Philip M. Roedel

A Message from the Director

We have become part of the new National Oceanic and Atmospheric Administration. NOAA attests our government's recognition that "the oceans and the atmosphere are interacting parts of the total environmental system upon which we depend not only for the quality of our lives, but for life itself."

NOAA will strive to improve our understanding of this environmental system--and the way we use it.

NOAA is a functioning agency. It is large enough for a mission that involves nearly three-fourths of the surface of our planet. It brings together 13,000 persons representing a broad range of scientific talent, a great fleet, and remarkable equipment that probes the seas and the atmosphere. As new challenges emerge, it must be prepared to meet them.

Why NOAA? President Nixon explained: "By employing a unified approach to the problems of the oceans and atmosphere, we can increase our knowledge and expand our opportunities not only in those areas, but in the third major component of our environment, the solid earth as well."

NOAA means that the strengths of many organizations are joined, which for us means that the strengths of others can be added to our own in carrying out our mission. Secretary of Commerce Stans has commented on how the members of the new NOAA family will benefit from the union. For example, the combined NOAA fleet will be able to accomplish far more than did its component parts. With a closely coordinated program, it will be able to collect more data to meet both our needs for fishery information and those of others for mapping and charting. The fleet will enable the National Oceanographic Instrumentation Center to test equipment at sea. It will permit the Sea Grant Program "to provide training facilities for the education of young people in this exciting and challenging field."

What are our roles--the roles of the National Marine Fisheries Service?

Our primary role is to gain, through scientific studies, enough information about the size, distribution, and susceptibility to capture of fish stocks--so that we will know how many fish can be taken without endangering a species and can contribute to programs designed to manage fisheries for conservation purposes. At the same time, we must gather enough information to help insure that the aquatic environment will be protected.

In cooperation with other entities, we will work toward development of management techniques at international, national and state levels that will permit rational allocations of stocks among the nations of the

world, and among user groups in the United States--commercial, sport, and others.

We will aid the fishing industry where factors such as the common-property nature of the resource prevent the industry from doing the job itself.

And we will help insure that the American public is adequately informed about the products it buys.

We will work with other Federal agencies to assist developing nations meet some of their food needs from the sea.

As the National Marine Fisheries Service, our responsibilities are much broader than were those of its component parts--the Bureau of Commercial Fisheries and the Marine Sport Fish Laboratories of the Bureau of Sport Fisheries and Wildlife. Now we are assuming responsibilities for all living marine resources.

We must first consider the resource, then the needs and desires of all user groups will be given equal attention. These include both recreational and commercial interests--remembering that recreational users include not only sport fishermen but such people as those who go to watch whales migrate, to take pictures, or merely to escape the pressures of daily routine.

The basic goal of our organization is conservation: the wise use of living marine resources. This requires not only a strong biological base, but input from a variety of scientific disciplines. Finally, if conservation in its broadest sense is to become a reality, we must have a sound understanding of the legal, social, and political factors affecting resource use.

In 1970, NMFS and its predecessor agencies complete a century of service. In time, the names and dates of these organizations may be jumbled in the public mind, but their achievements will remain clear to us: They contributed much to piercing the darkness that was upon "the face of the deep."

In an early issue of COMMERCIAL FISHERIES REVIEW, I will discuss with you what we have done to reshape the Bureau of Commercial Fisheries for its vital role in NOAA--as the National Marine Fisheries Service.

BCF JOINED TO NEW NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

President Nixon's plan to reorganize the Nation's oceanic and atmospheric organizations into a single part of the U.S. Department of Commerce--the National Oceanic and Atmospheric Administration (NOAA)--went into effect on October 3, 1970.

The President sent his plan to Congress on July 9. After 60 consecutive days in session, neither house disapproved it.

(See CFR July 1970.)

The Bureau of Commercial Fisheries (BCF) was transferred to NOAA and renamed NATIONAL MARINE FISHERIES SERVICE.

NOAA

NOAA's largest component by far is Commerce Department's Environmental Science Services Administration (ESSA): 10,000 employes, 83% of NOAA's personnel, and estimated Fiscal 1970 expenditures of almost $200 million. Estimated budget of the other elements entering NOAA is about $71 million.

Other components of NOAA are:

FROM DEPARTMENT OF THE INTERIOR

1. Bureau of Commercial Fisheries (BCF)
2. Marine sport fish activities of Bureau of Sport Fisheries and Wildlife (BSFW)

   BCF and BSFW formerly made up The Fish and Wildlife Service.

3. Marine Minerals Technology Center of the Bureau of Mines

FROM DEPARTMENT OF DEFENSE

1. United States Survey of the Army Corps of Engineers
2. National Oceanographic Data Center of the Navy Department
3. National Oceanographic Instrumentation Center of the Navy Department

FROM DEPARTMENT OF TRANSPORTATION

National Data Buoy Project of the U.S. Coast Guard

FROM NATIONAL SCIENCE FOUNDATION

Office of Sea Grant Programs

NOAA'S ROLE

After listing the principal functions of the agencies and programs to be combined in NOAA, President Nixon outlined this role for it:

"By employing a unified approach to the problems of the oceans and atmosphere, we can increase our knowledge and expand our opportunities not only in those areas, but in the third major component of our environment, the solid earth, as well. . . .

"Drawing these activities together into a single agency would make possible a balanced Federal program to improve our understanding of the resources of the sea, and permit their development and use while guarding against the sort of thoughtless exploitation that in the past laid waste to so many of our precious natural assets. It would make possible a consolidated program for achieving a more comprehensive understanding of oceanic and atmospheric phenomena, which so

greatly affect our lives and activities. It would facilitate the cooperation between public and private interests that can best serve the interests of all.

"I expect that NOAA would exercise leadership in developing a national oceanic and atmospheric program of research and development. It would coordinate its own scientific and technical resources with the technical and operational capabilities of other government agencies and private institutions. As important, NOAA would continue to provide those services to other agencies of government, industry and private individuals which have become essential to the efficient operation of our transportation systems, our agriculture and our national security. I expect it to maintain continuing and close liaison with the new Environmental Protection Agency and the Council on Environmental Quality as part of an effort to ensure that environmental questions are dealt with in their totality and that they benefit from the full range of the government's technical and human resources."

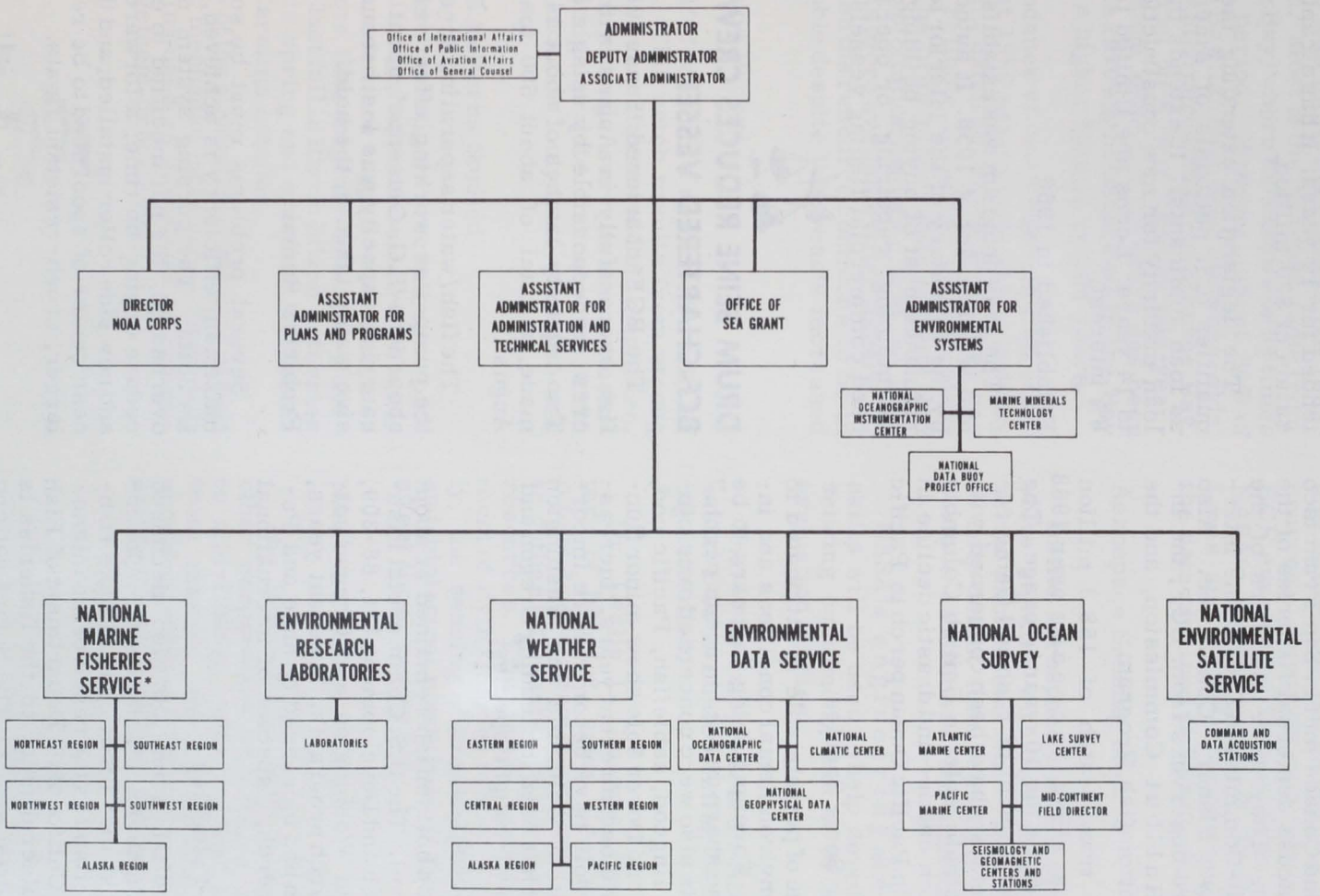
100 YEARS OF BCF
& ITS PREDECESSORS

1871 - 1903	-	First known as United States Fish Commission, the one-man commission was independent agency.
1903	-	Placed in newly established Department of Commerce and Labor. Renamed Bureau of Fisheries.
1913	-	Department of Labor was separated from Commerce. Bureau of Fisheries remained in Commerce until 1939.
1939	-	Bureau of Fisheries and U.S. Department of Agriculture's Bureau of Biological Survey were transferred to U.S. Department of the Interior.
JUNE 30, 1940	-	The 2 Bureaus were merged to form the Fish and Wildlife Service.
1956	-	The Fish and Wildlife Act of 1956 created the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.
OCT. 3, 1970	-	BCF transferred to NOAA in Commerce Department. Renamed National Marine Fisheries Service.

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

(PROPOSED INTERIM Organization)



*MARINE SPORT FISHERIES LABORATORIES TEMPORARILY REPORT TO THE OFFICE OF THE DIRECTOR

SEPTEMBER 25, 1970

U.S. & CANADIAN SCIENTISTS DISCUSS PACIFIC GROUNDFISH SITUATION

Groundfish scientists of the U.S. Pacific coast states and Canada met in San Francisco in July to discuss demersal fisheries of the Pacific coast. They were members of the Technical Sub-Committee (TSC) of the International Trawl Fishery Committee. Also attending were observers from BCF, the International Halibut Commission, and the California Bottomfish Program.

The 1969 trawl catch of 158.3 million pounds was a slight increase over 1968 catches and above the 10-year average. The California Department of Fish and Game reports that scientists have been concerned with decline in petrale sole in British Columbia and Washington catch--and drastic decline in recent years in Pacific Ocean perch in Pacific Northwest.

Concern Over Some Species

The decline of petrale sole is attributed to unfavorable environmental conditions and intense fishing. Foreign fishing "appears to be the cause of the sharp decline in ocean perch." TSC scientists also were concerned over other species: lingcod, sablefish, Pacific cod, English sole, and Dover sole show minor fluctuations from those of recent years. Increasingly, Dover sole have become more important for British Columbia and Washington fishermen. It has been the leading Oregon and California trawl-caught species.

Bottomfish Research

Research on bottomfish remained at about last year's level. The U.S. Commercial Fisheries Research and Development Act, 88-309, supports most Washington and Oregon bottomfish research programs. In recent years, BCF research has increased on hake and Pacific Ocean perch, "species of international concern."

Soviet Trawl Fisheries

The groundfish scientists also discussed Soviet trawl fisheries off the coast. Observations suggest that USSR coastal hake fisheries have declined as the result of the intense fishery, says California's Department of Fish and Game. Recruitment to the fisheries is below that of past years. The Soviet pattern of operations off California has changed slightly in 1970. In previous years, BMRT trawlers left California in April; this year, several trawlers have continued past that time to fish off northern California.

FISHERIES LOAN FUND IS EXTENDED 10 YEARS

The Fisheries Loan Fund has been extended for 10 years. It has a capital authorization of $20 million.

The legislation extending the Fund also qualifies U.S. nationals of American Samoa as loan applicants. It extends the maximum loan maturity for new constructions from 10 to 14 years. Loans are limited to $40,000 at 8% interest.

Established in 1956

The loan program was established by Fish and Wildlife Act of 1956. It authorizes loans by the Secretary of the Interior to finance or refinance cost of buying, building, equipping, maintaining, repairing, or operating new or used commercial fishing vessels or gear.

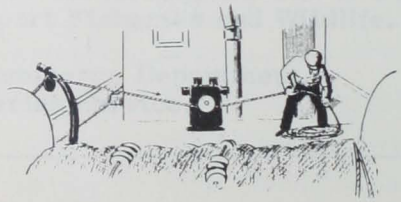
DRUM SEINE REDUCES CREW OF BCF-CHARTERED VESSEL

The BCF-chartered 'Sunset' continued to fish successfully in August with a reduced crew made possible by using a drum seine. Two capacity catches of about 145 tons were made, a total of about 500 tons landed in August.

The fish/water separating screen used with the pump was working effectively. Before, aboard the 'S.G. Giuseppe', about 10% of fish-carrying capacity was lost because of excessive water taken in the hold.

Problems Remain

Several problems must be solved before maximum efficiency is achieved, notes BCF La Jolla: The pursing system needs to be overhauled; the net modified to eliminate or reduce drying-up time; a forward level wind and new side roller installed; and the net floats near center of spool need to be replaced with larger, crush-resistant floats.



ATLANTIC MENHADEN RESOURCE STATUS STUDIED

The catch of Atlantic menhaden through August 1970 was more than double the 1969-period catch. Most of the increase came from Chesapeake Bay, where the catch was $3\frac{1}{2}$ times above 1969 period. However, about 80% of Chesapeake Bay fish have been one-year-olds, an unusually high percentage even for the Bay. Normally about 50-60% of fish are one-year-olds; the range over last 15 years has been 18-91%. The 1970 exploitation rate in the Bay also appears higher than in recent years.

The abundance of one-year-old fish could indicate that 1969 year-class was relatively strong; but the catch of one-year-old fish has not been a reliable indicator of year-class strength. The preliminary data suggest that the rate of exploitation is higher, and the 1969 year-class is more available to the fishery. If this is so, then the resource continues to be in serious trouble despite this year's increased catch.

Gulf of Mexico Record

In the Gulf of Mexico, a new record will be set in 1970. This catch results from strong 1968 and 1969 year-classes of Gulf menhaden. Although the juvenile surveys are not complete, preliminary data indicate the 1970 year-class index is only half the 1968 and 1969 indexes.

Recruitment Patterns Studied

To further investigate recruitment patterns, juvenile menhaden in selected Atlantic and Gulf estuaries are tagged in the summer and fall before they migrate outward. Juveniles tagged last fall in Rhode Island estuaries occurred this spring and summer in Florida and North Carolina catches.

Analyses of the population dynamics of Gulf and Atlantic menhaden have been completed. They are being used as guidelines to recommend management procedures.

FISHERY-RESOURCE STUDY AIDED BY SPACE PROGRAM

The U.S. space program is helping to find and determine the abundance of fishery resources. An agreement between NASA and BCF enables the Bureau to use equipment at NASA's Mississippi Test Facility at Bay St. Louis and NASA's "know-how" in applying the data obtained to fishery problems.

Aerospace Sensing Studies

Initial aerospace sensing studies will involve sighting with light amplifiers, laser, aerial photos, and other equipment designed to help detect fish schools and to study sea-surface conditions from high altitudes.

NASA's engineering and management skills will be used to help develop additional sensing equipment, and to provide test and evaluation studies.

The Mississippi Test Facility is ideal to assist BCF in implementing its remote sensing activities.

Dr. Leslie L. Glasgow, Assistant Secretary of Interior, said: "Aerospace sensing offers two distinct but related opportunities to gather information on the status of oceanic resources. First is the location and assessment of living marine resources, and secondly, the sensing of broad physical, chemical, and biological conditions of the ocean which affect those resources."

NASA-BCF Cooperation

The latest NASA-BCF agreement is another cooperative effort in a series dating to mid-1960's. Then, photos and other data from manned and unmanned space flights provided valuable information on the ocean environment, including pollution.

MONTHLY SEA-SURFACE TEMPERATURE CHART AVAILABLE FOR N. PACIFIC

A new monthly sea-surface temperature chart for the northwestern Pacific is included in the Fishing Information publication of BCF's Fishery-Oceanography Center, La Jolla, Calif. Yearly and long-term sea-surface temperature anomaly charts for the area will be published later.

Dr. R. Michael Laurs, leader of Fishery-Oceanography Group, says that with this chart sea-surface temperature conditions now are monitored over entire north Pacific and eastern tropical Pacific.

Charts Will Aid Scientists

This is first time that such monthly charts are available "on a near real-time basis" for the entire North Pacific. The extensive coverage will enable BCF scientists and others "to study large-scale changes in sea surface temperature patterns that may affect the distribution, abundance, and availability of commercially important fishes in the north and eastern tropical Pacific."

Satellite Receiver In Operation

In July, an Automatic Picture Transmission (APT) satellite receiver was installed at La Jolla to provide more weather and sea-surface temperature information for fishery advisories along west coast and over eastern tropical Pacific.

During August, the APT tracked ESSA weather satellites nearly every day before issuance of the daily albacore and eastern tropical fishery advisories prepared by Dr. Nathan Clark and Forrest Miller. Cloud-cover photos were excellent. Infrared sea-surface temperature photos were of moderate quality. Both sets of photos, when combined with ship observations, have provided valuable information to analyze and forecast weather and sea-state conditions over albacore and tropical tuna-fishing areas.

Mark Sweeney handles the APT. Larry Eber prepares the necessary background information to track satellite.

ANCHOVIES SPAWN IN CAPTIVITY

At BCF La Jolla, in August, R. Leong obtained anchovy spawning by injecting gonadotropins and salmon pituitaries at 48-hour intervals. Between 72 and 96 hours after first injection, the anchovy spawned. The eggs were trapped in an outflow of tank. Of about 5,000 eggs spawned, about 20 floating eggs were seen with developing embryos.

Extreme Day-Night Regime

A contributing factor to spawning activity has been extreme day-night regime: 4 hours of daylight and 20 hours of darkness that preceded hormone injections. This regime has been found superior to many others tested in bringing anchovy gonads to near-spawning condition. Anchovy larvae hatched from these eggs are developing normally in tanks at La Jolla.

GREAT LAKES SALMON SET STATE RECORDS

Coho and chinook salmon caught recently in Michigan waters of Great Lakes have set new state records, according to Michigan Department of Natural Resources. The records very likely apply to all the Great Lakes.

The record-sized salmon were caught in eastern Lake Michigan, where coho were first planted in tributary streams in 1966 and chinook in 1967.

Coho & Chinook

The coho, or silver salmon, caught near Manistee weighed 26 pounds, 4 ounces, and was $38\frac{1}{2}$ inches long. The record for this species is 31 pounds, set in British Columbia in 1947.

The record chinook, or king salmon, for the Lakes also was caught in Manistee area. It weighed 42 pounds and was 46 inches long. Michigan fishery officials believe chinook running up to 50 pounds may be caught soon. The record chinook, one of the largest salmon species, was caught on the west coast. It weighed over 100 pounds.

U.S. OYSTERS & CLAMS WELL RECEIVED AT BRUSSELS FAIR

Fresh Blue Point oysters and hard-shell clams were introduced to food tradesmen in September at the Brussels International Food Trade Fair. The products were delivered by jet air freight in prime condition and proved big hits.

Buyers were complimentary about Blue Point's flavor and size. Hard-shell clams are virtually unknown in Western Europe. Importers welcomed chance to add a fresh shellfish to their line. Several major firms said they would start importing clams and oysters immediately.

Dutch Situation

The oyster beds in Holland are being destroyed by pollution and land fill. Holland used to be largest supplier of fresh oysters to Belgium. The shortage now presents an opportunity for other oyster-producing nations.

BCF CONDUCTS RESEARCH ON PESTICIDE RESIDUES

Scientists of the BCF Fishery-Oceanography Center, La Jolla, Calif., are participating in a nationwide survey of pesticide residues in marine fishes. So far, the survey has been limited to DDT and the products into which it breaks down. Since January 1970, samples of livers from small numbers of sand bass, rock cod, ocean white fish, hake, bonito, jack mackerel, and other species have been collected from Cortez Bank on Baja California coast northward to Santa Monica Bay.

Pesticides are known to accumulate in the livers of fish, so presence of even small amounts can first be detected in that organ. However, no general relationship has yet been established between pesticide amounts in liver and those in flesh. Preliminary investigations indicate that pesticide amounts in flesh are substantially lower than those in liver.

First Findings

Preliminary study shows that lowest amounts of DDT were in livers of fish taken off Baja California; the highest amounts in livers of fish collected from Santa Monica Bay. Levels of DDT in livers of all fish examined ranged from less than $\frac{1}{25}$ part per million parts of liver in 10 sand bass from Baja California--to average of 1,000 parts per million (ppm) in a group of 5 rockfish from Santa Monica Bay (not a commercial fishing area). The DDT in flesh of Santa Monica rockfish was 30 ppm. Other species from Santa Monica Bay had much lower levels in both livers and flesh. Samples of 41 rockfish from Santa Catalina Island had average of only 12 ppm of DDT in livers. Federal regulations limit DDT to 5 ppm in fish flesh sold for human consumption.

Study Fishes' Food

BCF La Jolla recently began to study pesticide levels in microscopic food of fishes in California Current and effect of pesticides on anchovies.

SANTA BARBARA OIL SPILL CAUSED LITTLE PERMANENT DAMAGE

The Santa Barbara (Calif.) oil spill caused minimal, if any, permanent damage to the ecology of Santa Barbara Channel. This was theme of a report of the U.S. Geological Survey based on information from government agencies and universities. Biologists found no evidence that a significant number of marine fauna was affected adversely by either short-term or long-term effects of the spill. Even though some marine animal deaths reasonably can be attributed to oil, it is not clear whether the oil came from spill area or from natural seeps.

The Findings

Neither representatives from the University of Southern California nor Interior Department could find evidence that deaths of seals, sea elephants, or whales were more than normal, nor that any deaths were due to oil contamination.

Fish life counts and commercial catches showed no decline for comparable periods of February to July in 1968 and 1969. Though algae and marine grass in intertidal zones of Channel Islands were damaged, they had recovered almost fully by August 1969.

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NEW BOOKLET ON INVESTIGATING FISH KILLS

A 21-page booklet, "Investigating Fish Mortalities," has been published by the Federal Water Quality Administration (FWQA).

Commissioner David D. Dominick described it as a comprehensive guide for the field investigator in obtaining samples, preparing specimens for analysis, and evaluating data to determine cause of deaths.

The booklet has a checklist to aid investigator in thorough study of kill and in reporting symptoms of dead or dying fish.

Investigation Important

Dominick said: "It is particularly important that significant fish kills are reported and scientifically investigated because they may indicate violations of Federal-State water quality standards or enforcement conference recommendations." The field investigator's observations of dead fish and their environment are essential to determine whether kill resulted from manmade pollution or from adverse natural conditions. Dominick also said: "Where pollution is the cause, the investigator's findings can be a major factor in helping to correct the situation."

U.S. State Relations

FWQA has established voluntary reporting procedures with the states through its 9 regional offices to provide a swift response to fish kills. The states exercise primary responsibility for investigating fish kills within their boundaries, but FWQA shares this responsibility where interstate waters are affected.

FWQA can provide technical assistance to states in conducting investigations.

Copies may be obtained from Office of Public Information, Federal Water Quality Administration, U.S. Department of the Interior, Washington, D.C. 20242.

BIGHT NAMED FOR HENRY B. BIGELOW (1879-1967)

The New England coast between Cape Ann and Cape Small of the western Gulf of Maine forms a large open bay, a bight. The bight has been named Bigelow Bight by the Board of Geographic Names, Geological Survey, U.S. Department of the Interior, in honor of Henry B. Bigelow (1879-1967). He was an early contributor to oceanographic knowledge of the area (C.G.S. charts 70 and 1106).

The name was suggested by Dr. Joseph J. Graham, U.S. Biological Laboratory at Boothbay Harbor, Maine. His recent oceanographic studies show this bight has oceanic conditions that differ from the remainder of the coast and from the offshore waters of the Gulf of Maine.

Bigelow Bight always has been important to coastal fishermen for its pelagic and bottom fisheries.

'OCEAN QUEEN' MAKES DEBUT

The Ocean Queen, world's largest tuna purse seiner, recently made her debut in South Pacific.

Designer and builder is Campbell Machine, Inc., San Diego. Owner is Ace Fisheries Co., captain, Roland Virissimo.

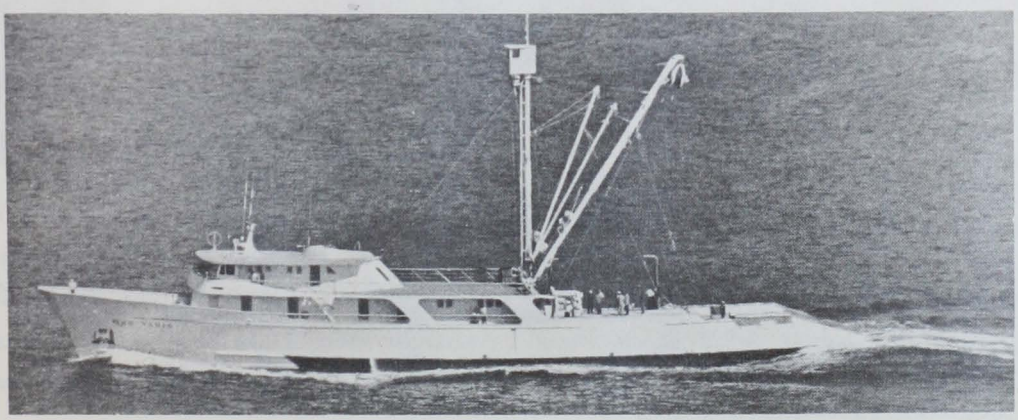
The vessel is 202 feet long, has 42-foot beam, and capacity of over 1,300 tons of fish. Powered by a General Motors 20-cylinder, 3,600-hp. diesel engine, she has cruising speed of 16 knots and range of 7,200 miles. Auxiliaries: 3 Caterpillar No. 353 diesels w 250 kw. generators; 1 Caterpillar No. 343 diesel with 150 kw. generators.

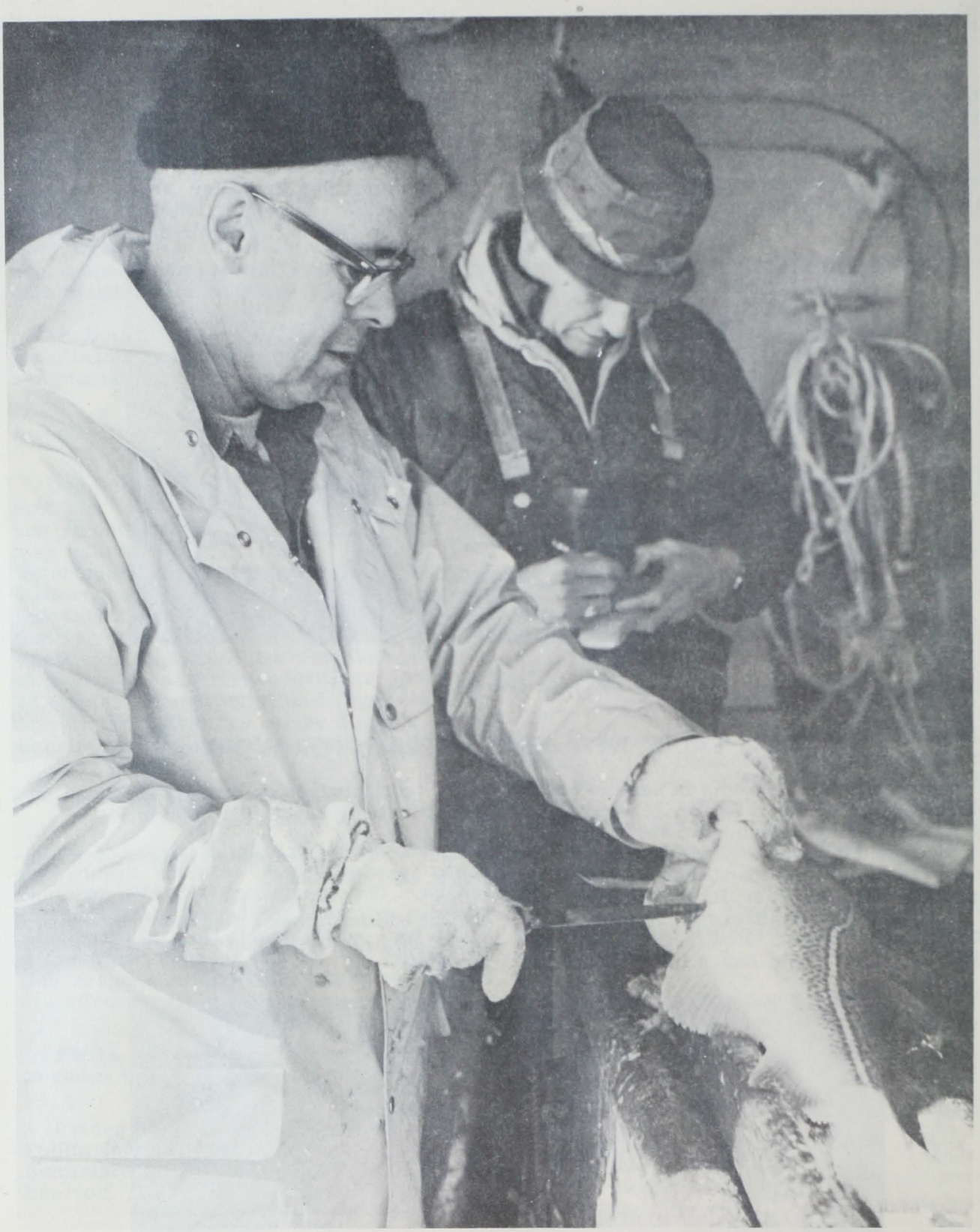
'QUO VADIS', NEW SEINER, IS READY FOR WORK

The new seiner Quo Vadis is seen in photo returning to San Diego Harbor (Calif.) after sea trials in early September 1970. The hull was designed by Rados Western Corp., machinery and interior by San Diego Marine Construction Co. Built for R. A. Watt, vessel is skippered by Joe Rogers. Her length is 202'9", beam 36'3". Powered by an Alco 3,100-hp. diesel, she has a fish capacity of 1,000 tons, cruises at 15.9 knots loaded, and has a cruising range of 17,000 miles.

Quo Vadis was expected to leave for fishing in early October.

The builder is scheduled to produce 7 or 8 more similar or larger seiners for various owners.





Checking stomach contents of cod. (Photo: Robert K. Brigham)

MARSH CLAMS ARE UNEXPLOITED RESOURCE, SAYS VIMS

Vast beds of marsh clams are awaiting use by man, scientists of the Virginia Institute of Marine Science, Gloucester Point, reported in September. They were attending Regional Seafood Seminar at Virginia Beach. Dexter Haven discussed the distribution and abundance of Rangia, the marsh clam, in Virginia waters. Dr. Marvin Wass described its general biology.

Although sampling for Rangia in Virginia has not been completed, Haven said they are very abundant in parts of James and Rappahannock rivers. They are found off lower Machodoc Creek on Potomac and far up the river, but most Potomac tributaries have not been sampled. Marsh clams have not been found in York River.

Many in James R.

In James River, extremely large populations occur from below Jamestown Island to Windmill Point. Haven reported: "On July 16, 1970, we took our hydraulic dredge to the vicinity of Hog Island on the James River near the Surry Power Plant intake for cooling water. Clams were lifted by the dredge at the rate of 1-2 bushels per minute. These clams shucked out about 8 pints per bushel. However, yields at other seasons might be lower." He estimated that in this stretch of river over a ton of meats could be recovered in a day.

The Marsh Clam

Dr. Wass reported that first record of a living Rangia on east coast was by Harry Wells in 1955 in Newport River, North Carolina. Wass stated: "It is not known when or how they were first introduced into Virginia, but they were certainly present in Back Bay by 1960, and probably entered the James River about that time. The marsh clam is the same family with the well-known surf clam and the little Mulinia, probably the most abundant clam in Chesapeake Bay. Both are used by wild ducks for food."

If some natural predators on juvenile Rangia were not present, Wass thinks, the clams might set so heavily that many would starve when plankton productivity was low.

Food in Texas & Mexico

One report states marsh clams were canned as early as 1892 in Galveston, Texas, and marketed as "Little Neck Clams." In 1957, marsh clams in Mexico were served in clam-and-rice dish called "Paella a Valenciana."

Possible Food

In sections of James and Rappahannock rivers, marsh clams are so abundant they make up probably 98% of the weight of everything living in the bottom, the VIMS scientists claim.

Haven stated: "This is an enormous mass of usable food. Rangia might possibly be eaten by humans cooked in chowders, steamed or cooked in other ways. They also could be manufactured into poultry feed and cat and dog food."

When used for human consumption, Rangia should be harvested and handled under health laws regulating oyster and clam use. It is not safe to eat those taken from polluted waters, the scientists warn.

12-MONTH OUTLOOK FOR VIRGINIA-AREA CRABS REMAINS POOR

The outlook for crab stocks for the next 12 months remains poor, say W. A. Van Engel and Mark E. Chittenden Jr., who conduct crab surveys for the Virginia Institute of Marine Science (VIMS), Gloucester Point, Va. Relatively few crabs from the 1969 hatch appeared in samples taken routinely to form basis for predicting catch a year in advance.

Van Engel said: "The crabs which hatched out during the summer of 1969 began to reach commercial size this month (Sept. 1970) and will form the major part of the commercial fishery through August 1971. At that time the 1970 hatch will reach legal size and will become the major source of the catch. Since the number of young crabs hatched out in 1969 appears below average, the catch for the fall of this year and next summer is expected to be below average."

Estimate 50 Million Pounds

The scientists estimate combined Maryland-Virginia commercial catch for Sept. 1970 through Aug. 1971 may be only 50 million pounds. From Sept. 1969 through Aug. 1970, unconfirmed landings are believed close to 70 million pounds. However, this figure is short of the 100 million pounds predicted by VIMS for that crab season.

Why Decline?

Van Engel had based his higher estimate on unprecedented number of young crabs appearing in late summer 1969. But surveys in early spring 1970 indicated stock of young crabs had been greatly reduced. He believes many were destroyed by the unusually heavy rains before and during Hurricane Camille in August 1969, and the severe cold of last winter, although it could not be verified.

Van Engel added: "Most of the crabs caught in the last 12 months were hatched in 1968. Numerically this was the biggest crop ever reported." He noted that crabs hatched that year were so numerous they overcrowded bay and lacked adequate food.

Less Meat Per Crab

Food demand was greater than the environment could provide, so the crabs were in poor condition. They became vulnerable to the freshwater flooding and the severe cold that followed.

Van Engel said: "The most unexpected blow to the economy came when the crab houses realized that they were getting less crab meat per 100 pounds of crabs brought from the crabbers than any time previously. Malnutrition resulted in a reduction in average size of crabs which in turn yielded less meat. Both Maryland and Virginia crab houses reported getting only 8 to 10 pounds of meat per 100 pounds of live crabs bought, instead of the usual 14 pounds."

Long-Range Outlook Brighter

Although the 12-month outlook for crab stocks remains poor, the long-range outlook is brighter.

"Crab stocks appear to be on the increase again," said Chittenden. "Small crabs hatched in 1970 are already present in Virginia waters and in such large numbers that we predict larger than average supplies for the 12 months beginning September 1971."

Many factors could cause change in crab population before 1971, the scientists stated. But with average crab survival, crabbers can look forward to above-average catches in the late pot fishery of 1971. Similar catches are expected to continue through dredge fishery of 1971-72, and into pot fishery of 1972.

SOUTH CAROLINA COMMERCIAL CATCHES ARE ABOUT AVERAGE IN FIRST HALF

Landings of fish and shellfish during first 6 months of 1970 have been about average for most species, reports South Carolina's Marine Resources Division. Total catches exceeded 3.5 million pounds. The run of brown shrimp in 1970 has been well above 1969's. During June, about 357,194 pounds of shrimp worth $180,370 to the fishermen were landed at S.C. ports. Last year's brown shrimp crop in June was only 23,387 pounds. Although drought hampered "run" of browns during latter June 1970, landing reports from dealers up to August indicate a heads-on catch of around one million pounds for July. This preseason sampling indicated an average or slightly better season for browns.

White Shrimp

Experimental sampling for white shrimp has indicated that the major commercial crop is in the Southern coastal area. Spawning stocks of white shrimp were down this spring. This probably accounts for apparent shortage in Charleston area. However, Georgia's white "roe" shrimp crop was extensive enough to support a fair fishery during May-June. The Marine Resources Division says there is reason to believe that Georgia's spawning crop contributed significantly to Southern portion of South Carolina's shrimp fishery. The postlarvae are carried into S. Carolina's southern sounds, bays, and estuaries via the oceanic currents.

Sea Bass Near Record

As of August, landings of sea bass were approaching all-time high. Over a million pounds were landed during January-June 1970. Large concentrations are located off S. Carolina coast. Potentials for expansion are significant, the Division believes.

Blue Crabs Down

Blue-crab production through June 1970 was down almost 800,000 pounds. Poor April-May catch accounted for decrease in overall fishing. Many crabs were in precommercial size class and needed just one molt before attaining legal size. The July reports from crab dealers and processors indicate a better trend: almost a million pounds were reported. This was below last July's by only a few thousand pounds. If prices remain constant, annual production should be good. No large crab kills in commercial fishing areas were reported this year. Fall and winter sampling by Division biologists showed abundance of juvenile crabs which would enter summer fishery. N. Carolina crab production is good this year; trend is even better up the coast.

Hard Clams

Landings of hard clams exceeded 77,000 pounds during first-half 1970, a significant increase over past years. The prices for clams in New York market have been good; clammers were receiving up to $22-23 per bushel for little necks. Cherrystones were around $9-10 per bushel. The Marine Resources Division says that the hard-clam fishery appears to have a potential for considerable expansion. The supply has been moderate, demand good, and market steady.

Alewives

The production of alewives during April, peak of the herring run, was down 850,000 pounds. This was due to a power failure at the Santee-Cooper. The locks were closed. Fresh water flow was cut back into the Cooper River. This caused critical change in salinity--and resulted in considerable commercial loss.

GIANT BLUE WHALE'S VOICE DETECTED BY NAVAL SCIENTISTS

The vanishing blue whale has a strong underwater voice--"its powerful, half-minute murmur can travel over 100 miles"--report scientists of the Naval Undersea Research and Development Center (NUC), San Diego, Calif. The blue whale, the world's largest animal, grows to more than 100 feet and up to 130 tons. Overhunting has greatly reduced the stocks. Catch dropped from 6,908 animals in 1948 to only one in 1965.

The discovery occurred during a 6-week expedition of Dr. William C. Cummings, a NUC senior scientist, and Dr. Raymond M. Gilmore, Dr. Joseph R. Jehl Jr., and Steven L. Bowen, of San Diego Natural History Museum.

Expedition Departs From Southern Tip of South America

The expedition departed Punta Arena, Chile, aboard National Science Foundation's 125-foot ship 'R/V Hero'. Cummings and Paul O. Thompson, research psychologist, sighted 4 blue whales, about 75 feet long, near Guafo Island, southern Chile. Immediately, they lowered a hydrophone (underwater microphone), readied shipboard electronics, and began observing whale behavior.

Two Types of Whale Signals Noted

The blue whales voiced two kinds of signals: one lasted precisely 37 seconds, including a 2-second break. The second type lasted as long, but it exhibited two breaks, 1.5 and 3.5 seconds. Most acoustic energy was at 24 cycles per second, a murmuring sound about as low in pitch as man can hear.

Blue-whale signals are much longer than those recorded from other whales. They are extremely complicated--with overtones extending pitch up to about 250 cycles per second, about middle C on musical scale.

Cummings reported: "An interesting fact is that the blue whale produces these signals at very standardized intervals. There is a precise duration of 100 seconds from the beginning of one voice sequence to the beginning of the next. We have also found precise timing in the phonations (sounds) of other whales, but its significance is still a mystery. We still have no idea what the sounds mean.

"Beginning with our own work on right whales (so called because old time whalers considered them the 'right' ones to go after), we have learned that these great beasts have very characteristic phonations. Five years ago, I discovered that right whales repeat a complicated, 12-minute stanza of signals in exactly the same way, signal for signal. More recently, others have reported a similar occurrence among humpback whales, the so-called song of the whales...a good analogy for this phenomenon might be a man reciting the same poem over and over again. This thrilling experience with the blue whales once again pointed out the orderly conduct of whale voices.

"It is clear that whale phonations are not voiced indiscriminately. They may well represent a simple kind of communication. Even though it may be a very elementary form of communication compared to man's, our biggest job as behaviorists is to learn what is implied in the sound produced by the whales."

Whales Respond to Other Whale Voices

Cummings and his coworkers have shown that different species of marine mammals can recognize one another's voices. They played back the eerie screams of the killer whale, a predator of other whales, which caused gray whales and beluga whales to leave an area.

Helpful To Salmon Fishery

This knowledge recently was put to practical use in an Alaskan river. There, Dr. James F. Fish, NUC oceanographer, successfully kept hundreds of belugas from devouring young salmon before the fish could reach the open sea.

TECHNICAL NOTES FOR INDUSTRY

NEW RECOMMENDATIONS FOR PRESERVATION OF FISH BY FREEZING

M. L. Anderson

During recent years, research has given us greater insight into the causes of toughening in fish during frozen storage. This article discusses the research findings--and uses these as a basis to recommend new freezing techniques.

Recommendations for preserving fish by freezing have been based on the results of studies made over a period of about 40 years. The studies were designed to determine the effects of storage time, storage temperature, and other variables on quality of stored product.

The researchers have found that fish retain their quality best when they are (1) of good quality initially, (2) wrapped in material that is a good barrier to passage of air and moisture, and (3) deep-frozen, preferably at -20° F. However, holding times, temperatures before fish are frozen, and rate of freezing them have not always been considered critical.

Retaining Quality in Frozen Storage

The retention of quality in fish when held in frozen storage as recommended has been attributed largely to the effect of low temperature in slowing the rates of reactions that decrease quality. If the storage temperature is not low enough, the reactions causing toughening and development of rancidity usually end the product's storage life quickly.

Although much was known about the nature of the reactions causing rancidity, little was known about the nature of those causing toughening. About 20 years ago, evidence began to accumulate that toughening in frozen-stored fish is accompanied by the hydrolysis of lipids--by the breakdown of fats and related compounds as the result of the action of enzymes. Because of differences in the extent that the hydrolysis of lipids affects the toughening process in various species of fish, the relation was not generally recognized. During the past five years, however, studies have shown that the two phenomena are definitely related. We now know enough about the toughening process to propose a model for the way toughening takes place in frozen tissue.

What does this information on the nature of the process that results in loss of quality mean for the fisherman, the handler, the processor, and the distributor of fish preserved by freezing? Here is the way prefreezing handling, freezing rate, and storage temperature affect the course of lipid hydrolysis--and affect the development of toughening.

Prefreezing Holding Time & Temperatures

The products of lipid hydrolysis begin to accumulate after the death of the fish. The rate at which these products accumulate depends on the temperature at which fish are held--the higher the temperature, the faster the products form. Before a fish is frozen, these products of lipid hydrolysis exert some effect on the proteins of a fish; but soon after it is frozen, they exert their full effect. Even in a fish deep-frozen at recommended temperatures, they will bring about toughening in less than two weeks. The greater their amounts present, the greater the toughening.

This finding indicates that after fish are caught and, before they are processed, those destined for freezing should be held in ice. Ideally, when they are removed from the water

M. L. Anderson is Research Chemist, BCF Technological Laboratory, Gloucester, Massachusetts 01930.

in which they are caught, their temperature should be held as close to 32° F. as possible until they are frozen. Because a time-temperature relation applies to lipid hydrolysis during storage of fish in ice, they should be frozen as quickly as possible after capture--preferably before onset of rigor.

Freezing Rate

Paradoxically, although lowering temperature tends to slow rate of chemical reaction, some reactions occur more rapidly at temperatures just below 32° F. than at those just above it. In short, the favorable conditions for reaction in the frozen muscle just below 32° F. more than offset effects of decreased temperature on reaction rates. Some reactions that cause toughening are of this type. Recently, researchers reported that reactions causing decreases in the substances which contribute to flavor of very fresh fish are also of this type. These findings argue strongly for use of very-quick-freezing techniques, such as can be obtained with liquid nitrogen, liquid carbon dioxide, or liquid Refrigerant 12.

Storage Temperature

Recommendations for storing fish at about -20° F. have been based on assumption that retention of quality for long periods at that temperature is due simply to effect of temperature on slowing reaction rates. Researchers thought that if fish were held in storage long enough, the changes in quality would be just as extensive as those that occur more quickly at higher storage temperatures. We now have found that lipid hydrolysis proceeds to various levels of completion, depending on the temperature of storage. In the range of practical storage temperatures, the lower the storage temperature, the less the extent to which lipid hydrolysis will occur.

This new finding means that the potentials for retention of quality through lowering temperature of storage are greater than we had predicted previously. To reap benefits of storage at low temperature, however, we must maintain low storage temperature. If we allow temperature to rise--even for a short period--the hydrolysis of lipid will not only occur at an increased rate but will tend to approach a higher level of completion.

Recommendations

1. After fish are caught and, before they are processed, hold in ice those fish destined for freezing.

2. During period of iced storage before freezing, lower temperature of fish quickly to 32° F., and hold them at that temperature.

3. Freeze the fish as soon after capture as possible--preferably before onset of rigor.

4. When freezing fish, use very-quick-freezing techniques, such as can be obtained with liquid nitrogen, liquid carbon dioxide, or liquid Refrigerant 12.

5. While holding fish in frozen storage, do not at any time allow their temperature to rise above -20° F.

NORTHERN SHRIMP: Its Fresh & Frozen Life When Cooked at Different Stages of Freshness

Burton L. Tinker and J. Perry Lane

Norwegian and Swedish scientists have reported that the quality and yield of northern shrimp, Pandalus borealis, can be enhanced by cooking the catch soon after harvesting. BCF's Gloucester Technological Laboratory sought to determine the extent of the advantage of cooking shrimp within 2 hours after catching over shrimp cooked 24 hours after catching--and over shrimp not cooked at all. We also investigated the freezing of shrimp at sea.

This study was concerned with raw frozen shrimp and with frozen shrimp because New England northern shrimp are marketed in both forms.

The shrimp used were caught in Gulf of Maine during February 1968 in three days of fishing.

The Test

The shrimp cooked at sea were cooked by the following method: A gas-fired Frialator[1/] of 10-gallon capacity was filled with sea water, which was heated to boiling. Two wire baskets, each containing about 5 pounds of washed shrimp, were immersed in the boiling water (water resumed boiling in less than a minute) for 2 minutes. This procedure was repeated until 50 pounds of shrimp from each tow were cooked. After cooking, they were allowed to cool on deck to ambient temperature (32°-42° F.). The cooling time was 2 to 3 hours. Half the shrimp were packed in fillet tins and stored in ice within insulated containers; half were individually quick-frozen (IQF). The quality and storage life of shrimp reported in this paper were determined periodically by a laboratory taste panel.

Results of Study

The results of this study showed that cooking at sea improves the texture and enhances the flavor of northern shrimp. More important, the quality of shrimp cooked at sea less than 8 hours after landing was better than the quality of shrimp held for more than 8 hours before cooking. The texture of the shrimp cooked at sea was firmer, and the shelf life was longer than that of shrimp cooked ashore 24 hours after being caught.

Shrimp cooked at sea and stored at 33° F. rated an average score of 6.6 (fair to good), and they had an average acceptable shelf life of about 3 weeks. This compared with a shelf life of 1 week for shrimp cooked ashore. The shrimp cooked and frozen at sea had an average quality rating of 7.0 (good), compared with 6.3 (fair to good) for shrimp frozen in raw state. The samples cooked and frozen at the laboratory were of low quality throughout the test (5 months).

Mr. Tinker is Chemist
Mr. Lane is Supervisory Research Food Technologist } BCF Technological Laboratory, Emerson Avenue, Gloucester, Mass. 01930.

1/Trade names are used to simplify description of experiment, not to endorse commercial products.

USE OF ANTIFOAMING AGENTS IN SHRIMP COOKING

John C. Leyczek Jr.

When shrimp is cooked in brine, one problem noted by some processors is the formation of an excess amount of foam. This is particularly noticeable in cooking at sea.

Recently, several silicone antifoam emulsions have been evaluated for use as defoamers in shrimp cookers. The antifoamants were FG-10 from Dow Chemical, and AF-72 silicone antifoam from General Electric. 1/ Both antifoamants are approved by the U.S. Food and Drug Administration for use as direct food additives in concentrations decribed in their literature. The permissible concentrations vary according to the individual foam, and the user should observe these.

Testing Emulsions

To test the emulsions, each was added to a uniform amount of water that contained a 16% salt solution by weight. Dow's FG-10 was added in 10 ppm, and General Electric's AF-72 was added in concentrations of 30 ppm. Then, the solution was brought to a boil, and an equal amount of shrimp added to each.

Results showed that both emulsions were successful in retarding formation of foam ordinarily produced when shrimp is cooked.

Dow's FG-10

Dow's FG-10 emulsion is a food grade 10% silicone emulsion designed for aqueous solutions. It is effective at temperatures up to 212° F., in concentrations from 10 to 100 ppm. It can be ordered directly from Dow Corning Corporation, 886 Washington Street, Dedham, Massachusetts 02026. The price for a 5-gallon can is 56 cents per pound.

GE's AF-72

General Electric's AF-72 is a 30% silicone emulsion designed for aqueous solutions in concentrations up to 33 ppm. However, this emulsion did not mix with brine solution as easily as Dow's FG-10. It required a little more stirring. It can be ordered directly from General Electric Company, 2120 Commonwealth Avenue, Auburndale, Massachusetts 02166. The price for one to 25 cans is $1.53 per pound, and $1.23 per pound for orders over 25 cans.

Mr. Leyczek is Northeastern Cooperative Student with BCF Technological Laboratory, Emerson Avenue, Gloucester, Mass. 01930.

1/Trade names are used to simplify description of experiment, not to endorse commercial products.

GETTING MEAT FROM UNCOOPERATIVE CRABS

Because picking meat from crab by hand is tiresome--and because the meat adheres tenaciously to the shell--the search for a mechanical process to separate meat from shell has challenged ingenuity of industrial scientists.

One was Dr. Wayne Tretsven, BCF Technology Laboratory, Seattle. He saw two basic needs: the need to recover meat not now being recovered by hand-picking method; the need to improve efficiency of present manual method. For example, sections of the crab that are hard to pick, such as tips of legs, might be picked with aid of a machine, whereas prime sections, such as the large leg section of the Dungeness crab, can best be separated manually.

Dr. Tretsven's Approach

Dr. Tretsven visualized a combined manual and machine process in which the prime-value, easy-to-separate meat is recovered by hand, and the lesser-value, hard-to separate meat is recovered by machine. In the machine recovery, he pictured a centrifugal method in which the shell portions, after having been chopped into $\frac{3}{4}$-inch lengths, are separated from the meat by the difference in density of the meat and shell in brine.

A centrifugal provides several options in adjusting operation to (a) size of crab, (b) difficulty in separating meat from shell, (c) availability of labor, and (d) market for the product. You can produce an aseptic product free from possibility of human contamination because if you choose a completely mechanized operation--with small hard-to-pick crabs, for example--the crab is not touched by hand after it is butchered and cooked.

Sought Continuous Process

Dr. Tretsven had difficulty developing his process, primarily because he wanted a continuous rather than a batch process. To accomplish this, he had to use a centrifugal, which will discharge solids continuously. The only centrifugal available, however, was one designed to separate solids such as wood pulp. Nevertheless, it worked remarkably well.

The main difficulty was that it broke the crab meat into particles smaller than is most desirable. To solve this problem, Dr. Tretsven suggested several changes in the centrifugal's design, which the manufacturer is undertaking.

Crab-Meat Yield Up 50%

Even at present stage of development, the process is impressive: it increases yield of crab meat by 50%. This improved yield results from virtually complete separation of meat from shell, and less loss of soluble protein and flavor components from meat.

Dr. Tretsven has tried his process with three species of crab: Dungeness, blue, and tanner (also called snow crab). The yields he obtained from Dungeness crab waste after crab had been picked was 14 to 20%; from cooked blue-crab claws 31%; from cooked tanner-crab bodies 52%; and from cooked tanner-crab legs 29%.

Dr. Tretsven's process has the potential of rapidly producing in a continuous operation an aseptic, uniform, flavorful product at low cost and minimum labor and waste. Because of these advantages, he is confident that crab processing in the future will be done by this method.

TRAILER SHIPMENT OF LIVE DUNGENESS CRAB

To sell Dungeness crab meat successfully, advise the scientists of BCF's Seattle Technology Laboratory, you have to keep in mind that it's a delicious but delicate product subject to rapid spoilage. So, the best way is to deliver it alive.

The first real step in this direction was taken about 3 years ago by the laboratory. It perfected a method of shipping live crab by air. The aim was to ship live Dungeness crab from Washington State, where they grow to a nice 2-pound size, to Hawaii, where they don't grow. The method was so successful that live Dungeness crab can be air-shipped to almost anywhere in the world.

By Truck

How about shipping them by truck? Of course, a truck takes longer, and this gives the crab more chance to die, which they do easily enough.

This problem of crab mortality was solved by using the know-how acquired in learning how to air-ship live crabs and by taking advantage of the fact that weight is not crucial in truck shipment. The laboratory developed a system of holding crab. It used shallow trays flooded with filtered, recirculated, refrigerated seawater. Dungeness crab are kept in good condition for at least 7 days. And, in 7 days, live crab can be trucked to virtually any place in the United States.

Trial Shipments

The researchers, in cooperation with industry, took a 30-foot refrigerated commercial trailer and installed a refrigerated-seawater system with plastic trays, each holding 8 crabs.

Fig. 1 - Loading live Dungeness crab in holding trays aboard a crab boat on the coast of Washington.

Figs. 2 & 3 - Unloading trays of live Dungeness crab from 30-foot refrigerated trailer at a market in Portland, Oregon.

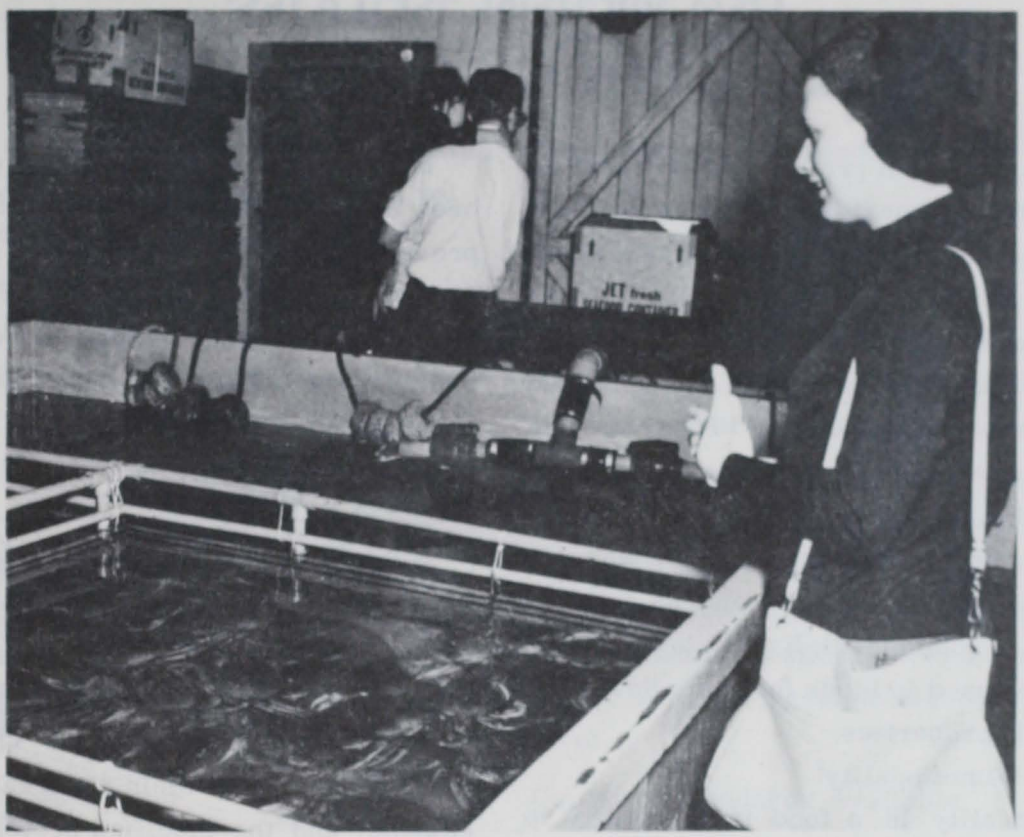


Fig. 4 - Customer for live Dungeness crab held in tank after being shipped from coast of Washington.

In the first over-the-road test, 3,600 pounds of live Dungeness crab were loaded into the trailer at a plant on the Washington coast and trucked to Portland, Oregon, by way of Seattle, a distance of 380 miles. The run was a complete success: all the crabs were alive and well.

In the next test run, the truck owners shipped 4,200 pounds of live crab from Westport, Washington, to California, where they made deliveries to Port Morrow, Santa Barbara, Redondo Beach, San Pedro, and Long Beach. The total distance was about 1,300 miles. The results were encouraging enough for the firm to contract for two 40-foot trailers to be outfitted for regular crab hauling. At present, live Dungeness crab are being air-shipped from Alaska to Washington State, and distributed by truck along the coast.

Now there's an industry based on shipping live Dungeness crab by air and truck--and there are happy gourmets.

FISH PROTEIN 'ISOLATES' ARE MODERN FOOD INGREDIENTS

Wider use of fish protein concentrates as pure isolates is indicated by work of the BCF Technology Laboratory, Seattle, Washington. Believing that underutilized species of fish could be used as a basic source of protein, its scientists separated and concentrated fish proteins into isolates. These contain over 90% protein and should have wide appeal in the food industry.

Fish protein concentrate (FPC) was developed by BCF primarily for use as a nutritious protein supplement; fish protein isolates also may be used in foods for their desirable 'functional' properties.

A Food's 'Functionality'

Functionality in a food is its ability to impart desirable characteristics to a processed food. Egg albumin, for example, is used to make meringues, or to give sponginess to angel food cake. Lean meat is used to bind fats and water in processed meats such as frankfurters. Egg yolk is used for similar purposes to emulsify the water, vinegar, and oil in mayonnaise. Less familiar examples are coffee whiteners and synthetic whipped toppings, where sodium caseinate is used as a lipid emulsifier and whipping agent.

In recent years, vegetable proteins have been isolated and modified to fill functions in processed foods industry, where demand for them is increasing continually. Protein isolates made from fish have an added advantage over vegetable proteins: they are superior nutritionally.

How Lab Prepares Isolates

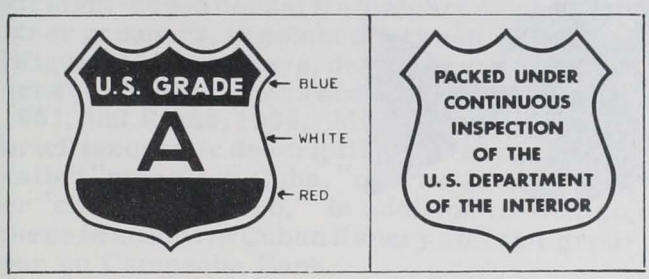
Fish protein isolates are prepared at Seattle Technology Laboratory by extracting minced, eviscerated, and deboned fish with a mild saline solution to remove most water-soluble constituents and oil. Then, the extracted muscle protein is treated with an enzyme, and the modified proteins are isolated, washed, and dried. The isolates are white, bland to the taste, and have good properties as moisture binders, emulsifiers, and whipping agents in processed foods.

The work at Seattle suggests that in the future FPC may be produced in several forms. Like many natural products, purified fish proteins will appear as an indistinguishable component in many foods blended to suit the preferences of people everywhere.

U.S. STANDARDS FOR FROZEN RAW SCALLOPS ANNOUNCED

To help the consumer select high-quality fishery products, BCF has published a voluntary standard for frozen raw scallops.

About 27% of the fishery products processed in the United States (about 327 million pounds in 1969) is inspected by the U.S. Department of the Interior (USDI). Many of the products carry the USDI shield.



Shield using red, white, and blue background.

Shield with plain background.

Under the inspection program, products are graded "A", "B", or "not acceptable." Inspection for compliance with sanitation and public health requirements is part of the BCF inspection service at processing plants.

The voluntary program, paid for by the processor, is similar to the also-voluntary Agriculture Department grading of poultry and dairy products. Any commercially harvested scallops are eligible for grading under the new standard. The U.S. scallop industry harvests 3 major areas: off Alaska, southeastern U.S., and the traditional scallop grounds off New England. Industry representatives worked with BCF technologists and scientists in developing the technical aspects.

Requirements for Product

Some requirements to receive Grade A state that the scallops must have good flavor and odor, reasonably uniform color, and be practically free from extraneous material. For Grade B, some of the defects noted are allowed within certain tolerances.

Current standards cover 17 fishery products, including precooked breaded scallops. The standards guide the processor in preparing a high-quality product; they provide the distributor, wholesaler, retailer, and consumer with an accurate description of quality level.

Copies of Standards Available

A processor does not have to subscribe to the USDI service to adhere to the standards. They may be used in a processor's quality-control program, but the U.S. Grade A shield may not be displayed on the package unless the plant subscribes to the program. Copies of the standards for frozen raw scallops may be obtained from Publications Unit, BCF, 1801 N. Moore St., Arlington, Va. 22209.

Standards also are available for fish blocks, cod fillets, haddock fillets, halibut steaks, ocean perch fillets, breaded fish portions, fried fish portions, salmon steaks, fried scallops, raw breaded shrimp, raw headless shrimp, sole and flounder fillets, breaded fish sticks, fried fish sticks, headless dressed whiting, and raw fish portions.