and had no appreciable detrimental effect on populations of valuable species of fish. Results of these initial applications indicate that chemical treatment of streams will reduce the sea lamprey populations to a low level.

**General**

*Enforcement.*—Regional enforcement groups were established in New England and in the Pacific Northwest for carrying out commercial fisheries enforcement responsibilities as required by international treaties, implementing legislation, and Departmental regulations pertaining to commercial fish and marine mammals.

*New technique for washing fishing-vessel holds.*—A high-pressure, chlorinated, sea-water spraying device for washing and sanitizing fish holds of vessels was installed on 15 fishing vessels after Bureau technologists demonstrated to the fishermen that use of such a technique is much more effective than water for removing fish slime and odors from the holds. Landings of fish from these vessels have been reportedly of a consistently higher quality than landings from vessels not equipped with this new spraying apparatus.

*Era of automation being brought to fishing industry.*—A prototype automatic deicing and weighing machine was developed and was tested during the year by Bureau technologists on a semicommercial basis. This machine is designed to increase the efficiency of unloading fish from boats at the docks by eliminating antiquated handling procedures. If this apparatus is used a better quality of fish can be

expected, since fish will no longer be pierced by the pitchforks, which are the traditional tool for handling fish in many ports.

*Survey of shrimp industry.*—The Bureau, with the assistance of private research firms and universities, completed a comprehensive survey of the shrimp industry. The results were incorporated in a two-volume report entitled "Survey of the United States Shrimp Industry." This report makes specific suggestions for increasing efficiency of operations at all levels to effect savings in shrimp production, processing, and distribution. For example, plant layout charts provide innovations for improving production in canning, breading, and freezing shrimp, thereby reducing labor costs. The report also makes suggestions for increasing retail sales through use of low-cost, point-of-sale advertising.

*Foreign shrimp exploration.*—To gain more detailed information on shrimp, which were observed over wide areas off the northeast coast of South America by the Bureau's vessel *Oregon* in 1957, an additional exploration was carried out during the late summer of 1958. Catches of commercial interest were made off Surinam and off Chandler Point, British Guiana.

*Fish oil research.*—Bureau experimental research on fish oils showed that high serum-cholesterol levels are markedly reduced by introducing unsaturated fish oil fatty acids into the diet. In addition to the cholesterol-depressing effects, fish oils introduced into the diets of test animals caused a more rapid growth rate than of those fed diets without the oils. Incomplete results indicate that cholesterol-depressing effects and growth rates are directly related to the degree of unsaturation of the oils.

Results of Bureau contract studies have shown that fish oils are uniquely valuable in separating impurities from iron ore by a flotation process. Contrary to the present industrial flotation methods, fish oils have been found to be exceptionally efficient in removing the impurities. Additional studies are currently under way to ensure that this process is perfected for large-scale industrial use. A new market for fish oils may be opened up.

*Fish meal research.*—Bureau researchers have developed an accurate method for measuring the nutritive value of fish meals through controlled-diet feeding studies. A standard control diet has been established, consisting of synthetic amino acids, vitamins, minerals, and other dietary requirements which will consistently produce a 4-percent gain in chick weight per day. This diet is used as a constant against which weight-gain results of other diets can be compared. By feeding fish meal diets containing various amounts of amino acids while all other requirements are held constant, the weight-gain results of the experimental diets can be checked as deviations from the results of

the control-diet fed chicks. This approach establishes an absolute base for evaluating the nutritive value of fish meals.

The use of fish meal in chick diets is a distinct economic advantage to commercial broiler raisers. The Bureau's fish meal studies were conducted on chicks subjected to the same identical conditions as found on broiler-raising farms. Use of a meal containing 22 percent protein of which 2.5 percent was in the form of fish meal demonstrated that this meal produced weight gains which were equivalent to those produced by other meals containing a 26 percent vegetable-protein diet.

*Rough-fish market development.*—Increasing efforts were made to develop markets for underutilized fish. New markets in the pet-food and mink-food industries, successfully developed during the Bureau's pilot research effort in the Lake Erie area during the past few years, were expanded to other areas with rough-fish marketing problems.

*Fish-cookery demonstrations.*—Bureau home economists and marketing specialists conducted 88 fish-cookery demonstrations for supervisory school-lunch personnel, cooks, and managers during 1958. School lunches represent one of the major potential outlets for fishery products.

*The eyes and ears of the fishing industry.*—The Fishery Market News Service during 1958 refined its collection and expanded its reporting on prices of frozen and canned fishery products. Fishermen's prices for their catch of shrimp at certain key ports on the Gulf of Mexico were shown weekly. Collection and dissemination of information on receipts and wholesale prices of fishery products at Baltimore, Md., were started with the opening of an office in that city. Lists of fishery products importers in New York City and in California were compiled and issued for the first time by the Market News offices located in those places. Special timely reports were issued just prior to the beginning of a new season for halibut, salmon, shrimp, and Great Lakes fish so that all facts and figures of the previous several years reported by the Market News Service would be readily available as a guide in gauging the prospects for the new season.

*Fisheries Loan Program.*—Authorized by the Fish and Wildlife Act of 1956 and announced in October of that year, the Fisheries Loan Program began operating in 1957 through the Office of Loans and Grants. By December 31, 1958, a total of 514 applications, totaling $17,780,883, had been received. Of these, 160 ($4,439,212) were received during the calendar year 1958. As of December 31, 1958, 278 loans, totaling $7,176,800, had been approved, and 29 applications, totaling $3,059,000, were being processed. A total of 125 applications were declined, 44 were found to be ineligible, and 38 were withdrawn by the applicants.

Approximately 57 percent of the amount authorized was for refinancing of debts, 38 percent for vessel improvement or new vessels,

and the balance for operating expenses. Approximately 44 percent of the funds were loaned to fishermen in the New England and Middle Atlantic area, 23 percent to California fishermen, 21 percent to fishermen in the South Atlantic and Gulf area, 8 percent to fishermen of the Pacific Northwest, and the balance to fishermen in Alaska, Hawaii, and the Great Lakes area.

*Fishery statistics.*—Through the Bureau's statistical services, detailed data were assembled on the U.S. tuna industry for the years from 1911 to 1957, inclusive. The information was for the use of the tuna industry and Federal Government agencies in studying means of alleviating serious financial problems of tuna fishermen. The data included information on the U.S. catch by species, the pack of canned tuna from domestically caught and imported frozen tuna, and the volume and value of imported fresh, frozen, and canned tuna.

Specific tables containing detailed information on all craft employed in the important menhaden purse seine and fish and shrimp otter trawl fisheries were published in the Bureau's annual Statistical Digest. These summary tabulations provided, for the first time in a single source, complete information on the number and size of craft employed in these fisheries which operate in many of the Nation's coastal States.

## New Programs

During the year the Bureau started several long-range programs. Some of the programs expressly provide for services to the fisheries and the fishing industry. Among those is the Great Lakes fisheries exploration and gear-research program. It was initiated during midyear, and an operations base was established at Sandusky, Ohio. This program is designed to (1) locate additional or alternate resources of fish to offset fluctuations in production and to enable fishermen to continue fishing until once important fisheries, such as the lake-trout fishery, can be rehabilitated and (2) develop, through research on fishing gear, the most efficient means of locating and capturing unutilized and underutilized species, thus assisting Great Lakes fishermen in diversifying their operations to broaden their present market base.

Another of the new service programs is a vessel safety program. It was initiated in the new England area early in the year. The primary purpose of this program is to reduce unsafe acts and unsafe conditions aboard fishing vessels. A reduction in shipboard accidents could eventually bring about substantially lower property and indemnity insurance rates.

On July 1, 1958, the U.S. Department of the Interior assumed the responsibility for the development and promulgation of U.S. stand-

ards for grades of fishery products and the operation of a program for the voluntary inspection and certification service for fishery products. This service was formerly provided by the U.S. Department of Agriculture. By the end of the year a total of 20 plants were under contract for USDI continuous inspection services. Lot inspection services for quality and condition were made available to interested parties in Boston, Mass., and Tampa, Fla. All Bureau inspection services provided are voluntarily subscribed to by industry members and are financed from funds contributed by those members.

Recognizing that a knowledge of distribution and consumption patterns for fishery products is a necessary prerequisite to orderly marketing and market promotion by industry and effective consumer education by Government, the Bureau intensified its market-research efforts. A contract was let to Crossley S-D Surveys, Inc. for a 10-city study of consumption of frozen processed fish, shellfish, and portions in institutions and public eating places. This study will aid the fishing industry in developing markets for the use of fish and shellfish in the mass-feeding industry, considered one of the best potential markets for frozen fishery products. Contracts were also given to the Bureau of Labor Statistics, the Bureau of Census, and the Market Research Corporation of America for studies of distribution patterns, prices, and consumer characteristics for canned tuna, salmon, and sardines.

Early in 1958 the Bureau provided funds to assist the scientists at Rutgers University in their studies on the extent of the oyster mortalities in Delaware Bay, N.J. The Bureau had been asked to assist the Delaware Bay oyster industry after the heavy and unexplained mortalities in that area during the middle of 1957. The efforts of the Bureau's biological staff at Franklin City, Va., were redirected toward this problem in 1958 when mortalities were reported from that area. A new multinucleate organism, tentatively called "MSX", was discovered in oysters from the high mortality area of Delaware Bay. Definite identification of this organism and its relationship to the oyster mortalities will not be possible until its complete life history is described.

A program to rear tilapia as a supplement to the natural bait required by the Honolulu-based, skipjack fishing vessels was started by the Bureau's Biological Laboratory at Honolulu. An experimental rearing plant was operated during the year on the island of Maui to determine whether these fish could be economically reared for this purpose. The experiment was a success, and over 1 million fry were produced. Largely on the basis of these results, the Territorial Legislation appropriated $130,000 for the construction of a tilapia rearing plant.

A Biological Laboratory was established in January 1958 in Washington, D.C., to investigate the mechanisms by which the elements of the marine environment affect commercially important fishes and invertebrates. The influences of temperature, salinity, currents, and chemical nutrients are being studied in relation to the survival, distribution, and behavior of commercial species. During this first year the staff devoted its efforts to the organization of the new laboratory; assembling working materials; searching for sources of systematically collected physical, climatic, and biological data; and soliciting cooperation of marine scientists working in the North Atlantic area.

## Meetings

Important international and domestic fishery meetings were attended by Bureau officials whenever their presence was advantageous to the government. In many instances members of the scientific staffs went to meetings and conferences to present the results of their studies or to learn of the contributions of others in their fields of endeavor. Such contacts with other workers are invaluable and provide our scientists with current awareness of recent developments.

Meetings with organized groups of fishermen or industry members were also attended by key personnel. Such meetings represent excellent opportunities to explain the programs and results of Bureau activities.

Interest and commitments in various international commissions and conferences led to Bureau attendance at foreign meetings of the Food and Agriculture Organization, Indo-Pacific Fisheries Council, Inter-American Tropical Tuna Commission, International Commission for the Northwest Atlantic Fisheries, International North Pacific Fisheries Commission, International Passamaquoddy Fisheries Investigation, International Whaling Commission, Organization for European Economic Cooperation, and United Nations Conference on the Law of the Sea.

The most significant of these meetings internationally was the United Nations Conference on the Law of the Sea, which convened in Geneva on February 24, 1958, and continued its deliberations until early May. Eighty-six nations participated. The Conference was concerned with the codification and progressive development of international law. Four conventions were drafted and opened for signature. The most important of these in terms of conservation is the Convention on Fishing and Conservation of the Living Resources of the High Seas. The negotiations of this convention marks a major step forward among nations in the cooperative approach to marine resource conservation. The terms of the convention impose upon nations an obligation "to adopt, or to cooperate with other States in

adopting, such measures as may be necessary for the conservation of the living resources of the high seas." For the first time, broad agreement has been reached on a system of rules to guide nations in the orderly and harmonious development and conservation of the resources of the sea.

## Cooperation and Coordination With International, Federal, State, and Other Agencies

The success and expeditious accomplishment of the Bureau's program depends to a marked extent on cooperation and coordination between the Bureau and various foreign governments, other Federal agencies, State agencies, universities, and other private agencies. This cooperation takes the form of international agreements and treaties, formal and informal agreements with Federal and State agencies, and contracts and informal agreements with State conservation departments, universities, and private associations. Such cooperative arrangements permit the exchange of ideas and research results and the development of coordinated programs to make the best use of available research talent and facilities toward solving mutual problems. International coordinated programs function through international organizations established by international agreements and treaties. Some of these organizations are the International North Pacific Fisheries Commission (INPFC), the Great Lakes Fishery Commission, the International Commission for the Northwest Atlantic Fisheries (ICNAF), and the Food and Agriculture Organization of the United Nations (FAO).

The Bureau, during the year 1958, played an important role in the research and conservation actions of a number of interstate commissions by providing some of the scientific data upon which coordinated action by such commissions is based. Examples of such commissions with which the Bureau has formal agreements are the Atlantic States Marine Fisheries Commission and the Gulf States Marine Fisheries Commission. The Bureau also cooperated closely with the national, regional, and local fishery and allied trade associations.

Formal and informal agreements exist between the Bureau and other Federal Government agencies, such as the Atomic Energy Commission, Department of Health, Education, and Welfare, Weather Bureau, Navy, Coast Guard, Air Force, Department of Commerce, and Department of Agriculture.

Although the Bureau is responsible for the general administration and coordination of the Columbia River Fishery Program, this is a cooperative endeavor involving the fish and game agencies of Washington, Oregon, and Idaho, as well as the two Bureaus of the Fish and Wildlife Service. Cooperative arrangements are developed with the

Bureau of Reclamation, Corps of Engineers, and other Federal and State agencies, as appropriate.

The management of the Pribilof Islands fur seal herd and the maintenance of the two native communities has involved cooperative arrangements with the Navy, Weather Bureau, Civil Aeronautics Administration, Public Health Service, and the former Territory of Alaska.

In addition to the research and services conducted by Bureau personnel in 1958, extensive use was also made of the professional staff and facilities of a number of universities, State agencies, trade associations, and private organizations through Bureau-sponsored contracts. These contractual arrangements provided the Bureau with the services of highly skilled professional personnel in these organizations and, at the same time, enabled these cooperators to expand their research facilities for and in the interest of fishery matters. A list of the organizations with which the Bureau had formal contractual arrangements in 1958 is given in Appendix C.

## Organization, Budget, and Physical Property

In 1958 the Bureau of Commercial Fisheries continued its internal reorganization, both in Washington and in the field (Appendix D). In Washington the Office of Administration was made a division with four branches: Budget and Finance, Management Analysis, Personnel Management, and Property Management. The activities of the Office of Loans and Grants were temporarily supervised by the Division of Industrial Research and Services. In the field organization, two areas were established: California with headquarters at Terminal Island and Hawaii with headquarters at Honolulu. They are independent of any of the Regions; are on an equal basis with them; and like them, are immediately responsible to the Director of the Bureau. The five Regions and two areas and the territory included in each are shown in figure 1. Regional enforcement organizations were established in New England and in the Pacific Northwest.

In the calendar year 1958 the Bureau had an average employment of 1,635 persons. At the end of July a peak of 2,063 employees was reached. This peak results from the large number of students employed temporarily during the summer vacation of the school year. The number of permanent employees averaged 1,380 and reached a high of 1,431 in July and remained at approximately that figure for the rest of the year. Seasonal, or temporary, employees averaged 255 persons but increased in number to 632 in July. The variations in the number of employees throughout the year and the relationship between the total number and the number of permanent employees and seasonal, or temporary, employees are shown in figure 2.

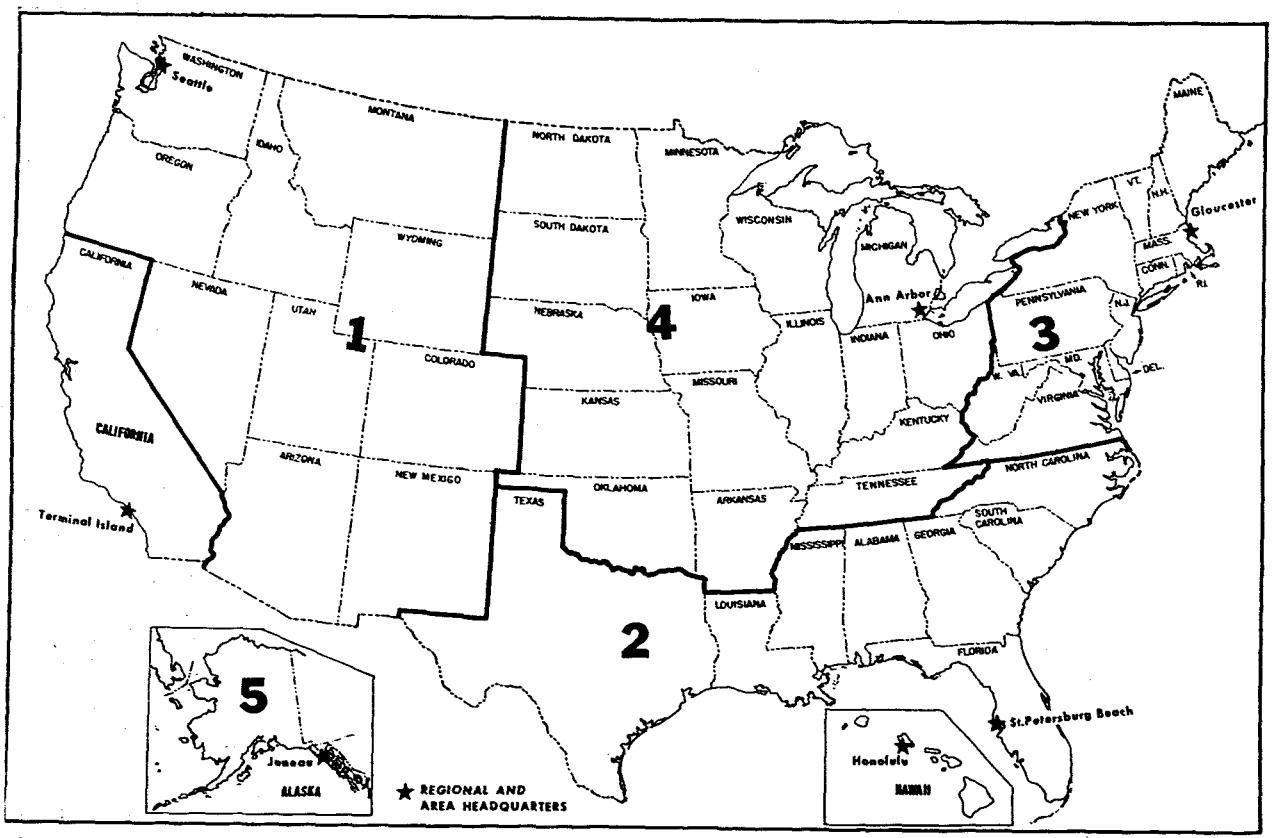



FIGURE 1.—*Regions and areas, Bureau of Commercial Fisheries.*

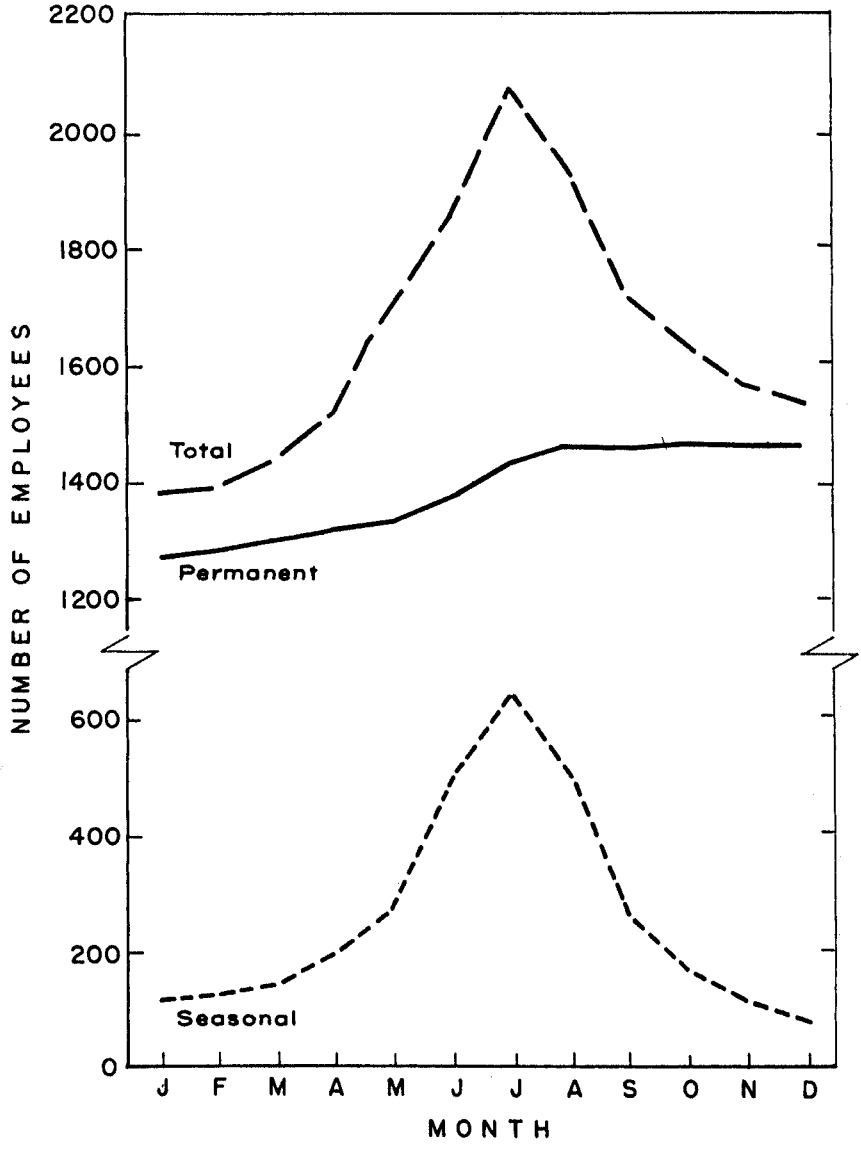



FIGURE 2.—*Bureau of Commercial Fisheries employment totals, calendar year 1958.*

For the fiscal year 1958, $18.5 million were available to carry out the Bureau's program (Appendix E). Of this amount, $9 million were from regular annual appropriations; $5.6 million from Public Law 466 (known as the Saltonstall-Kennedy) funds; $3 million from funds transferred by the Corps of Engineers and the State Department; and $0.8 million made available to the Bureau by the Great Lakes Fishery Commission for sea lamprey control.

Field laboratories and stations, vessels, and installations on the Pribilof Islands are the principal physical properties of the Bureau (Appendix F). In the calendar year 1958, there were 20 large laboratories and installations, 61 smaller stations and offices, and 35 vessels, 40 feet and over long. Two of the statistical field offices were acquired during the year at Northville, Mich., and Milan, Tenn., and two field research stations, at Karluk Lake, Alaska, and Maui, Hawaiian Islands.

## Publications

Emphasis on publishing was continued during 1958. By means of printed reports the results of the Bureau's many investigations and activities were distributed to the public, both scientific and general.

In addition to the daily Fishery Products Reports issued by seven Market News Service offices (5,956 pages), the Bureau sponsored 638 publications, which had a total of 10,159 pages. Published in the Fish and Wildlife Service series were 462 reports. Scientific and trade journals issued 178 reports authored by Bureau personnel. The number of publications in 1958 was about equal to the 1957 production.

The publications were prepared for several groups of readers. About 50 percent of the papers are statistical summaries of interest to industry and scientific readers; 24 percent are for industrial and commercial audiences; 23 percent are scientific contributions; and 3 percent present popular information for the general public.

A 16-mm., sound, color picture and a recording were produced in 1958.

A description and a partial list of the Bureau's publications in 1958 are presented in Appendix G.

# Appendix A—Fisheries of the United States and Alaska

## A–1.—*Employment, fishing craft, and establishments, calendar years 1958 and 1957*

| Item | 1958 | 1957 |
|---|---|---|
| Persons employed: | | |
| Direct: | *Number* | *Number* |
| Fishermen | 128,960 | 133,171 |
| Transporters | 2,022 | 3,024 |
| Shore workers | 97,604 | 96,585 |
| Indirect: | | |
| Allied industries (gear, manufacture, boat building, processing equipment, etc.). | 310,000 | 300,000 |
| Total | 538,586 | 537,780 |
| Craft utilized: | | |
| Fishing: | | |
| Vessels (5 net tons and over) | 11,496 | 11,671 |
| Motor boats | 54,821 | 56,434 |
| Other boats | 8,974 | 9,865 |
| Transporting: | | |
| Vessels (5 net tons and over) | 479 | 1,045 |
| Motor boats | 347 | 412 |
| Total | 76,117 | 79,427 |
| Vessels documented for fishing for the first time during the year | 684 | 601 |
| Fishery shore establishments: | | |
| Alaska | 157 | 169 |
| Pacific Coast States | 384 | 396 |
| Atlantic Coast and Gulf States | 2,970 | 3,018 |
| Great Lakes and Mississippi River States | 885 | 739 |
| Total | 4,402 | 4,322 |

## A–2.—*Catch, 1958, 1957, and record year*

| Species | 1958 | | 1957 | | Record catch | |
|---|---|---|---|---|---|---|
| | *Million pounds* | *Million dollars* | *Million pounds* | *Million dollars* | *Year* | *Million pounds* |
| Menhaden | 1,549 | 22 | 1,690 | 22 | 1956 | 2,097 |
| Tuna | 319 | 43 | 297 | 38 | 1950 | 391 |
| Salmon | 307 | 40 | 265 | 40 | 1936 | 791 |
| Herring, sea: | | | | | | |
| Atlantic | 179 | 3 | 162 | 2 | 1902 | 201 |
| Pacific | 100 | 1 | 121 | 2 | 1937 | 263 |
| Industrial fish [1] | 229 | 3 | 241 | 2 | 1957 | 241 |
| Shrimp | 214 | 73 | 204 | 73 | 1954 | 268 |
| Sardines, Pacific | 207 | 5 | 46 | 2 | 1936 | 1,502 |
| Crabs | 166 | 12 | 171 | 12 | 1957 | 171 |
| Ocean perch (Atlantic) | 149 | 6 | 134 | 5 | 1951 | 258 |
| Flounders | 125 | 12 | 117 | 12 | 1948 | 139 |
| Haddock | 120 | 12 | 134 | 10 | 1929 | 294 |
| Whiting | 111 | 3 | 133 | 2 | 1957 | 133 |
| Alewives | 76 | 1 | 58 | 1 | 1908 | 90 |
| Oysters | 66 | 30 | 72 | 29 | [2] 1908 | 152 |
| Cod | 64 | 4 | 46 | 3 | 1880 | 308 |
| Halibut | 48 | 8 | 50 | 7 | 1915 | 67 |
| Mullet | 43 | 3 | 40 | 2 | 1902 | 43 |
| Clams | 36 | 11 | 40 | 11 | 1951 | 43 |
| Mackerel, Pacific | 28 | 1 | 62 | 1 | 1935 | 140 |
| Jack mackerel | 22 | 1 | 82 | 2 | 1952 | 147 |
| Anchovies | 12 | [3] | 41 | 1 | 1953 | 86 |
| Other | 570 | 71 | 572 | 72 | ---------- | ---------- |
| Total | 4,730 | 371 | 4,778 | 351 | ---------- | ---------- |

[1] Unclassified species used for bait, reduction, and mink food.
[2] First year in which an oyster survey was made for all regions.
[3] Less than one-half million dollars.

A-3.—*Summary of manufactured fishery products by quantity and value, calendar years 1958 and 1957*

| Item | 1958 | | 1957 | |
|---|---|---|---|---|
| | Quantity | Value | Quantity | Value |
| | *Thousand pounds* | *Thousand dollars* | *Thousand pounds* | *Thousand dollars* |
| Packaged products, fresh and frozen: | | | | |
| Fish: | | | | |
| Not breaded: | | | | |
| Fillets and steaks, raw | 155,885 | 51,230 | 154,469 | 46,763 |
| Other (includes whale meat for animal feeding). | 4,556 | 666 | 2,123 | 293 |
| Breaded, raw and cooked: | | | | |
| Sticks | 61,011 | 27,000 | 53,128 | 23,544 |
| Fillets, portions, and pandressed | 28,960 | 11,063 | 21,408 | 8,770 |
| Shellfish: | | | | |
| Not breaded | 163,809 | 124,046 | 172,133 | 127,899 |
| Breaded | 71,973 | 52,541 | 59,643 | 44,740 |
| Fish and shellfish specialties | 26,393 | 17,980 | 17,400 | 14,409 |
| Total fresh and frozen | 512,587 | 284,526 | 480,304 | 266,418 |
| Canned: | | | | |
| Fish and shellfish for human consumption: | | | | |
| Tuna | 277,131 | 161,793 | 232,456 | 135,813 |
| Salmon | 179,134 | 92,822 | 153,917 | 86,149 |
| Sardines: | | | | |
| Maine (sea herring) | 49,139 | 15,874 | 45,019 | 14,733 |
| Pacific | 100,016 | 16,497 | 22,399 | 4,721 |
| Mackerel | 18,199 | 2,657 | 59,096 | 7,404 |
| Clam products and specialties | 48,444 | 13,021 | 49,304 | 13,526 |
| Shrimp and specialties | 14,554 | 20,885 | 9,514 | 13,295 |
| Oysters and specialties | 12,056 | 7,247 | 14,134 | 9,000 |
| Squid | 5,043 | 414 | 12,533 | 922 |
| Other | 34,453 | 14,406 | 45,056 | 15,187 |
| Total for human consumption | 738,169 | 345,616 | 644,028 | 300,750 |
| Bait and animal food: | | | | |
| Animal food | 360,156 | 41,959 | 346,723 | 34,153 |
| Salmon eggs for bait | 927 | 1,007 | 914 | 926 |
| Total bait and animal food | 361,083 | 42,966 | 347,637 | 35,079 |
| Total canned | 1,099,252 | 388,582 | 991,665 | 335,829 |
| Cured fish and shellfish: | | | | |
| Salted | 40,224 | 15,374 | 35,873 | 12,015 |
| Smoked | 34,563 | 25,764 | 35,289 | 25,274 |
| Dried shrimp and cod (lutefisk) | 474 | 519 | 3,029 | 1,118 |
| Total cured | 75,261 | 41,657 | 74,191 | 38,407 |
| Industrial products: | | | | |
| Meal and scrap | 496,280 | 31,759 | 528,170 | 32,592 |
| Oil, body and liver | 165,210 | 12,333 | 152,615 | 12,619 |
| Fish solubles and homogenized-condensed fish | 260,354 | 11,519 | 244,546 | 10,218 |
| Oyster-shell lime and poultry grit | 862,342 | 4,719 | 957,136 | 5,201 |
| Mussel-shell lime and poultry grit | 21,350 | 65 | 5,102 | 20 |
| Marine pearl-shell and mussel-shell buttons | [1] 4,144 | 6,577 | [1] 6,060 | 9,068 |
| Other | | 12,911 | | 11,663 |
| Total industrial products | | 79,883 | | 81,381 |
| Grand total | | 794,648 | | 722,035 |

[1] Number of gross of manufactured buttons.

A–4.—*Foreign trade in fishery products by quantity and value, calendar years 1958 and 1957*

| Item | 1958 | | 1957 | |
|---|---|---|---|---|
| | Quantity | Value | Quantity | Value |
| Imports: | *Thousand pounds* | *Thousand dollars* | *Thousand pounds* | *Thousand dollars* |
| Edible: | | | | |
| Fresh or frozen: | | | | |
| Fresh-water (not fillets) | 42,074 | 13,684 | 38,320 | 11,134 |
| Salt-water (not fillets) | 318,743 | 48,930 | 261,594 | 35,022 |
| Groundfish and ocean perch fillets | 146,589 | 30,431 | 140,678 | 27,417 |
| Other fillets | 62,688 | 22,000 | 63,300 | 21,725 |
| Shrimp | 85,394 | 43,162 | 69,676 | 35,415 |
| Lobsters: | | | | |
| Common | 21,413 | 13,474 | 22,218 | 13,073 |
| Spiny | 25,938 | 22,187 | 28,236 | 23,754 |
| Other shellfish | 11,865 | 3,986 | 13,916 | 4,428 |
| Canned: | | | | |
| Salmon | 29,226 | 11,271 | 24,401 | 9,470 |
| Sardines | 28,156 | 8,564 | 24,697 | 8,957 |
| Tuna | 46,204 | 16,882 | 44,386 | 17,002 |
| Crabmeat | 5,854 | 6,116 | 6,185 | 6,254 |
| Other | 55,076 | 19,513 | 47,702 | 19,662 |
| Cured, dried, pickled, or salted | 82,749 | 13,248 | 79,783 | 12,508 |
| Smoked or kippered | 4,991 | 1,090 | 4,867 | 1,106 |
| Other | 24,519 | 5,674 | 14,065 | 4,029 |
| Total edible | 991,479 | 280,212 | 884,024 | 250,956 |
| Nonedible: | | | | |
| Fish and marine animal oils | [1] 10,980 | 9,149 | [1] 7,946 | 9,598 |
| Fish meal and scrap | [2] 100 | 11,335 | [2] 81 | 9,717 |
| Other | | 26,475 | | 27,172 |
| Total nonedible | | 46,959 | | 46,487 |
| Grand total, imports | | 327,171 | | 297,443 |
| Exports: | | | | |
| Edible: | | | | |
| Fresh or frozen | 24,230 | 4,119 | 15,539 | 3,001 |
| Canned: | | | | |
| Mackerel | 2,308 | 333 | 17,044 | 2,146 |
| Salmon | 9,227 | 6,669 | 6,688 | 4,740 |
| Sardines | 18,461 | 3,395 | 15,301 | 2,779 |
| Other | 9,875 | 4,133 | 29,283 | 6,381 |
| Total canned | 39,871 | 14,530 | 68,316 | 16,046 |
| Cured | 893 | 565 | 698 | 373 |
| Other | 474 | 226 | 668 | 229 |
| Total edible | 65,468 | 19,440 | 85,221 | 20,549 |
| Nonedible: | | | | |
| Fish and marine animal oil | 95,318 | 7,896 | 117,301 | 10,993 |
| Other | | 3,668 | | 4,410 |
| Total nonedible | | 11,564 | | 15,403 |
| Grand total, exports | | 31,004 | | 35,952 |

[1] In thousand gallons.
[2] In thousand tons.

## Appendix B—New Legislation

### Fishery Research for Commercial Production of Fish on Flooded Rice Areas

16 U.S.C. 778–778c

Authorizes research and experimentation to develop methods for the commercial production of fish on flooded rice acreage in rotation with rice field crops.

72 Stat. 35; Public Law 85–342; Act of March 15, 1958.

### Alaska Statehood Act

48 U.S.C. Prec. Sec. 21 Note

Provides for the admission of the State of Alaska into the Union. The effect of this law will be to transfer to the new State many functions heretofore carried on by the Federal Government including the management and control of the fishery resources of the State. An exception to this transfer is jurisdiction over the management and harvest of the fur seal herd of the Pribilof Islands which by a specific provision of the law is retained by the Federal Government. The law provides, however, that 70 percent of the net proceeds from such harvest shall be paid to the State.

72 Stat. 339; Public Law 85–508; Act of July 7, 1958.

### Study of Effects of Insecticides on Fish and Wildlife

16 U.S.C. 742d–1

Authorizes comprehensive continuing studies on the effects of insecticides, herbicides, fungicides, and pesticides upon the fish and wildlife resources of the United States to determine the amounts, percentages, and formulas of these chemicals that are lethal to or injurious to fish and wildlife and thereby prevent losses of fish and wildlife from their use.

72 Stat. 479; Public Law 85–582; Act of August 1, 1958.

### Fish and Wildlife Coordination Act

16 U.S.C. 661–666c

An amendment to the Act of March 10, 1934, as amended, making broad changes to provide for a mandatory review by the Fish and Wildlife Service of all Federal or Federally licensed private power, navigation, irrigation, and drainage projects to insure the safeguarding of the fish and wildlife resources of the United States.

72 Stat. 563; Public Law 85–624; Act of August 12, 1958.

### Investigation and Eradication of Dogfish Sharks

16 U.S.C. 758a Note

Authorizes for no more than four years, investigations of the abundance and distribution of dogfish sharks, experiments to develop control measures, and a program for the elimination and eradication or development of economic uses of dogfish shark populations.

72 Stat. 1710; Public Law 85–887; Act of September 2, 1958.

### Increase in Authorization for Fisheries Loan Fund

16 U.S.C. 742c (c)

Amends the Fish and Wildlife Act of 1956 (70 Stat. 1119) by increasing from $10 million to $20 million the fisheries loan fund which can be used as a revolving fund by the Secretary of the Interior to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

72 Stat. 1710; Public Law 85-888; Act of September 2, 1958.

**Research Grants to Institutions of Higher Education and Scientific Research Organizations**

42 U.S.C. 1891-1893

Authorizes basic scientific research grants to nonprofit institutions of higher education or to nonprofit organizations whose primary purpose is to conduct scientific research, when such grants are deemed to be in furtherance of agency objectives; provides for discretionary authority to vest in such institutions or organizations, title to equipment purchased with grant or contract funds, if in furtherance of agency objectives; and requires an annual report on such grants to the appropriate committees of both Houses of Congress.

72 Stat. 1793; Public Law 85-934; Act of September 6, 1958.

**Bureau of the Budget Determination of March 22, 1958, With Respect to Certain Matters Pursuant to the Fish and Wildlife Act of 1956**

23 Federal Register 2304

The Fish and Wildlife Act of 1956 in Section 6a (16 U.S.C. 742e) provides for the transfer to the Secretary of the Interior of all functions of the Secretaries of Agriculture and Commerce, and the heads of other departments or agencies, which relate primarily to the development, advancement, management, conservation, and protection of commercial fisheries. The act provides that the determination of such transfers is to be made by the Director of the Bureau of the Budget. Pursuant to this requirement, the Director of the Bureau of the Budget determined, on March 22, 1958, that the following functions were to be transferred:

1. Distribution and disposal of surplus fishery products now performed by the Department of Agriculture under the authority of the Act of August 11, 1939 (15 U.S.C. 713c-2).

2. All functions of the Department of Agriculture pertaining to fish and shellfish performed under authority of Title II of the Agriculture Marketing Act of 1946, as amended (7 U.S.C. 1621-1627) including but not limited to development and promulgation of grade standards, inspection and certification, and improvement of transportation facilities and rates for fish and shellfish.

3. All functions of the Maritime Administration, Department of Commerce, pertaining to Federal ship mortgage insurance for fishing vessels under authority of Title XI of the Merchant Marine Act of 1936, as amended (46 U.S.C. 1271-1279).

4. All functions of the Maritime Administration, Department of Commerce pertaining to direct loans to aid construction of fishing vessels under authority of Title V of the Merchant Marine Act of 1936, as amended (46 U.S.C. 1151-1161o).

The effect of the Determination in extending the Authority of the Secretary of the Interior requires a restatement in three instances of such authority as listed in Appendix G of the 1957 Annual Report. These three restatements are as follows:

**Acquisition and Disposal of Surplus Fishery Products**

15 U.S.C. 713c-2
15 U.S.C. 713c-3
15 U.S.C. 713c-3 Note
7 U.S.C. 612c
16 U.S.C. 742e
23 F.R. 2304

Authorizes the Secretary of the Interior to divert surplus fishery products from the normal channels of trade and commerce by acquiring them and providing for their distribution through Federal, State, and private relief channels. By a Memorandum of Understanding signed by the Acting Secretary of the Interior on May 22, 1958, and by the Acting Secretary of Agriculture on July 1, 1958, in order to avoid uneconomical and duplicate activity in fishery products procurement and distribution, it was agreed that the Department of the Interior will request the Department of Agriculture to handle procurement and disposition of surplus fishery products for which a program of surplus products disposal is determined to be necessary. Such determination is to be made by the Secretary of the Interior who will then transfer the necessary funds to the Secretary of Agriculture to carry out the program.

50 Stat. 27; Public Law 15, 75th Cong.; Act of March 5, 1937.
50 Stat. 61; Public Law 22, 75th Cong.; Joint Resolution of April 12, 1937.
52 Stat. 441; Public Law 542, 75th Cong.; Act of May 25, 1938.
53 Stat. 1411; Public Law 393, 76th Cong.; Act of August 11, 1939.
(49 Stat. 774; Public Law 320, 74th Cong.; Act of August 24, 1935).
68 Stat. 376; Public Law 466, 83rd Cong.; Act of July 1, 1954.
70 Stat. 1119; Public Law 1024, 84th Cong.; Act of August 8, 1956.

**Act of July 1, 1954, as Amended (Sometimes known as the Saltonstall-Kennedy, or S–K, Act of 1954)**

15 U.S.C. 713c–3
16 U.S.C. 742e
23 F.R. 2304

Directs the Secretary of Agriculture to transfer annually to the Secretary of the Interior, from funds made available under the terms of the Agricultural Adjustment Act of 1935, an amount equal to 30 percent of the gross receipts from customs duties collected on fishery products. Such funds are to be used by the Secretary of the Interior to promote the free flow of fishery products by conducting a fishery educational service and research program including the use of vessels or other facilities; to develop and increase markets for fishery products; and to conduct various types of research pertaining to American fisheries. The Secretary is also authorized to acquire and dispose of surplus fishery products.

68 Stat. 376; Public Law 466, 83rd Cong.; Act of July 1, 1954.
70 Stat. 1122, 1124; Public Law 1024, 84th Cong.; Act of August 8, 1956.

**Fish and Wildlife Act of 1956**

16 U.S.C. 742a–742d, 742e–742j
15 U.S.C. 713c–3(e)
15 U.S.C. 713c–3 Note
23 F.R. 2304

Establishes a comprehensive national policy on fish and wildlife resources; reorganizes the Fish and Wildlife Service; establishes a fisheries loan fund and authorizes the Secretary to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels and for research into the basic problems of fisheries; the administration of a program of fishing vessel mortgage insurance as provided for in Title XI of the Merchant Marine Act of 1936, as amended (46 U.S.C. 1271–1280); and under

provisions of Title V of the Merchant Marine Act of 1936, as amended (46 U.S.C. 1151–1161(o)), to make loans to aid in the construction of fishing vessels; creates in the Secretary of the Interior, or his designee, consultative and representative responsibilities in international relations involving fishery matters; authorizes a program of Fishery Educational Service and Market Development; authorizes the Acquisition and Disposal of Surplus Fishery Products; authorizes the Secretary to foster research, investigation and experimentation to determine the best methods for processing, packaging, transporting, distributing, and marketing fish and fishery products, including but not limited to the development and promulgation of grade standards and the inspection and certification of fish and fishery products; and improvement of transportation facilities and rates for fish and shellfish and any products thereof; authorizes the collection and dissemination of information of all kinds to the public, to the President, and to Congress, concerning the commercial fishing industry and its products; authorizes investigations and reports with respect to the competitive aspects of domestic and foreign produced fish and fishery products; authorizes programs and investigations that may be required for the development, advancement, management, conservation and protection of the fishery resources of the United States and the competitive economic position of the various fish and fishery products with respect to each other, and with respect to competitive domestic and foreign-produced commodities.

70 Stat. 1119; Public Law 1024, 84th Cong.; Act of August 8, 1956.
72 Stat. 1710; Public Law 85–888; Act of September 2, 1958.

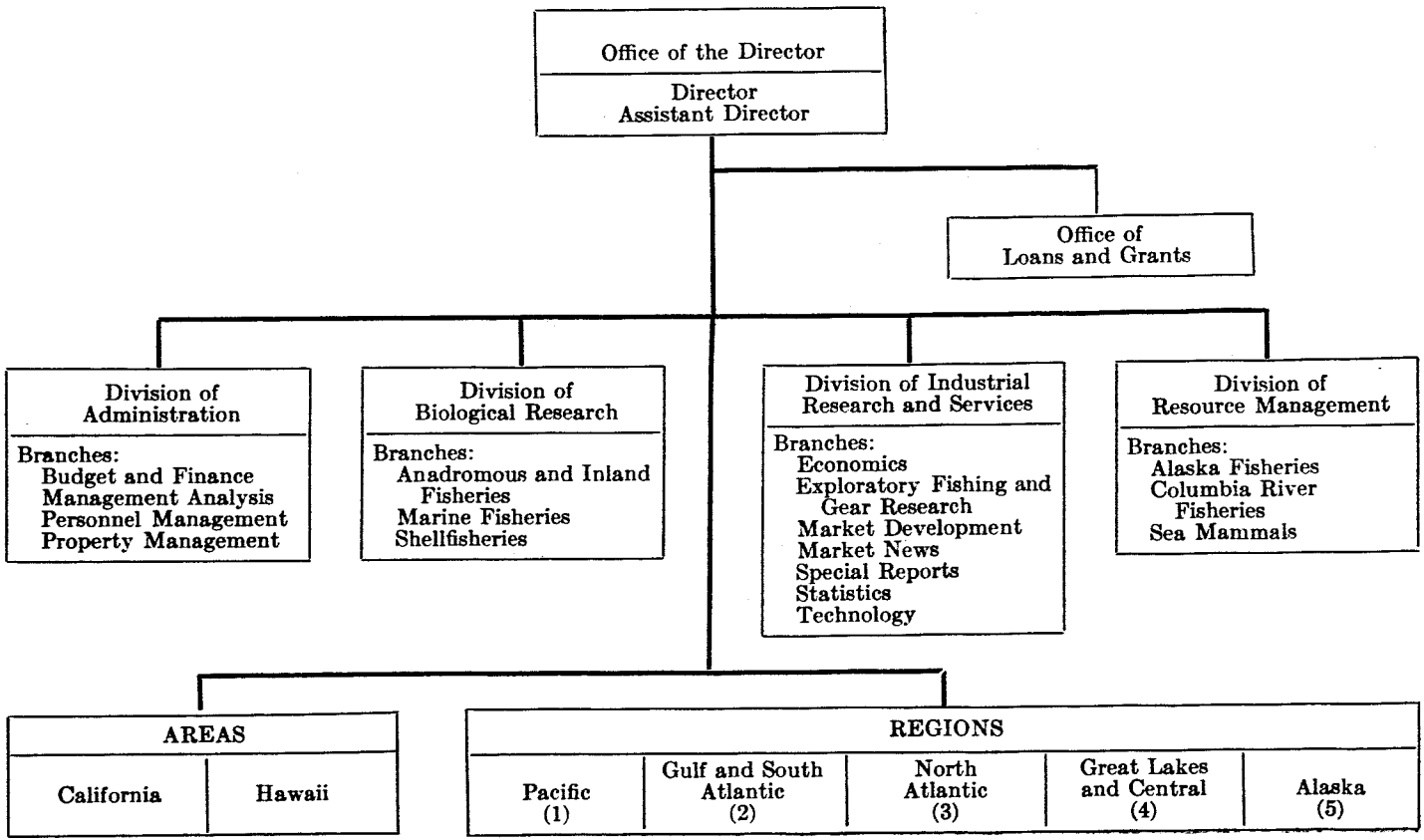
## Appendix C—Organizations With Which the Bureau Had Contracts in 1958

| *Organization* | *Location* |
|---|---|
| A. J. Wood and Company | Philadelphia, Pa. |
| Alaska Department of Fisheries | Juneau, Alaska |
| Alaska Fisheries Experimental Commission | Juneau, Alaska |
| Barkeley and Dexter Laboratories | Fitchburg, Mass. |
| Boston College (Bureau of Business Research) | Boston, Mass. |
| Buffalo, University of | Buffalo, N.Y. |
| California Academy of Sciences | San Francisco, Calif. |
| California, University of | Davis, Calif. |
| California, University of | Berkeley, Calif. |
| Cincinnati, University of | Cincinnati, Ohio |
| Crossley S–D Surveys, Inc | New York, N.Y. |
| Dairy Laboratories | Washington, D.C. |
| Delaware, University of | Newark, Del. |
| Eastern Traffic Bureau, Inc | New York, N.Y. |
| Ebasco Services, Inc | New York, N.Y. |
| Florida, University of | Gainesville, Fla. |
| Florida State University | Tallahassee, Fla. |
| Food, Chemical and Research Laboratories, Inc | Seattle, Wash. |
| Gulf Coast Research Laboratory | Ocean Springs, Miss. |
| Idaho Department of Fish and Game | Boise, Idaho |
| Lime Crest Research Laboratory | Newton, N.J. |
| Louisiana State University | Baton Rouge, La. |

## Appendix C—Organizations With Which the Bureau Had Contracts in 1958—Continued

| *Organization* | *Location* |
|---|---|
| Market Research Corporation of America | New York, N.Y. |
| Maryland, University of | College Park, Md. |
| Maryland State College | Princess Anne, Md. |
| Massachusetts Institute of Technology | Boston, Mass. |
| Massachusetts Division of Marine Fisheries | Boston, Mass. |
| Miami, University of (Marine Laboratory) | Coral Gables, Fla. |
| Michigan, University of | Ann Arbor, Mich. |
| Milner Productions | Baltimore, Md. |
| Minnesota, University of (Hormel Institute) | Austin, Minn. |
| MPO Productions | New York, N.Y. |
| National Fisheries Institute | Washington, D.C. |
| North Carolina State College | Raleigh, N.C. |
| North Carolina, University of | Chapel Hill, N.C. |
| Oklahoma, University of | Norman, Okla. |
| Oregon Fish Commission | Portland, Oreg. |
| Oregon State College | Corvallis, Oreg. |
| Oregon State Game Commission | Portland, Oreg. |
| Oyster Institute of North America | Annapolis, Md. |
| Philip R. Park Foundation | San Pedro, Calif. |
| PML Laboratories | Sarasota, Fla. |
| Rutgers University | Brunswick, N.J. |
| Sam Johnson and Sons, Inc | Duluth, Minn. |
| San Diego State College (Bureau of Business and Economic Research). | San Diego, Calif. |
| Scripps Institution of Oceanography | La Jolla, Calif. |
| Skinner and Sherman, Inc | Boston, Mass. |
| Southern California, University of | Los Angeles, Calif. |
| Strasburger and Siegel, Inc | Baltimore, Md. |
| Sun Dial Films | New York, N.Y. |
| Tradeways, Inc | New York, N.Y. |
| Truesdail Laboratories | Los Angeles, Calif. |
| Tulane University | New Orleans, La. |
| U.S. Bureau of Census | Washington, D.C. |
| U.S. Bureau of Labor Statistics | Washington, D.C. |
| Virginia Fisheries Laboratory | Gloucester Point, Va. |
| Washington, University of | Seattle, Wash. |
| Washington, University of (Fisheries Research Institute). | Seattle, Wash. |
| Washington State College | Pullman, Wash. |
| Washington State Department of Fisheries | Seattle, Wash. |
| Washington State Department of Game | Seattle, Wash. |
| Wisconsin, University of | Madison, Wis. |
| Wisconsin Alumni Research Foundation | Madison, Wis. |
| Woods Hole Oceanographic Institute | Woods Hole, Mass. |

## Appendix D—Organization Chart



# Appendix E—Budget for Fiscal Year 1958

| Function | Appropriations | | | | | Transferred funds | | | Advances and contributed funds [2] | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Management and investigations of resources | Construction | General administrative expenses | Administration of Pribilof Islands | Promote and develop fisheries [1] | Corps of Engineers: Operation and maintenance | Corps of Engineers: Construction | State Dept., Passamaquoddy studies | | |
| Management | $115,100 | | | | | | | | | $115,100 |
| Marketing and technology | 1,197,000 | | | | $2,605,820 | | | | $66,750 | 3,869,570 |
| Research | 2,963,000 | | | | 2,693,250 | | | $50,000 | 803,475 | 6,509,725 |
| Research on fish migration over dams | 253,000 | | | | | | | | | 253,000 |
| Administration of Alaska fisheries | 1,662,588 | | | | | | | | | 1,662,588 |
| Construction and land acquisition | | $700,000 | | | | | | | | 700,000 |
| General administrative services | 36,600 | | [3] $334,247 | | 270,000 | $43,800 | $44,600 | | 30,000 | 759,247 |
| Administration of Pribilof Islands | | | | $1,611,900 | | | | | | 1,611,000 |
| Fur seal research | | | | 205,500 | | | | | | 205,500 |
| Fisheries Advisory Committee | | | | | 15,000 | | | | | 15,000 |
| Lower Columbia River: | | | | | | | | | | |
| Operation and maintenance | | | | | | 1,271,200 | | | | 1,271,200 |
| Construction | | | | | | | 1,555,400 | | | 1,555,400 |
| Total | 6,227,288 | 700,000 | [3] 334,247 | 1,816,500 | 5,584,070 | 1,315,000 | 1,600,000 | 50,000 | 900,225 | 18,527,330 |

[1] Funds made available under Public Law 466, 83d Cong. (known as the Saltonstall-Kennedy Act of 1954).

[2] Includes $776,450 from the Great Lakes Fishery Commission, $57,055 from Central Intelligence Agency, and many minor amounts from other sources.

[3] Includes $212,990 available to the Bureau of Commercial Fisheries from the appropriation for salaries and expenses, Office of the Commissioner.

# Appendix F—Physical Properties

## F–1.—*Principal laboratories and installations, calendar year 1958*

| Location | Type | Principal use | Gross valuation [1] |
|---|---|---|---|
| California: | | | |
| La Jolla | Laboratory | Biological research | [2] |
| Stanford | do | do | [2] |
| Connecticut, Milford | do | do | $80,000 |
| Florida, Gulf Breeze | do | do | 75,000 |
| Georgia, Brunswick | do | do | [3] |
| Maine, Boothbay Harbor | do | Biological research, exploratory fishing and gear research. | [2] 110,000 |
| Maryland: | | | |
| College Park | do | Technology, home economics | 81,000 |
| Annapolis | do | Biological research | [3] |
| Massachusetts: | | | |
| East Boston | do | Technology, exploratory fishing and gear research, loans and grants. | [2] |
| Woods Hole | do | Biological research | 364,000 |
| Michigan, Ann Arbor | do | do | [3] |
| Mississippi, Pascagoula | Exploratory Fishing Station | Exploratory fishing and gear research, loans and grants, market development. | 40,000 |
| North Carolina, Beaufort | Laboratory | Biological research, statistics | 150,000 |
| Texas, Galveston | do | Biological research | [3] |
| Washington, Seattle | Laboratory, dock, and warehouse. | Biological research, technology, exploratory fishing and gear research, Pribilof Islands supply. | [2] 122,000 |
| Alaska: | | | |
| Juneau | Laboratory, warehouse, and shops. | Vessel maintenance and biological research, loans and grants. | [2] 212,000 |
| Ketchikan | Laboratory | Technology | 175,000 |
| Pribilof Islands | Fur seal processing facilities and native villages. | Management of Alaska fur seals. | 2,327,000 |
| Puerto Rico, Mayaquez | Laboratory | On loan to University of Puerto Rico. | 27,000 |
| Hawaii, Honolulu | do | Biological research, loans and grants. | 314,000 |

[1] Figures shown are original acquisition or construction costs.
[2] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.
[3] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.

## F–2.—*Minor field research stations, market news offices, exploratory fishing stations, market development offices, and statistical offices, calendar year 1958*

| Location | Type | Principal use | Gross valuation [1] |
|---|---|---|---|
| Alabama, Bayou LaBatre | Statistical Field Office | Statistics | [2] |
| California: | | | |
| Mill Creek | Field Research Station | Biological research | $29,000 |
| San Pedro | Market News Office | Market news reporting, statistics, loans and grants. | [2] |
| Terminal Island | Market Development Office | Market development | [2] |
| Delaware, Millville | Field Research Station | Biological research | [2] |
| Florida: | | | |
| Apalachicola | Statistical Field Office | Statistics | [2] |
| Coral Gables | do | do | [2] |
| Fort Meyers | do | do | [2] |
| Jacksonville | Market Development Office | Market development | [2] |
| Key West | Statistical Field Office | Statistics | [2] |
| Miami | Exploratory Fishing Station | Exploratory fishing and gear research. | [2] |
| St. Petersburg | Field Research Station | Biological research | [2] |
| Tampa | Statistical Field Office | Statistics | [2] |
| Georgia, Brunswick | do | do | [2] |
| Illinois: | | | |
| Chicago | Market News Office | Market news reporting | [2] |
| Springfield | Market Development Office | Market development | [2] |

**See footnotes at end of table.**

F–2.—*Minor field research stations, market news offices, exploratory fishing stations, market development offices, and statistical offices, calendar year 1958*—Continued

| Location | Type | Principal use | Gross valuation [1] |
|---|---|---|---|
| Louisiana: | | | |
| Empire | Statistical Field Office | Statistics | (2) |
| Galliano | do | do | (2) |
| Houma | do | do | (2) |
| New Orleans | Market News Office | Market news reporting, statistics. | (2) |
| Maine: | | | |
| West Boothbay Harbor | Statistical Field Office | Statistics | (2) |
| Eastport | Field Research Station | Biological research | (2) |
| Portland | Field Office | Statistics, biological research | (2) |
| Rockland | do | do | (2) |
| Maryland, Annapolis | Statistical Field Office | Statistics | (2) |
| Massachusetts: | | | |
| Boston | Market News Office | Market news reporting, statistics, biological research. | (2) |
| Gloucester | Market Development Office | Market development | (2) |
| | Field Office | Market news reporting, statistics, biological research. | (2) |
| New Bedford | do | do | (2) |
| Provincetown | Statistical Field Office | Statistics, market news reporting. | (2) |
| Michigan: | | | |
| Ludington | Field Research Station | Biological research | (2) |
| Northville | Statistical Field Office | Statistics | (2) |
| Rogers City | Field Research Station | Biological research | (2) |
| Mississippi: | | | |
| Ocean Springs | Statistical Field Office | Statistics | (2) |
| Vicksburg | do | do | (2) |
| New Jersey, Toms River | do | do | (2) |
| New York: | | | |
| Bayport | do | do | (2) |
| New York City | Market News Office | Market news reporting | (2) |
| | Market Development Office | Market development | (2) |
| Ohio: | | | |
| Sandusky | Field Research Station | Biological research, exploratory fishing and gear research. | (2) |
| Sheffield Lake | Market Development Office | Market development | (2) |
| Oregon, Astoria | Statistical Field Office | Statistics | (2) |
| Rhode Island: | | | |
| Kingston | Field Research Station | Biological research | (2) |
| Point Judith | do | do | (2) |
| Providence | Statistical Field Office | Statistics | (2) |
| South Carolina, Charleston | do | do | (2) |
| Tennessee, Milan | do | do | (2) |
| Texas: | | | |
| Aransas Pass | do | do | (2) |
| Brownsville | do | do | (2) |
| Fort Worth | Market Development Office | Market development | (2) |
| Freeport | Statistical Field Office | Statistics | (2) |
| Galveston | do | do | (2) |
| Virginia: | | | |
| Franklin City | Field Reasearch Station | Biological research | (2) |
| Hampton | Market News Office | Market news reporting | (2) |
| Weems | Statistical Field Office | Statistics | (2) |
| Washington: | | | |
| North Bonneville | Field Research Station | Biological research | (2) |
| Seattle | Market News Office | Market news reporting, statistics, loans and grants. | (2) |
| | Market Development Office | Market development | (2) |
| Wisconsin: | | | |
| Aconto | Field Research Station | Biological research | (2) |
| Ashland | do | do | (2) |
| Alaska: | | | |
| Brooks Lake | do | do | 21,000 |
| Karluk Lake | do | do | (3) |
| Little Port Walter | do | do | 18,000 |
| Hawaii, Maui | do | do | (2) |

[1] Figures shown are original acquisition or construction costs.
[2] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.
[3] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.

*F-3.—Bureau of commercial fisheries vessel fleet, calendar year 1958*

| Name of vessel | Home port | Length (feet) | Year built | Cost | Horse-power | Primary activity |
|---|---|---|---|---|---|---|
| Albatross III | Woods Hole, Mass | 163 | 1926 | (1) | 805 | Biological research. |
| Black Douglas | La Jolla, Calif | 152 | 1926 | $75,000 | 325 | Do. |
| Dennis Winn | Juneau, Alaska | 148 | 1944 | 533,532 | 875 | Management and biological research. |
| Penguin II | Seattle, Wash | 148 | 1950 | 533,532 | 875 | Pribilof Islands supply. |
| Delaware | East Boston, Mass | 147 | 1937 | 302,473 | 735 | Exploratory fishing and gear research. |
| Hugh M. Smith | Honolulu, Hawaii | 128 | 1945 | 150,000 | 500 | Biological research. |
| Brown Bear | Juneau, Alaska | 115 | 1934 | 130,000 | 400 | On loan to Navy. |
| Charles H. Gilbert | Honolulu, Hawaii | 112 | 1952 | [2] 409,800 | 640 | Biological research. |
| Alaska | Brunswick, Ga | 100 | 1947 | 300,000 | 600 | On loan to University of California Scripps Institution. |
| Oregon | Pascagoula, Miss | 100 | 1947 | 300,000 | 600 | Exploratory fishing and gear research. |
| John N. Cobb | Seattle, Wash | 93 | 1950 | 235,392 | 500 | Do. |
| Crane | do | 90 | 1928 | 60,000 | 200 | Management. |
| John R. Manning | Juneau, Alaska | 86 | 1950 | 181,600 | 320 | Biological research. |
| Murre II | do | 86 | 1943 | 64,000 | 115 | Do. |
| Pelican | do | 75 | 1930 | 50,200 | 200 | On loan to State of Washington. |
| George M. Bowers | Pascagoula, Miss | 73 | 1956 | 93,800 | 200 | Biological research. |
| Teal | Juneau, Alaska | 73 | (3) | 40,000 | 175 | Management. |
| Kittiwake II | do | 72 | 1944 | 120,000 | 240 | Management and biological research. |
| Cisco | Bay City, Mich | 60 | 1950 | 85,000 | 175 | Biological research. |
| Heron | Juneau, Alaska | 58 | 1940 | 19,000 | 135 | Do. |
| Auklet II | Seldovia, Alaska | 57 | 1951 | 60,000 | 200 | Management and biological research. |
| Musky | Sandusky, Ohio | 53 | 1931 | 3,666 | 170 | Biological research. |
| Mackinaw | Juneau, Alaska | 52 | 1927 | 40,000 | 150 | Management. |
| Siscowet | Ashland, Wis | 52 | 1946 | [2] 81,000 | 170 | Biological research. |
| Shang Wheeler | Milford, Conn | 50 | 1951 | 45,840 | 140 | Do. |
| Alosa | Annapolis, Md | 48 | 1941 | 6,500 | 82 | Biological fishery research. |
| Shad | Juneau, Alaska | 44 | 1957 | 23,000 | 110 | Management and biological research. |
| Kingfish | St. Petersburg Beach, Fla. | 43 | 1954 | 24,500 | 150 | Biological research. |
| Skipjack | Cordova, Alaska | 42 | 1943 | 14,600 | 175 | Management and biological research. |
| Albacore | do | 40 | 1938 | 6,000 | 122 | Biological research. |
| Capelin | Ketchikan, Alaska | 40 | 1939 | 9,695 | 145 | Management. |
| J-1110 | Beaufort, N.C. | 40 | 1934 | 15,000 | 200 | Biological research. |
| King | King Salmon, Alaska | 40 | 1946 | 16,168 | 175 | Management and biological research. |
| Phalarope II | Boothbay Harbor, Maine. | 40 | 1932 | 8,000 | 225 | Biological research. |
| Sockeye | King Salmon, Alaska | 40 | 1946 | 16,168 | 175 | Do. |

[1] Cost of conversion is unknown.
[2] The amount includes cost of alterations.
[3] Year of construction was prior to 1927.

## Appendix G—Fish and Wildlife Service Series and a 1958 List of Publications by Bureau Personnel

The Bureau of Commercial Fisheries' publications appear principally in the following regular, established series of the U.S. Fish and Wildlife Service.

*Fishery Bulletin.*—Technical reports dealing with basic scientific investigations of the marine and fresh-water fisheries. Fishery Bulletins 126, 128–136, 138–139, and 141–144 (484 p.) of volume 58 were published in 1958. The publications are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. Some are distributed free to a limited list of libraries and cooperators.

*Special Scientific Report—Fisheries.*—Results of scientific investigations, usually of restricted scope, intended to aid the fishing industry in its management and use of fishery products. In 1958 there were published 34 (2,604 p.) of these reports, No. 288 being the last. These have a limited free distribution to libraries and cooperators.

*Fishery Leaflet.*—Popular fishery articles intended primarily for answering correspondence. Twenty-three leaflets (661 p.) were issued in 1958. They are distributed free on request.

*Circular.*—Popular and semitechnical publications of general and regional interest on a variety of subjects relating to conservation and management of fish. One circular (22 p.) was published in 1958. They are distributed free to depository libraries and cooperators.

*Commercial Fisheries Abstracts.*—A monthly abstract of world fisheries literature, principally technological. Volume 11 in 1958 had 310 pages. They have free but limited distribution.

*Commercial Fisheries Review.*—A monthly review of developments and news of the domestic and foreign fishery industries. Volume 20 in 1958 had 1,373 pages. They have free but limited distribution.

*Statistical Digest.*—Annual statistical material for reference, chiefly tabular, sometimes with explanatory text, relating to the fish and wildlife resources. One (476 p.) was published in 1958. They are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. There is a limited number of free copies sent to libraries and cooperators.

*Current Fishery Statistics.*—Current information on fisheries of various regions, showing data on men employed, gear used, volume and value of catch, production of fishery products, freezing, and cold storage. This statistical information is distributed free. In 1958 there were 187 monthly landing reports (617 p.) for 15 States; 29 monthly reports of manufactured products (136 p.); and 33 annual reports of sectional and State operating units, on catch statistics, on manufactured products, and on foreign trade (278 p.).

*Fishery Products Report.*—Daily (5 times a week), monthly, and annual market news on landings, supplies, prices, and movements of fish and fish products in local areas. Also special supplementary reports are made when needed. Seven Market News Service field offices prepare and mail these free reports. During 1958 the daily reports totaled 5,956 pages; monthly, 990 pages; annual, 275 pages; and supplementary, 17 pages.

The Bureau produced several audiovisual items during the year. A 16-mm., 14-minute, sound and color motion picture, *Fish Cookery with Savoir*, was completed and made available for distribution. Also completed was a radio disc with a printed script for public service use. The recording, which advertises the nutritive value of fish and shellfish, has 14 messages ranging from 1 minute to 10 seconds.

A list of publications of the Bureau of Commercial Fisheries and its personnel in 1958 follows. It includes those articles published both in the Fish and Wildlife Service series and those through outside media. The articles are listed by author.

## Publications[1]

AHLSTROM, ELBERT H.

Research being done by the California Cooperative Oceanic Fisheries Investigations on oceanographic activities in the Pacific. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 47–48.

Sardine eggs and larvae and other fish larvae, Pacific coast, 1956. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 251, vi+84 p.

AHLSTROM, ELBERT H., and ROBERT C. COUNTS.

Development and distribution of *Vinciguerria lucetia* and related species in the eastern Pacific. U.S. Fish and Wildlife Service, Fishery Bulletin 139, vol. 58, iv + p. 363–416.

AHLSTROM, ELBERT H., JOHN D. ISAACS, JAMES R. THRAILKILL, and LEWIS W. KIDD.

High-speed plankton sampler. U.S. Fish and Wildlife Service, Fishery Bulletin 132, vol. 58, iii + p. 187–214.

ALBANO, G. A.

Receipts and prices of fresh and frozen fishery products at Chicago, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Chicago Market News Office, xxi+39 p.

ALEXANDER, DEVORA R.

United States government assistance to the fisheries of foreign countries. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Report to the Advisory Committee on Fish and Wildlife, Item 11, i+19 p.

ALLEN, DONALD M., and ANTHONY INGLIS.

A pushnet for quantitative sampling of shrimp in shallow estuaries. Limnology and Oceanography, vol. 3, no. 2, p. 239–241.

ALLEN, GEORGE H., and WILLIAM ARON.

Food of salmonid fishes of the western North Pacific Ocean. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 237, iii+11 p.

ANDERSON, ANDREW W.

Fisheries industry. *In* The Americana Annual 1958, p. 272–273. Americana Corporation, New York, N.Y.

ANDERSON, WILLIAM W.

Larval development, growth, and spawning of striped mullet (*Mugil cephalus*) along the South Atlantic coast of the United States. U.S. Fish and Wildlife Service, Fishery Bulletin 144, vol. 58, iv + p. 501–519.

Recognizing important shrimp of the South. U.S. Fish and Wildlife Service, Fishery Leaflet 366 [Revised], 7 p.

The shrimp and the shrimp industry of the southern United States. U.S. Fish and Wildlife Service, Fishery Leaflet 472, 9 p.

ANDERSON, WILLIAM W., and JACK W. GEHRINGER.

Physical oceanographic, biological, and chemical data—South Atlantic coast of the United States, M/V *Theodore N. Gill* cruise 5. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 248, iii+220 p.

[1] This list does not include Commercial Fisheries Abstracts, Current Fishery Statistics, and Commercial Fisheries Review except a few articles for which the authors' names are given.

Physical oceanographic, biological, and chemical data—South Atlantic coast of the United States, M/V *Theodore N. Gill* cruise 6. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 265, iii+99 p.

ANDERSON, WILLIAM W., and MILTON J. LINDNER.

Length-weight relation in the common or white shrimp, *Penaeus setiferus*. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 256, i + 13 p.

APPLEGATE, VERNON C., JOHN H. HOWELL, and MANNING A. SMITH.

Use of mononitrophenols containing halogens as selective sea lamprey larvicides. Science, vol. 127, no. 3294, p. 336–338.

ARNOLD, EDGAR L., Jr.

Gulf of Mexico plankton investigations, 1951–53. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 269, v+53 p.

ARNOLD, EDGAR L., Jr., and JOHN R. THOMPSON.

Offshore spawning of the striped mullet, *Mugil cephalus*, in the Gulf of Mexico. Copeia, 1958, no. 2, p. 130–132.

AUSTIN, THOMAS S.

Seasonal variations in the oceanographic and the marine biological features in the waters of French Oceania (Marquesas). [Abstract.] Proceedings of the Hawaiian Academy of Science, Thirty-third Annual Meeting, 1957–1958, p. 20–21.

Variations with depth of oceanographic properties along the Equator in the Pacific. Transactions of the American Geophysical Union, vol. 39, no. 6, p. 1055–1063.

AUSTIN, THOMAS S., and MURICE O. RINKEL.

Variations in upwelling in the equatorial Pacific. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 67–71.

BATES, DANIEL W., and RUSSELL VINSONHALER.

Use of louvers for guiding fish. Transactions of the American Fisheries Society, vol. 86, for the year 1956, p. 38–57.

BEETON, ALFRED M.

Relationship between Secchi disc readings and light penetration in Lake Huron. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 73–79.

BENARDE, MELVIN A.

Breading contributes to the microbial populations of frozen breaded fishery products. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 3, p. 6–10. [Also as Separate No. 505.]

BENDER, MAURICE, DAVID T. MIYAUCHI, and JOSEPH H. CARVER.

Progress report on radiation pasteurization and sterilization of seafood. Quick Frozen Foods, vol. 20, no. 11, p. 150–151.

BENNETT, ROBERT B.

Background information for voluntary grade standards on natural sponges. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 273, 60 p.

BERRY, FREDERICK H.

A new species of fish from the western North Atlantic, *Dikellorhynchus tropidolepis*, and relationships of the genera *Dikellorhynchus* and *Malacanthus*. Copeia, 1958, no. 2, p. 116–125.

Additions to the fishes known from the vicinity of Cedar Key, Florida. Quarterly Journal of the Florida Academy of Sciences, vol. 20, no. 4, p. 232.

Additions to the fishes of Cedar Key, Florida, and a list of Gulf of Mexico Carangidae. Quarterly Journal of the Florida Academy of Sciences, vol. 21, no. 2, p. 190.

BERSAMIN, SILVESTRE V.

A preliminary study of the nutritional ecology and food habits of the chubs (*Leucichthys* spp.) and their relation to the ecology of Lake Michigan. Papers of the Michigan Academy of Science, Arts and Letters, vol. 43, for the year 1957, p. 107–118.

BROWN, W. DUANE, MICHAEL R. GUMBMANN, A. L. TAPPEL, and M. E. STANSBY.

Review of basic research on oxidative enzymes in fish tissue. U.S. Fish and Wildlife Service, *Commercial Fisheries Review*, vol. 20, no. 11a, p. 28–31.

BROWN, W. DUANE, and A. L. TAPPEL.

Pigment-antioxidant relationship to meat-color stability. Proceedings of the Tenth Research Conference of the American Meat Institute Foundation, University of Chicago, March 27–29, Circular 45, p. 81–89.

BROWN, W. DUANE, A. L. TAPPEL, and H. S. OLCOTT.

The pigments of off-color cooked tuna meat. Food Research, vol. 23, no. 3, p. 262–268.

BUREAU OF COMMERCIAL FISHERIES.

A market development plan for the New England groundfish industry. U.S. Fish and Wildlife Service, Circular 53, iv+22 p.

Canned fish consumer purchases. U.S. Fish and Wildlife Service, Fishery Leaflet 478, October-November, iii+27 p.; 478*a*, December, v+27 p.

Commercial fisheries outlook. U.S. Fish and Wildlife Service, Fishery Leaflet 336*ii*, January-March, i+46 p.; 336*jj*, April-June, 1+46 p.; 336*kk*, July-September, i+46 p.; 336*ll*, October-December, i+45 p.

*Delicious recipes combining eggs with seafoods*, 5 p.

Federal specification, fish; fresh (chilled) and frozen. PP–F–381e. U.S. Government Printing Office, Washington, D.C., 14 p.

Fish 'n' seafood parade, October 6–12, 1958 (for food editors). Special Fisheries Marketing Bulletin, i+18 p.

Fish 'n' seafood parade, October 6–12, 1958 (for institutional use). Special Fisheries Marketing Bulletin No. 6, 1 p.

Fish 'n' seafood parade, October 6–12, 1958 (for restaurant use). Special Fisheries Marketing Bulletin No. 7, 1 p.

Fish 'n' seafood parade, October 6–12, 1958 (for school lunch). Special Fisheries Marketing Bulletin Nos. 1–5, each 1 p.

Fish recipes for Lent, February 19–April 6, 1958 (for food editors). Special Fisheries Marketing Bulletin, i+17 p.

Fish recipes for Lent, February 19–April 6, 1958 (for institutional use). Special Fisheries Marketing Bulletin No. 3, 1 p.

Fish recipes for Lent, February 19–April 6, 1958 (for school lunch). Special Fisheries Marketing Bulletin, 1 p.

Fishery motion pictures. U.S. Fish and Wildlife Service, Fishery Leaflet 452, 18 p.

Inspection and certification of fishery products by U.S. Department of the Interior. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol 20, no. 8, p. 16–20. [Also as Separate No. 520.]

Inspectors' instructions for grading frozen fish blocks. First issue. Document was prepared only for the guidance of fishery products inspectors (not for public distribution), iii+26 p.

Inspectors' instructions for grading frozen raw breaded shrimp. First issue (not for public distribution), iii+26 p.

Instructions to supervisors of inspectors assigned to plants processing fishery products for the guidance of fishery products inspectors (not for public distribution), i+10 p.

List of fishermen's and fish shore workers' unions in the United States, Alaska, and Hawaii. U.S. Fish and Wildlife Service, Fishery Leaflet 293 [Revised], 8 p.

List of fishery associations in the United States. U.S. Fish and Wildlife Service, Fishery Leaflet 254 [Revised], 13 p.

List of fishery cooperatives in the United States. U.S. Fish and Wildlife Service, Fishery Leaflet 292 [Revised], 5 p.

Organizations and officials concerned with the commercial fisheries, 1958. U.S. Fish and Wildlife Service, Fishery Leaflet 449, 13 p.

Proposed interim federal specification, shrimp, frozen, raw, breaded. PP-S-00315a. U.S. Government Printing Office, Washington, D.C. 14 p.

Regulations governing processed fishery products. First issue, 26 p.

Report of the Secretary of the Interior to the President and the Congress on fresh or frozen yellowfin, skipjack and bigeye tuna, ix+81 p.

Research and activities under the Saltonstall-Kennedy Act, fiscal year 1957. U.S. Department of the Interior, v+143 p.

Selected references on nutrition and school lunch. Interagency Committee on Nutrition Education and School Lunch [Revised June 1958], 13 p.

September is canned foods month. Special Fisheries Marketing Bulletin, September 1958, i+15 p.

Tips on cooking fish and shellfish. Prepared by U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries in cooperation with United States fishing industry, 10 p.

U.S. standards for grades of frozen haddock fillets. Federal Register, vol. 23, no. 246, p. 9759-9761.

United States standards for grades of frozen fish blocks. First issue. 6 p.

United States standards for grades of frozen fried fish sticks. First issue. 5 p.

United States standards for grades of frozen raw breaded shrimp. First issue. 5 p.

BUREAU OF COMMERCIAL FISHERIES, ALASKA REGION STAFF.

Progress report on Alaska fisheries management and research, 1957. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 258, iv+22 p.

BUREAU OF COMMERCIAL FISHERIES, BALTIMORE MARKET NEWS OFFICE.

Monthly summary—fishery products (1958). Five issues, August to December, 18 p.

BUREAU OF COMMERCIAL FISHERIES, BIOLOGICAL LABORATORY, SEATTLE.

Pacific salmon. U.S. Fish and Wildlife Service, Fishery Leaflet 14 [Revised], 10 p.

BUREAU OF COMMERCIAL FISHERIES, BIOLOGICAL LABORATORY STAFF, SEATTLE.

Report on the investigations by the United States for the International North Pacific Fisheries Commission—1957. *In* International North Pacific Fisheries Commission, Annual Report for the year 1957, p. 54-86.

BUREAU OF COMMERCIAL FISHERIES, BRANCH OF ECONOMICS.

Foreign shrimp fisheries other than Central and South America. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 254, iii+71 p.

Survey of the United States shrimp industry. Vol. 1. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 277, x+311 p.

U.S. customs receipts from imports of aquatic products for calendar years 1956 and 1957, fiscal years 1956 and 1957, and list of duty free aquatic products, i+18 p.

BUREAU OF COMMERCIAL FISHERIES, BRANCH OF MARKET DEVELOPMENT.

Canned fish retail prices. U.S. Fish and Wildlife Service, Fishery Leaflet 476, July–September, iii+67 p.; 476*a*, October, iii+24 p.; 476*b*, November, iii+23 p.; 476*c*, December, iv+23 p.

BUREAU OF COMMERCIAL FISHERIES, CHICAGO MARKET NEWS OFFICE.

Monthly summary of Chicago's fresh and frozen fishery products receipts and wholesale market prices (1958). Twelve issues, January to December, 147 p.

BUREAU OF COMMERCIAL FISHERIES (contributor).

Freezing meat and poultry products for home use. U.S. Department of Agriculture, Home and Garden Bulletin No. 15, 8 p.

Nutrition activities of agencies represented on the Interagency Committee on Nutrition Education and School Lunch. Agricultural Research Service, 62–7, ii+23 p.

Recipes—Type A school lunches. U.S. Department of Agriculture, PA 271 [Revised 1958], 34 p. (of fish recipes).

BUREAU OF COMMERCIAL FISHERIES, HAMPTON MARKET NEWS OFFICE.

Monthly summary of fishery products production in selected areas of Virginia, North Carolina and Maryland (1958). Twelve issues, January to December, 48 p.

BUREAU OF COMMERCIAL FISHERIES, NEW ORLEANS MARKET NEWS OFFICE.

Gulf monthly landings, production, and shipments of fishery products (1958). Twelve issues, January to December, 68 p.

BUREAU of COMMERCIAL FISHERIES, NEW YORK MARKET NEWS OFFICE.

Monthly summary of New York City's wholesale Fulton Fish Market fishery products receipts (1958). Two issues, September–October, 32 p.

Monthly summary. Receipts of fishery products at New York City's wholesale Fulton Fish Market (1958). Eight issues, January to August, 112 p.

New York City's wholesale fishery trade—monthly summary (1958). Two issues, November–December, 37 p.

BUREAU OF COMMERCIAL FISHERIES, OFFICE OF LOANS AND GRANTS.

Fisheries loans for vessels, gear, and research. Policies, applications, repayments. U.S. Fish and Wildlife Service, Fishery Leaflet 477, iii+7 p.

BUREAU OF COMMERCIAL FISHERIES, SAN PEDRO MARKET NEWS OFFICE.

California fishery products and byproducts brokers and importers (1958). SP List 1, 6 p.

California fishery products monthly summary (1958). Twelve issues, January to December, 152 p.

West coast Mexican shrimp crossings, 5 p.

West coast Mexican shrimp landings, 7 p.

BUREAU OF COMMERCIAL FISHERIES, SEATTLE MARKET NEWS OFFICE.

Monthly summary of Seattle's fresh and frozen fishery products including meals and oils and monthly summary of Astoria's (Oregon) fresh and frozen fishery products (1958). Three issues, January to March, 18 p.

Washington, Oregon, and Alaska receipts and landings of fishery products for selected areas and fisheries. Monthly summary (1958). Nine issues, April to December, 82 p.

BUREAU OF COMMERCIAL FISHERIES (with U.S. DEPARTMENT OF AGRICULTURE).

Writing school lunch recipes and menus. HN–31, 14 p.

BUTLER, CHARLES.

Fish, diet, and research. Maine Coast Fisherman, vol. 13, no. 2, p. 16.

Nutritional value of fish in reference to atherosclerosis and current dietary research. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 7, p. 7–16. [Also as Separate No. 515.]

BUTLER, PHILIP A.

A simple marine vivarium. U.S. Fish and Wildlife Service, Fishery Leaflet 473, 3 p.

CALDWELL, DAVID K.

A new fish of the genus *Ophioscion*, family Sciaenidae, from Caribbean Costa Rica. Quarterly Journal of the Florida Academy of Sciences, vol. 21, no. 2, p. 117–124.

Fossil fish teeth of the family Sparidae from Florida. Quarterly Journal of the Florida Academy of Sciences, vol. 21, no. 2, p. 113–116.

Notes on the barred pattern in the sheepsheads, *Archosargus probatocephalus* and *A. oviceps*. Quarterly Journal of the Florida Academy of Sciences, vol. 21, no. 2, p. 138–144.

On the status of the Atlantic leatherback turtle, *Dermochelys coriacea coriacea*, as a visitant to Florida nesting beaches, with natural history notes. Quarterly Journal of the Florida Academy of Sciences, vol. 21, no. 3, p. 285–291.

CALLAWAY, RICHARD J.

Annual variations of sea surface temperature in the eastern North Pacific Ocean. [Abstract.] Proceedings of the Hawaiian Academy of Science, Thirty-third Annual Meeting, 1957–58, p. 26–27.

CARBINE, W. F.

Reports of standing committees. Committee on international relations. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 416–425.

CARR, ARCHIE, and DAVID K. CALDWELL.

The problem of the Atlantic ridley turtle (*Lepidochelys kempi*) in 1958. Revista de Biologia Tropical, vol. 6, no. 2, p. 245–262.

CATING, JAMES P.

Damariscotta (Maine) alewife fishery. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 6, p. 1–5. [Also as Separate No. 511.]

CHANLEY, PAUL E.

Survival of some juvenile bivalves in water of low salinity. Proceedings of the National Shellfisheries Association, vol. 48, p. 52–65.

CHIN, EDWARD.

Shrimping in Galveston Bay. The Conservationist (Baytown, Tex.), vol. 2, no. 8, p. 2.

CHIPMAN, WALTER A.

Biological accumulation of radioactive materials. Proceedings of the First Texas Conference on the Utilization of Atomic Energy. Miscellaneous Publication of the Agricultural and Mechanical College of Texas, p. 36–41.

CHIPMAN, WALTER A., THEODORE R. RICE, and THOMAS J. PRICE.

Uptake and accumulation of radioactive zinc by marine plankton, fish, and shellfish. U.S. Fish and Wildlife Service, Fishery Bulletin 135, vol. 58, ii + p. 279–292.

CLARK, JOHN R.

Consistency of scale reading. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 191–192.

Drumming muscle may reveal habits of haddock. National Fisherman, vol. 39, no. 11, p. 10.

The identification of haddock stocks based on vertebral enumeration. [Author's abstract.] International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 333.

Size selection of fish by otter trawls. Proceedings of the Gulf and Caribbean Fisheries Institute, Tenth Annual Session, November 1957, p. 113–118.

Underwater television observations on the effect of chafing gear on escapement of haddock. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, vol. 8, p. 101–102.

CLARK, JOHN R., and FRANK A. DREYER.

Length frequencies—haddock. Tables 62 and 63, United States—1955. International Commission for the Northwest Atlantic Fisheries, Sampling Yearbook, vol. 1, p. 94–95.

CLARK, JOHN R., and FRANK D. MCCRACKEN.

Observations on the cod trawl fishery in the Gulf of St. Lawrence during the spring of 1958. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, vol. 8, p. 99–100.

CLARK, JOHN R., FRANK D. MCCRACKEN, and WILFRED TEMPLEMAN.

Summary of gear selection information for the Commission area. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, vol. 8, p. 83–99.

CLEMENS, HOWARD P., and KERMIT E. SNEED.

The chemical control of some diseases and parasites of channel catfish. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 1, p. 8–15.

Effect of temperature and physiological condition on tolerance of channel catfish to pyridylmercuric acetate (PMA). U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 4, p. 147–150.

COHEN, DANIEL M.

Two new species of *Bathylagus* from the western North Atlantic, with notes on other species. Breviora, No. 98, p. 1–9.

COLLIER, ALBERT.

Gulf of Mexico physical and chemical data from *Alaska* cruises. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 249, v+417 p.

Some biochemical aspects of red tides and related oceanographic problems. Limnology and Oceanography, vol. 3, no. 1, p. 33–39.

COLLINS, GERALD.

The measurement of performance of salmon in fishways. *In* H. R. MacMillan Lectures in Fisheries, p. 85–91. Symposium on Investigation of Fish-Power Problems, University of Vancouver, Vancouver, B.C., Canada.

COLLINS, JEFF.

Machine peeling characteristics of pink shrimp held in refrigerated sea water (RSW). Laboratory Report for Industry, Fishery Products Laboratory, Ketchikan, Alaska, August, 2 p.

Questions and answers concerning the holding of fish in refrigerated sea water (RSW). Laboratory Report for Industry, Fishery Products Laboratory, Ketchikan, Alaska, June, 8 p.

COLTON, JOHN B., Jr.

Adaptability of the Hardy plankton recorder to research ship studies. [Author's abstract.] International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 277.

Report on studies of fluctuations of year-class strength of haddock. [Author's abstract.] International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 279.

COOKE, S. R. B.

Progress on studies in utilization of fish-oil derivatives in ore flotation. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 14–19. [Also as Separate No. 499.]

COOLEY, NELSON R.

Incidence and life history of *Parorchis acanthus*, a digenetic trematode, in the southern oyster drill, *Thais haemastoma*. Proceedings of the National Shellfisheries Association, vol. 48, p. 174–188.

COUTURE, LAWRENCE H.

ICNAF mesh regulation. Operation of 10% annual exemption, October 1, 1957, through March 31, 1958. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, vol. 8, p. 103–104.

CRADDOCK, DONOVAN R.

Construction of a two-way weir for the enumeration of salmon migrants. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 1, p. 33–37.

Spawning escapement of Okanogan River blueback salmon (*O. nerka*), 1957. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 275, iv+8 p.

DANFORTH, WARNER C., and CHRIS A. THEODORE.

Hull insurance and protection and indemnity insurance of commercial fishing vessels—supplement. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 241–Supplement, iv+158 p.

DASSOW, JOHN A.

The occurrence of paralytic poison in shellfish of the Pacific coast. Annual Report of the Pacific Coast Oyster Growers' Association, September 1, 1957–August 31, 1958, p. 24.

DAVIS, H. C.

Survival and growth of clam and oyster larvae at different salinities. Biological Bulletin, vol. 114, no. 3, p. 296–307.

DAVIS, HARRY C., and ROBERT R. GUILLARD.

Relative value of ten genera of micro-organisms as foods for oyster and clam larvae. U.S. Fish and Wildlife Service, Fishery Bulletin 136, vol. 58, iii + p. 293–304.

DAY, C. GODFREY.

Surface circulation in the Gulf of Maine as deduced from drift bottles. U.S. Fish and Wildlife Service, Fishery Bulletin 141, vol. 58, iv + p. 443–472.

DEUBLER, EARL E., JR., and WARREN F. RATHJEN.

Records of the flounder, *Chascanopsetta lugubris* Alcock, from the western Atlantic. Copeia, 1958, no. 2, p. 132–133.

DI MARCO, PETER.

Production of fishery products in selected areas of Alabama, Florida, Louisiana, Mississippi, Texas. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, New Orleans Market News Office, x+25 p.

EDWARDS, ROBERT L.

Gloucester's trawl fishery for indusrial fish. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 8, p. 10–15. [Also as Separate no. 519.]

Species composition of industrial trawl landings in New England, 1957. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 266, v.+23 p.

EDWARDS, ROBERT L., and FRED E. LUX.

New England's industrial fishery. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 5, p. 1–6. [Also as Separate No. 509.]

EINSET, E.

Notes on recommended methods for shrimp processing. Laboratory Report for Industry, Fishery Products Laboratory, Ketchikan, Alaska, June, 2 p.

ENGLE, JAMES B.

The seasonal significance of total solids of oysters in commercial exploitation. Proceedings of the National Shellfisheries Association, vol. 48, p. 72–78.

ERICSON, MILDRED J.

When the bluebacks come home. Ford Times, vol. 50, no. 9, p. 54–55.

FARRIS, DAVID A.

Diet-induced variation in the free amino acid complex of *Sardinops caerulea*. Journal du Conseil Permanent International pour l'Exploration de la Mer, vol. 23, no. 2, p. 235–244.

Jack mackerel eggs, Pacific coast, 1951–54. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 263, iii + 44 p.

FELIN, FRANCES E., ROBERT S. WOLF, ANITA E. DAUGHERTY, and DANIEL J. MILLER.

Age and length composition of the sardine catch off the Pacific coast of the United States and Mexico in 1955–56. California Department of Fish and Game, Fish Bulletin No. 106, p. 7–12.

FELLERS, C. R., N. I. LEMACK, and G. E. LIVINGSTON.

Chemical and enzymatic hydrolysis of fish scales. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 8, p. 1–3. [Also as Separate No. 517.]

FINGERMAN, MILTON, and LAURENCE D. FAIRBANKS.

Histophysiology of the oyster kidney. Proceedings of the National Shellfisheries Association, vol. 48, p. 125–133.

FUKUHARA, FRANCIS M., and GEORGE K. TANONAKA.

A Japanese high-seas salmon fishery in the North Pacific since 1952. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 4, p. 1–16. [Also as Separate No. 507.]

GAGNON, MARCEL, and CARL R. FELLERS.

Biochemical methods for determining shrimp quality. I. Study of analytical methods. Food Technology, vol. 12, no. 7, p. 340–343.

GALTSOFF, PAUL S.

A decade of progress in fishery biology of the Gulf and Caribbean area. Proceedings of the Gulf and Caribbean Fisheries Institute, Tenth Annual Session, November 1957, p. 16–21.

Coordination of ciliary motion and muscular contractions in the gills of *Crassostrea virginica*. [Abstract.]Biological Bulletin, vol. 115, no. 2, p. 320–321.

Observations on muscle attachments, ciliary motion, and the pallial organ of oysters. Proceedings of the National Shellfisheries Association, vol. 48, p. 154–161.

The past and future of oyster research. Proceedings of the National Shellfisheries Association, vol. 48, p. 8–22.

Ultrastructure of the ciliated epithelium and the correlation between the ciliary motion and muscular contractions in the gills of *Crassostrea virginica*. Anatomical Record, vol. 132, no. 3, p. 440–441.

GANAROS, ANTHONY E.
On development of early stages of *Urosalpinx cinerea* (Say) at constant temperatures and their tolerance to low temperatures. Biological Bulletin, vol. 114, no. 2, p. 188–195.

GANGMARK, HAROLD A., and RICHARD G. BAKKALA.
Plastic standpipe for sampling streambed environment of salmon spawn. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 261, iv + 20 p.

GAULEY, JOSEPH E., RAYMOND E. ANAS, and LEWIS C. SCHLOTTERBECK.
Downstream movement of salmonids at Bonneville Dam. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 236, iv+11 p.

GILMORE, RAYMOND M.
Whaling. *In* The Americana Annual 1958, p. 832. Americana Corporation, New York, N.Y.

GLUDE, JOHN B.
A summary of the accomplishments of the Fish and Wildlife Service clam investigations—1948–1957. Sixteenth Annual Report of the Atlantic States Marine Fisheries Commission, Appendix 5, p. 55–62.

GODFREY, MARY LYNNE.
Review of POFI's oceanographic program, January 1952–June 1957. Proceedings of the Ninth Pacific Science Congress of the Pacific Science Association, vol. 16, p. 18–20.

GRAHAM, HERBERT W.
United States research, 1957. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, vol. 8, p. 75–77.
Effects of haddock mesh regulation in subarea 5. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 111.

GRAHAM, JOSEPH J., and DOROTHY D. STEWART.
Estimating maximum fishing depth of longline gear with chemical sounding tubes. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 285, iii+16 p.

GRAU, C. R.
Amino acids. 1. Biological availability of amino acids in feedstuffs. Feedstuffs, vol. 30, no. 49, p. 34–35.

GREENWOOD, MELVIN R.
Bottom trawling explorations off Southeastern Alaska, 1956–1957. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 12, p. 9–21. [Also as Separate No. 532.]

GRONINGER, HERMAN S.
Fish spoilage. I—Determination of bacterial metabolites by gas chromatography. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11, p. 23–26. [Also as Separate No. 530.]

GRUGER, E. H., JR.
Significance of ultraviolet absorption data of fish-oil fatty acids. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 12–14.

GUILLARD, ROBERT R.
Some factors in the use of nannoplankton cultures as food for larval and juvenile bivalves. Proceedings of the National Shellfisheries Association, vol. 48, p. 134–142.

GUMBMANN, M., W. DUANE BROWN, and A. L. TAPPEL.
Intermediary metabolism of fishes and other aquatic animals. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 288, iv+51 p.

HAMLISCH, ROBERT.
Excise tax exemptions granted to fishermen. U.S. Fish and Wildlife Service, Fishery Leaflet 468, 2 p.

HARRY, HAROLD W., and DAVID V. ALDRICH.
The ecology of *Australorbis glabratus* in Puerto Rico. Bulletin of the World Health Organization, vol. 18, nos. 5 and 6, p. 819–832.

HART, PHILLIP A.
Fish-oil research at the Seattle Fishery Technological Laboratory. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 4, p. 17–20. [Also as Separate No. 508.]

HIGGINS, ELMER.
Review of *Living resources of the sea* by Lionel A. Walford. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 4, p. 192–193.

HOFFMAN, CARL P., JR.
Fishery products transportation in 1958. Fishing Gazette, 1958 Annual Review Number, vol. 75, no. 13, p. 198, 200, 202, 204–205.

HOLMES, ROBERT W., and OTHER MEMBERS of the SCRIPPS COOPERATIVE OCEANIC PRODUCTIVITY EXPEDITION.
Physical, chemical, and biological oceanographic observations obtained on expedition SCOPE in the eastern tropical Pacific, November–December 1956. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 279, v+117 p.

HOLSTON, J. A.
Exploratory fishing. Fishing Gazette, 1958 Annual Review Number, vol. 75, no. 13, p. 112–113.

IVERSEN, EDWIN S., and EARL E. HOVEN.
Some trematodes of fishes from the central Equatorial Pacific. Pacific Science, vol. 12, no. 2, p. 131–134.

IVERSON, JOHN L.
Proximate composition of fishery products. Laboratory Report for Industry, Fishery Products Laboratory, Ketchikan, Alaska, April, 7 p.
Technical Note No. 47—Steelhead trout—description and proximate composition. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11, p. 26–27. [Also as Separate No. 530.]
Technical Note No. 48—Pacific ocean perch—proximate composition. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 12, p. 22–24. [Also as Separate No. 533.]

JENSEN, ALBERT C.
A tag holder for use in the field. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 2, p. 96.
Corrosion resistance of fish-tagging pins. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 262, iv+6 p.
More haddock and cod aim of fish-tagging program. Maine Coast Fisherman, vol. 12, no. 8, p. 16.

JENSEN, ALBERT C., and JOHN R. CLARK.
Time of formation of scale annuli. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 193–197.

JOHNSON, HARLAN E., and J. M. SHELTON.
Marking chinook salmon fry. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 4, p. 183–185.

JOHNSON, JAMES H.
Surface-current studies of Saginaw Bay and Lake Huron, 1956. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 267, v+84 p.

JUNE, FRED C.

Variation in meristic characters of young Atlantic menhaden, *Brevoortia tyrannus*. Rapports et Procès-Verbaux des Réunions du Conseil Permanent International pour l'Exploration de la Mer, vol. 143, part II, p. 26–35.

KELLY, GEORGE F., and GEORGE M. CLARKE.

Length frequencies—redfish. Table 64, United States—1956. International Commission for the Northwest Atlantic Fisheries, Sampling Yearbook, vol. 1, p. 96–103.

KELLY, GEORGE F., and T. W. MARTIN.

Variations in body proportions of redfish from the Gulf of Maine, Nova Scotian Banks and the Grand Banks. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 335–337.

KELLY, GEORGE F., and ROBERT S. WOLF.

Age and growth of redfish, *Sebastes marinus* (Linnaeus), in the Gulf of Maine. [Author's abstract.] International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 215.

KELLY, WILLIAM N.

Production of fishery products in selected areas of Virginia, Maryland, and North Carolina as reported to Hampton Fishery Market News Office, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Hampton Market News Office, xxv+18 p.

KING, JOSEPH E.

Some observations on the birds of Tahiti and the Marquesas Islands. The Elepaio, vol. 19, no. 3, p. 14–17.

Variation in abundance of zooplankton and forage organisms in the central Pacific in respect to the equatorial upwelling. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 98–107.

KNAKE, BORIS O.

Operation of North Atlantic type otter trawl gear. U.S. Fish and Wildlife Service, Fishery Leaflet 445, iii+15 p.

KNAKE, BORIS O., JAMES F. MURDOCK, and JAMES P. CATING.

Double-rig shrimp trawling in the Gulf of Mexico. U.S. Fish and Wildlife Service, Fishery Leaflet 470, ii+11 p.

KNAUSS, JOHN A., and JOSEPH E. KING.

Observations on the Pacific equatorial undercurrent. Nature, vol. 182, no. 4635, p. 601–602.

KOHLER, A. C., and J. R. CLARK.

Haddock scale-otolith comparisons. Journal of the Fisheries Research Board of Canada, vol. 15, no. 6, p. 1239–1246.

KOHLER, A. C., W. TEMPLEMAN, JOHN R. CLARK, and A. C. JENSEN.

Haddock scale-otolith comparisons. [Authors' abstract.] International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 199.

KYTE, R. M.

Potential byproducts from Alaska fisheries: Utilization of salmon eggs and salmon waste. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 3, p. 1–5. [Also as Separate No. 504.]

LAPOINTE, DONALD F.

Age and growth of the American shad from three Atlantic coast rivers. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 139–150.

LEE, CHARLES F.

Report on development of fungicides from fish oil. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 6, p. 20. [Also as Separate No. 513.]

LEMACH, H. I., G. E. LIVINGSTON, L. R. PARKINSON, C. R. FELLERS, AND D. L. ANDERSON.

Exploratory rat and chick bioassays of scales from ocean perch and herring as animal feed. Food Research, vol. 23, no. 6, p. 684–692.

LEONARD, ELIZABETH B.

A decimal classification for fisheries. Special Libraries, vol. 49, no. 3, p. 110–112.

LIVINGSTONE, ROBERT, JR.

Conversion of total length to fork length for subdivision 5Z haddock. Annual Proceedings of the International Commission for the Northwest Atlantic Fisheries, 1956–1957, vol. 7, p. 67–68.

LOOSANOFF, V. L.

Challenging problems in shellfish biology. *In* Buzzati-Traverso, Perspectives in Marine Biology, Part IV, p. 483–495. University of California Press, Berkeley and Los Angeles, Calif.

Some aspects of behavior of oysters at different temperatures. Biological Bulletin, vol. 114, no. 1, p. 57–70.

Use of plastics for collecting oyster set. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 9, p. 52–54.

LOOSANOFF, V. L., AND C. A. NOMEJKO.

Burial as a method for control of the common oyster drill, *Urosalpinx cinerea*, of Long Island Sound. Proceedings of the National Shellfisheries Association, vol. 48, p. 83–89.

LUX, FRED E.

Why yellowtails are tagged and tailed by the Feds. New Bedford Standard-Times, October 19, p. 5.

MAIRS, DONALD F., and LESLIE W. SCATTERGOOD.

Recent Maine records of the bottlenose porpoise and the beluga. Maine Field Naturalist, vol. 14, no. 4, p. 78–80.

MANGAN, GEORGE, JOSEPH H. CARVER, MAYNARD A. STEINBERG, and DONALD SNYDER.

Technical Note No. 45—Preparation of dried fish solubles from concentrated press liquors on a laboratory scale. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 7, p. 17–18. [Also as Separate No. 516.]

MANN, HERBERT.

A new method of handling longline gear (a description of POFI "tub" gear). [Abstract.] Proceedings of the Indo-Pacific Fisheries Council, 7th sess., secs. II–III, p. 73–76.

A new method of handling long-line gear using a rotating tub. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 10, p. 1–8. [Also as Separate No. 526.]

MARVIN, KENNETH T., and LARENCE M. LANSFORD.

Production of large amounts of pure water. Analytical Chemistry, vol. 30, no. 4, p. 551–552.

MATSUMOTO, WALTER M.

Description and distribution of larvae of four species of tuna in central Pacific waters. U.S. Fish and Wildlife Service, Fishery Bulletin 128, vol. 58, ii + p. 31–72.

MATTEI, VICTOR, and WILLIAM T. RODDY.

Experimental studies to extend uses of fish oils in the leather industry. Part I—Experiments with menhaden oil. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 7–11.

Use of marine oils for fatliquoring leather. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 3, p. 11–12.

MAXFIELD, GALEN H.

Record of a hatchery-reared rainbow trout, *Salmo gairdneri gairdneri*, with three pelvic fins. Copeia, 1958, no. 3, p. 232–233.

MCGARY, JAMES W., EVERET C. JONES, and JOSEPH J. GRAHAM.

Enrichment in the transition zone between the subarctic and central water masses of the central North Pacific. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 82–89.

MCGARY, JAMES W., and EDWARD D. STROUP.

Oceanographic observations in the central North Pacific, September 1954–August 1955. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 252, vi+250 p.

MCKENZIE, R. A., and B. E. SKUD.

Herring migrations in the Passamaquoddy region. Journal of the Fisheries Research Board of Canada, vol. 15, no. 6, p. 1329–1343.

MCKERNAN, DONALD L.

Publicize—fishery products. Fishing Gazette, vol. 75, no. 4, p. 66, 68.

MCKERNAN, DONALD L., and SIDNEY SHAPIRO.

Our work in the fisheries, a report on the activities of the Bureau of Commercial Fisheries and its program for year 1959. Fishing Gazette, 1958 Annual Review Number, vol. 75, no. 13, p. 20–23.

MCNEELY, RICHARD L.

A practical depth telemeter for midwater trawls. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 9, p. 1–10. [Also as Separate No. 522.]

MEAD, GILES W.

A catalog of the type specimens of fishes formerly in the collections of the Department of Tropical Research, New York Zoological Society. Zoologica, vol. 43, part 4, p. 131–134.

A new species of iniomous fish from the Gulf of Mexico. Journal of the Washington Academy of Sciences, vol. 48, no. 6, p. 188–191.

Review of *Living resources of the sea* by Lionel A. Walford. Copeia, 1958, no. 4, p. 343–344.

Three new species of archibenthic iniomous fishes from the western North Atlantic. Journal of the Washington Academy of Sciences, vol. 48, no. 11, p. 362–372.

MEAD, GILES W., and JAMES E. BÖHLKE.

*Gobionellus stigmalophius*, a new goby from the Gulf of Campeche and the Great Bahama Bank. Copeia, 1958, no. 4, p. 285–289.

MEAD, GILES W., and G. E. MAUL.

*Taractes asper* and the systematic relationships of the Steinegeriidae and Trachyberycidae. Bulletin of the Museum of Comparative Zoology, vol. 119, no. 6, p. 393–417.

MEDICO, ERNEST J.

Certification and after-use measurement of manila otter-trawl cod ends. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 12, p. 1–8. [Also as Separate No. 531.]

MILLER, DANIEL J., and ROBERT S. WOLF.

Age and length composition of the northern anchovy catch off the coast of California in 1954–55, 1955–56, and 1956–57. California Department of Fish and Game, Fish Bulletin No. 106, p. 27–72.

MIYAUCHI, DAVID T.

Pacific coast program on the irradiation preservation of fish—phase report. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 2, p. 16–17. [Also as Separate No. 503.]

MIYAUCHI, DAVID T., and RICHARD W. NELSON.

Technical Note No. 46—Method for removing blood from halibut to improve appearance of frozen steaks. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 10, p. 9–11. [Also as Separate No. 527.]

MOFFETT, J. W.

Attack on the sea lamprey. Michigan Conservation Magazine, vol. 27, no. 3, p. 21–27.

Lake trout and sea lamprey. The Conservation Volunteer, vol. 21, no. 126, p. 18–23. Minnesota Department of Conservation, St. Paul, Minn.

Trout in the Great Lakes. U.S. Trout News, vol. 3, no. 3, p. 8–10.

MOSHER, WILLIAM A., WILEY H. DANIELS, JACK R. CELESTE, and WILLIAM H. KELLEY.

The nonsaponifiable fraction of menhaden oil. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 1–6.

MURPHY, GARTH I., and RICHARD S. SHOMURA.

Variations in yellowfin abundance in the central equatorial Pacific. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 108–113.

MURRAY, JOHN J.

New winch-head contributes to greater trawler safety. Maine Coast Fisherman, vol. 13, no. 4, p. 12.

NAKAMURA, EUGENE L., and JAMES L. YOUNT.

An unusually large salp. Pacific Science, vol. 12, no. 2, p. 181.

NAUGHTON, JOHN J., HARRY ZEITLIN, and MICHAEL M. FRODYMA.

Tuna meat pigment studies—spectral reflectance studies of the heme pigments in tuna fish flesh. Some characteristics of the pigments and discoloration of tuna meat. Agricultural and Food Chemistry, vol. 6, no. 12, p. 933–938.

NELSON, PHILIP R.

Relationship between rate of photosynthesis and growth of juvenile red salmon. Science, vol. 128, no. 3317, p. 205–206.

NICHOLS, PAUL R.

Effect of New Jersey-New York pound-net catches on shad runs of Hudson and Connecticut Rivers. U.S. Fish and Wildlife Service, Fishery Bulletin 143, vol. 58, iv+p. 491–500.

O'BRIEN, JOHN J.

New England fisheries—monthly summary (1958). U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Boston Market News Office, twelve issues, January to December, 276 p.

Landings and prices of fishery products, Boston Fish Pier, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Boston Market News Office, 1+28 p.

OLCOTT, HAROLD S.

The role of free fatty acids on antioxidant effectiveness in unsaturated oils. Journal of the American Oil Chemists' Society, vol. 35, no. 11, p. 597–599.

OLCOTT, H. S., and E. EINSET.

A weighing method for measuring the induction period of marine and other oils. Journal of the American Oil Chemists' Society, vol. 35, no. 4, p. 161–162.

An antagonistic effect with antioxidants for unsaturated fats. Journal of the American Oil Chemists' Society, vol. 35, no. 4, p. 159–160.

OSTERHAUG, KATHRYN L.

Fish in the sodium-restricted diet. Pacific Fisherman, vol. 56, no. 11, p. 40–41.

OTSU, TAMIO, and RICHARD N. UCHIDA.

Age determination of albacore by the vertebral method. [Abstract.] Proceedings of the Indo-Pacific Fisheries Council, 7th sess., secs. II–III, p. 49–52.

PARSONS, JOHN W.

Fishery management problems and possibilities on large southeastern reservoirs. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 333–355.

PETERS, JOHN A.

New methods of packaging fish fillet blocks. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 4, p. 21. [Also as Separate No. 508.]

PETERS, JOHN A., and DANIEL T. MCLANE.

Tests on storage of frozen shrimp show that proper packaging "pays off." U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 27–28. [Also as Separate No. 499.]

PETERS, JOHN A., and JOSEPH W. SLAVIN.

Comparative keeping quality, cooling rates, and storage temperatures of haddock held in fresh-water ice and in saltwater ice. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 6–13. [Also as Separate No. 498.]

Technical Note No. 42—Keeping quality and rate of freezing of cooked deep-sea lobster meat frozen in cans. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 22–27. [Also as Separate No. 499.]

PISKUR, FRANK T.

Development of objective tests for quality of fresh, frozen, and processed fish. [Nontechnical summary.] U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 20–22. [Also as Separate No. 499.]

PISKUR, FRANK T., and MARIO N. SERENO.

Federal specifications for fishery food products and the responsibility of the U.S. Bureau of Commercial Fisheries. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 2, p. 1–6. [Also as Separate No. 501.]

POSGAY, JULIAN A.

A recording-measuring board. U.S. Fish and Wildlife Service, Progressive Fish-Culturist, vol. 20, no. 3, p. 142.

Photography of the sea floor. Oceanus, vol. 6, no. 1, p. 16–19.

POSGAY, JULIAN A., and K. DUANE NORMAN.
An observation on the spawning of the sea scallop, *Placopecten magellanicus* (Gmelin), on Georges Bank. Limnology and Oceanography, vol. 3, no. 4, p. 478.

POWELL, DONALD E.
The role of exploration and gear research in the future expansion of our commercial fisheries. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 309–315.

POWER, E. A.
Fisheries. *In* 1958 Britannica Book of the Year, p. 259–260. Encyclopaedia Britannica, Inc., Chicago, Ill.
Fisheries. *In* Collier's Encyclopaedia Year Book, 1958 Edition, p. 225–226. P. F. Collier & Son Corporation, New York, N.Y.
Fisheries of the United States and Alaska, 1957. A preliminary review. U.S. Fish and Wildlife Service, Fishery Leaflet 393, 41 p.
Fisheries production during 1958. Fishing Gazette, 1958 Annual Review Number, vol. 75, no. 13, p. 126.
Fishery statistics of the United States, 1956. U.S. Fish and Wildlife Service, Statistical Digest 43, 476 p.

PRIVETT, O. S., J. R. CHIPAULT, H. SCHLENK, and W. O. LUNDBERG.
Chemical and nutritional studies on fish oils. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 18–23.

RANEY, EDWARD C.
Striped bass. U.S. Fish and Wildlife Service, Fishery Leaflet 451, 6 p.
The Atlantic states cooperative striped bass program, 1952–1957. Sixteenth Annual Report of the Atlantic States Marine Fisheries Commission, appendix 7, p. 70–76.

REARDON, CHARLES M.
Seattle and Astoria landings, receipts, and value of fishery products, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Seattle Market News Office, xx + 23 p.
Supplementary market news reports. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Seattle Market News Office, 10 p.

RICE, THEODORE R., and REBECCA J. SMITH.
Filtering rates of the hard clam (*Venus mercenaria*) determined with radioactive phytoplankton. U.S. Fish and Wildlife Service, Fishery Bulletin 129, vol. 58, ii+p. 73–82.

RIDGWAY, G. J., J. E. CUSHING, and G. L. DURALL.
Serological differentiation of populations of sockeye salmon, (*Oncorhynchus nerka*). U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 257, iii+9 p.

RIGGS, CARL D.
Selected references on the channel catfish, *Ictalurus punctatus*. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 240, i+10 p.

RISOLI, T. J.
Receipts of fresh and frozen fishery products at New York City's Fulton Fish Market, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, New York Market News Office, 43 p.

ROSEN, SUMNER M.
An economic analysis of freezing fish at sea. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11, p. 1–14. [Also as Separate No. 528.]

ROUNSEFELL, GEORGE A.

Anadromy in North American salmonidae. U.S. Fish and Wildlife Service, Fishery Bulletin 131, vol. 58, ii + p. 171–185.

Factors causing decline in sockeye salmon of Karluk River, Alaska. U.S. Fish and Wildlife Service, Fishery Bulletin 130, vol. 58, iii+p. 83–169.

Shrimp research by the U.S. Fish and Wildlife Service. Proceedings of the Gulf and Caribbean Fisheries Institute, Tenth Annual Session, November 1957, p. 43–44.

ROUNSEFELL, GEORGE A., and JOHN E. EVANS.

Large-scale experimental test of copper sulfate as a control for the Florida red tide. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 270, v+57 p.

ROYCE, WILLIAM F.

Tuna Commission activities in Pacific oceanography. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 42–43.

SAKUDA, HENRY M.

Observations of moulting female king crabs (*Paralithodes camtschatica*). U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 274, iv + 5 p.

SAMSON, V. J.

California fisheries, 1957. U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, San Pedro Market News Office, xvii+26 p.

SANFORD, F. BRUCE.

Pacific coast fishing ports—Garibaldi, Oregon. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 48–56. [Also as Separate No. 500.]

Planning your research paper. U.S. Fish and Wildlife Service, Fishery Leaflet 447, 32 p.

Seaweeds and their uses. U.S. Fish and Wildlife Service, Fishery Leaflet 469, 23 p.

SCATTERGOOD, LESLIE W.

English translations of fishery literature. Additional listings, 1958. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 264, 1+33 p.

Western North Atlantic records of *Beryx splendens* Lowe and *B. decadactylus* Cuvier and Valenciennes. Copeia, 1958, no. 3, p. 231.

SCATTERGOOD, LESLIE W., and PHILLIP L. GOGGINS.

Unusual records of Gulf of Maine fishes. Maine Field Naturalist, vol. 14, no. 2, p. 40–43.

SCHAEFERS, EDWARD A., and DONALD E. POWELL.

Correlation of midwater trawl catches with echo recordings in the northeastern Pacific. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 2, p. 7–15. [Also as Separate No. 502.]

SCHEFFER, VICTOR B.

Seals, sea lions and walruses; a review of the Pinnipedia. Stanford University Press, Stanford, Calif. 179 p.

SEABLOOM, ROBERT WENDELL.

Water quality studies in the Wenatchee River Basin. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 268, vi+35 p.

SEAGRAN, HARRY L.

Analysis of the protein constituents of drip from thawed fish muscle. Food Research, vol. 23, no. 12, p. 143–149.

Contribution to the chemistry of the king crab (*Paralithodes camtschatica*). U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11, p. 15–22. [Also as Separate No. 529.]

Recommended methods for shrimp processing. Laboratory Report for Industry, Fishery Products Laboratory, Ketchikan, Alaska, May, 1 p.

SILLIMAN, RALPH P., and JAMES S. GUTSELL.

Experimental exploitation of fish populations. U.S. Fish and Wildlife Service, Fishery Bulletin 133, vol. 58, ii+p. 215–252.

SIMMONS, RAYMOND O.

Variation in physical and chemical characteristics of herring, menhaden, salmon, and tuna oils. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 15–17.

SINDERMANN, CARL J.

An epizootic in Gulf of Saint Lawrence fishes. Transactions of the Twenty-third North American Wildlife Conference, p. 349–360.

Antimammalian erythrocyte properties of sea herring serum. Anatomical Record, vol. 131, no. 3, p. 599.

SINDERMANN, CARL J., and DONALD F. MAIRS.

Serum protein changes in diseased sea herring. Anatomical Record, vol. 131, no. 3, p. 599–600.

SKUD, BERNARD EINAR.

Relation of adult pink salmon size to time of migration and freshwater survival. Copeia, 1958, no. 3, p. 170–176.

SKUD, B. E., and H. C. BOYAR.

Where the herring go. Maine Coast Fisherman, vol. 13, no. 1, p. 28.

SLAVIN, JOSEPH W.

Freezing fish in the United States of America. Bulletin of the International Institute of Refrigeration, Meeting of Commissions 3, 4, and 5, Moscow, Russia, September, p. 353–363.

Methods of freezing used in the fisheries—a review. Fishing Gazette, 1958 Annual Review Number, vol. 75, no. 13, p. 176, 180, 184, 186.

Technical Note No. 44.—Industry tests show brine-frozen haddock to be of good quality. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 6, p. 21. [Also as Separate No. 513.]

SLAVIN, JOSEPH W., and JOHN A. PETERS.

Freezing and storing deep-sea lobsters—some tests on cooked whole lobsters. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 7, p. 1–6. [Also as Separate No. 514.]

SLAVIN, JOSEPH W., JOHN A. PETERS, and S. R. POTTINGER.

Studies on a jacketed cold-storage room. Food Technology, vol. 12, no. 11, p. 602–609.

SMITH, REBECCA JOYCE.

Filtering efficiency of hard clams in mixed suspensions of radioactive phytoplankton. Proceedings of the National Shellfisheries Association, vol. 48, p. 115–124.

SNYDER, DONALD G.

Amino acid composition of the protein and inorganic constituents of the ash of pollock fish scales. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 8, p. 4–9. [Also as Separate No. 518.]

SNYDER, DONALD G., and HUGO W. NILSON.

Nutritive value of pollock fish scales as determined by rat feeding tests. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 260, v+12 p.

STANSBY, MAURICE E.

Problems in determining fish freshness. Food Technology, vol. 12, no. 5, p. 260–262.

Twenty-five years of research and service by the Seattle Technological Laboratory. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 5, p. 7–17. [Also as Separate No. 510.]

STANSBY, MAURICE E., and W. D. BROWN.

Review of progress on oxidative deterioration in fish and fishery products. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 11a, p. 24–27.

STANSBY, M. E., and CHARLES BUTLER.

Bureau of Commercial Fisheries oil research program. Journal of the American Oil Chemists' Society, vol. 35, no. 7, p. 8, 10–12.

STARR, THEODORE J.

Notes on a toxin from *Gymnodinium breve*. Texas Reports on Biology and Medicine, vol. 16, no. 4, p. 500–507.

STERN, JOSEPH A., DIPTIMAN CHAKRAVARTI, JOSEPH R. UZMANN, and MARY N. HESSELHOLT.

Rapid counting of Nematoda in salmon by peptic digestion. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 255, iii+5 p.

STERN, JOSEPH, and JOHN A. DASSOW.

Technical Note No. 43—Consideration on the use of refrigerated brine for chilling and storing fresh fish. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 2, p. 17–20. [Also as Separate No. 503.]

STRASBURG, DONALD W.

Distribution, abundance, and habits of pelagic sharks in the central Pacific Ocean. U.S. Fish and Wildlife Service, Fishery Bulletin 138, vol. 58, iv+p. 335–361.

STUNKARD, HORACE W.

The morphology and life-history of *Levinseniella minuta* (Trematoda: Microphallidae). Journal of Parasitology, vol. 44, no. 2, p. 225–229.

STUNKARD, HORACE W., and JOSEPH R. UZMANN.

Studies on digenetic trematodes of the genera *Gymnophallus* and *Parvatrema*. Biological Bulletin, vol. 115, no. 2, p. 276–302.

SUTHERLAND, DOYLE F.

Use of diagnostic X-ray for determining vertebral numbers of fish. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 244, iv+9 p.

SYKES, JAMES E.

A method of determining the sex of the striped bass, *Roccus saxatilis* (Walbaum). Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 104–107.

Problems relative to the Atlantic coast striped bass fishery and status of its biological research. Transactions of the Twenty-third North American Wildlife Conference, p. 370–377.

SYLVESTER, ROBERT O.

Water quality studies in the Columbia River Basin. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 239, iii+134 p.

TALBOT, GERALD B.

Summary of Atlantic coast shad investigations—1950–57. Sixteenth Annual Report of the Atlantic States Marine Fisheries Commission, appendix 6, p. 63–68.

TALBOT, GERALD B., and JAMES E. SYKES.

Atlantic coast migrations of American shad. U.S. Fish and Wildlife Service, Fishery Bulletin 142, vol. 58, iv+ p. 473–490.

TANONAKA, GEORGE.

Age, length, and body weight of salmon caught by Japanese high-seas fleets in North Pacific. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 259, iii+10 p. [Bears the erroneous date of 1957.]

TAYLOR, CLYDE C.

A note on Lee's phenomenon in Georges Bank haddock. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 243–251.

An appraisal of the New England Fisheries. Fishing Gazette, vol. 75, no. 1, p. 18–21, 50–51, and no. 2, p. 41, 101.

Cod growth and temperature. Journal du Conseil Permanent International pour l'Exploration de la Mer, vol. 23, no. 3, p. 366–370.

Natural mortality rate of Georges Bank haddock. U.S. Fish and Wildlife Service, Fishery Bulletin 126, vol. 58, ii+p. 1–7.

The problem of sampling oceanic stocks which are partly demersal, partly pelagic, whose distribution differs with size and age, and which are fished by diverse techniques and by diverse countries. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 13–16.

TESTER, A. L.

Symposium. EQUAPAC. Introduction. Proceedings of the Ninth Pacific Science Congress, vol. 16, p. 221.

THURSTON, CLAUDE E.

Changes in composition of sole during refrigeration. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 8, p. 21–22. [Also as Separate No. 521.]

Sodium and potassium content of 34 species of fish. Journal of the American Dietetic Association, vol. 34, no. 4, p. 396–399.

Sodium and potassium in the edible portions of 34 species of fish. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 1, p. 1–5. [Also as Separate No. 497.]

Variation in composition of southeastern Alaska pink salmon. Food Research, vol. 23, no. 6, p. 619–625.

TIBBO, S. N., J. E. HENRI LEGARÉ, LESLIE W. SCATTERGOOD, and ROBERT F. TEMPLE.

On the occurrence and distribution of larval herring (*Clupea harengus* L.) in the Bay of Fundy and the Gulf of Maine. Journal of the Fisheries Research Board of Canada, vol. 15, no. 6, p. 1451–1469.

TUBMAN, ARNOLD W., and LYNNE G. MCKEE.

Color and quality of canned Gulf of Mexico yellowfin tuna as related to weight of fish. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 9, p. 11–14. [Also as Separate No. 523.]

U.S. FISH and WILDLIFE SERVICE.

Laws and regulations for protection of the commercial fisheries of Alaska 1958. *Its* Regulatory announcement 56, i+p. 1–14, 2503–2526.

VAN LANDINGHAM, JOHN W.

Stabilizing heteropoly color in the estimation of phosphate-phosphorus in sea water. [Abstract.] Proceedings of the Hawaiian Academy of Science, Thirty-third Annual Meeting, 1957–1958, p. 22.

VENOLIA, A. W., and A. L. TAPPEL.

Brown-colored oxypolymers of unsaturated fats. Journal of the American Oil Chemists' Society, vol. 35, no. 3, p. 135–138.

WALFORD, LIONEL A.

Chairman's summary of discussions. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 5–12.

Living resources of the sea—opportunities for research and expansion. The Roland Press Company, New York, N.Y., 321 p.

To make the best use of the scientific talent, arrange that men with special skills are most effectively used for the needs of the whole Commission. This may require allocating tasks and materials. International Commission for the Northwest Atlantic Fisheries, Special Publication No. 1, p. 105–110.

WENTWORTH, JANE, and HARVYE LEWIS.

Riboflavin, niacin and thiamine in Apalachicola Bay oysters. Food Research, vol. 23, no. 2, p. 194–197.

WHITELEATHER, R. T.

Symposium on commercial fisheries. Introduction. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 281.

Reports of standing committees. Committee on commercial fisheries. Transactions of the American Fisheries Society, vol. 87, for the year 1957, p. 442–446.

WHITELEATHER, RICHARD T., and JAMES B. HIGMAN.

Weather and Caribbean fisheries development. Proceedings of the Gulf and Caribbean Fisheries Institute, Tenth Annual Session, November 1957, p. 143–147.

WILBOUR, FREDERICK G., JR.

Improved handling of fish aboard Massachusetts fishing vessels. U.S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 20, no. 9, p. 26. [Also as Separate No. 525.]

WILSON, ROBERT C., EUGENE L. NAKAMURA, AND HOWARD O. YOSHIDA.

Marquesas area fishery and environmental data, October 1957–June 1958. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 283, v+105 p.

WISE, JOHN P.

Cod and hydrography—a review. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 245, iii+16 p.

The world's southernmost indigenous cod. Journal du Conseil Permanent International pour l'Exploration de la Mer, vol. 23, no. 2, p. 208–212.

*Laphystius sturionis* parasitic on cod in North American waters. Journal of Parasitology, vol. 44, no. 1, p. 72.

Review of *Eels* by Leon Bertin. Atlantic Naturalist, vol. 13, no. 3, p. 201–202.

WISE, J. P., AND H. E. MURRAY.

Length frequencies—cod. Table 61, United States—1956. International Commission for the Northwest Atlantic Fisheries, Sampling Yearbook, vol. 1, p. 93.

WOLF, ROBERT S., JOHN S. MACGREGOR, ANITA E. DAUGHERTY, AND DANIEL J. MILLER.

Age and length composition of the sardine catch off the Pacific coast of the United States and Mexico in 1956–57. California Department of Fish and Game, Fish Bulletin No. 106, p. 13–17.

YAMASHITA, DANIEL T.

Analysis of catch statistics of the Hawaiian skipjack fishery. U.S. Fish and Wildlife Service, Fishery Bulletin 134, vol. 58, ii+p. 253–278.

YAMASHITA, DANIEL T., AND KENNETH D. WALDRON.
An all-plastic dart-type fish tag. California Fish and Game, vol. 44, no. 4, p. 311–317.
YUEN, HEENY S. H.
A preliminary report on the Sea Scanar, an ultra-sonic fish finder. [Abstract.] Proceedings of the Indo-Pacific Fisheries Council, 7th sess., secs. II–III, p. 83.
ZEIN-ELDIN, ZOULA P., AND BILLIE Z. MAY.
New absorption peak of tyrosine. Science, vol. 123, no. 3305, p. 1055–1056.
Improved N-ethylcarbazole determination of carbohydrates with emphasis on sea water samples. Analytical Chemistry, vol. 30, no. 12, p. 1935–1941.

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