TRENDS AND DEVELOPMENTS

American Samoa

TUNA FISHING INDUSTRY IMPROVES FINANCES: Japanese know-how about tuna fishing has given American Samoa's finances a new look. Records for the past 12 months ending June 30, 1957, show that total imports for American Samoa were valued at $1,256,868 and exports $4,999,537.

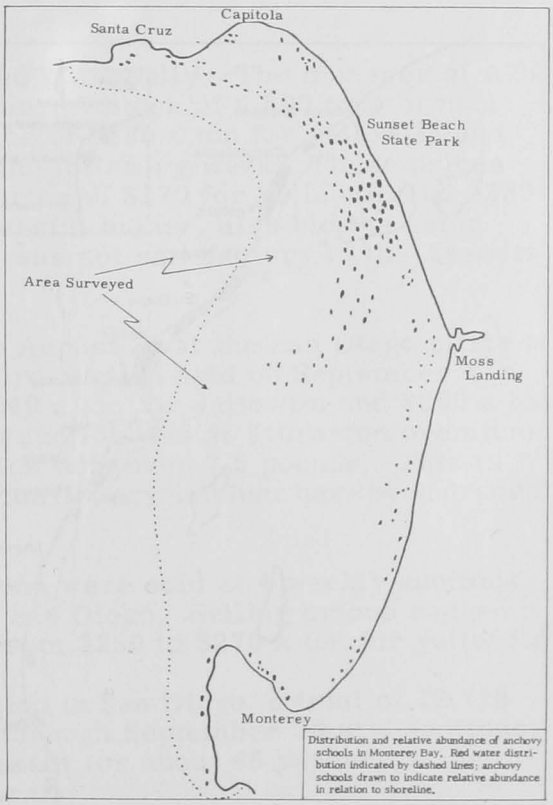
The major portion of the exports consisted of $4,833,187 of fish and canned tuna packed by the cannery located in the Island and operated by a United States west coast fish-canning firm. This is a $236,784 increase over fish production in the previous year (Pacific Islands Monthly, September 1957).

California

INSHORE AREA FROM SANTA CRUZ TO CARMEL SURVEYED FOR SCHOOLS OF YOUNG ANCHOVIES AND SARDINES (Airplane Spotting Flight No. 57-10): In order to check on reports of large numbers of young anchovies and sardines in Monterey Bay, an airplane spotting flight was made on October 11, 1957, by a privately-owned Beechcraft Bonanza under the direction of California's Department of Fish and Game.

Approximately 1,100 schools varying from 10 to 600 feet in diameter were observed in Monterey Bay. Over 700 of these schools were counted in a three-mile section of the coast near Sunset Beach State Park.

A "red water" bloom which was reported to have started developing about three days previously occupied the northern portion of the Bay. It was in and near this red water that most of the fish were concentrated. Water samples collected from this area on the afternoon of October 11 revealed that the organism contributing to the red color of the water was Ceratium sp., a dinoflagellate. The water sample contained very few organisms other than the Ceratium.



AIRPLANE SPOTTING FLIGHT 57-10 (OCT. 11, (OCTOBER 11, 1957)

A live-bait hauler (for albacore bait boats) who was working during the period of the flight was contacted later in the day. He reported that the school he caught consisted of two sizes of anchovies, about half of the school were "5-inch" fish and the other half "2-3 inch" fish. The 2- to 3-inch portions of the load contained approximately 10 percent young sardines of the same size range.

The "5-inch" anchovies were probably 1957 year-class fish that were spawned during the late fall of 1956 and early winter months of 1957. Larvae collected by Hopkins Marine Station biologists were taken in relatively large numbers during February and March 1957. The "2-3 inch" anchovies and sardines were probably the result of an offshore late spring (May and June) spawning. No significantly large number of larvae showed up during the spring, in fact, these schools of small fish of the year did not show up along the central California coast until about the middle of September.

A survey on foot of the beach adjacent to the area where the greatest concentration of fish was seen netted 12 anchovies ranging in size from 59-68 millimeters standard length, the same size as those collected in the tide pools at Pacific Grove during the previous week.

Commercial lampara net boats working out of Moss Landing reported no commercial-size anchovies in Monterey Bay on the night of October 10, but did report many schools of "pinheads."

* * * * *

PELAGIC FISH DISTRIBUTION, ABUNDANCE, AND BEHAVIOR BETWEEN SANTA BARBARA AND SAN DIEGO STUDIED (Airplane Spotting Flight No. 57-7): A series of flights between August 19-23, 1957, to study pelagic fish distribution, abundance, and behavior along the coastal area between Santa Barbara and San Diego was made by the California Department of Fish and Game airplane Cessna "170" 1359D.

The daily variation in the abundance of fish in a given area was also studied.

AIRPLANE SPOTTING FLIGHT 57-7 (AUGUST 19-23, 1957)

Anchovies appeared in greater abundance during this flight than on any previous flight this year. During this flight 1,731 anchovy schools totaling 4,429,000 sq. ft. were tallied. Compared to last year there were fewer anchovies along the coast of southern California (1956 totals were 508 schools totaling 5,818,900 sq. ft.) and the school groups were smaller and more widespread along the shore.

The largest anchovy school group was off Huntington Beach; however, the greater part of the population was concentrated in the area between Santa Barbara and Santa Monica. The only anchovies seen in the area between Huntington Beach and San Diego were 52 very small "breezing" schools of young anchovies between Del Mar and La Jolla and 32 adult anchovy schools on the border between California and Baja California.

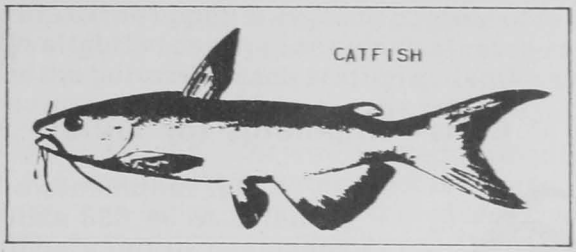
The largest concentration of Pacific sardines was observed in the area between Pt. Mugu and Pt. Duma. These schools were reported to be mainly sardines (by the commercial fishermen) but occasionally some schools would contain varying percentages of jack and Pacific mackerels. Scattered schools of pure sardines were seen in the area from San Pedro to San Diego. A total of 152 sardine schools (501,200 sq. ft.) were tallied.

Bluefin tuna schools (7) were seen off Pt. Mugu, Newport Beach, and La Jolla.

There was considerable variation in abundance of sardines and anchovies throughout the day and between consecutive days. On two school groups, the isolated sardine school group off Pt. Mugu and a portion of a school group (not entirely isolated) of anchovies in Santa Monica Bay near Malibu, periodic counts and measurements were made.

* * * * *

NEW CATFISH PACKAGING REGULATION: On September 27, the California Fish and Game Commission adopted a new regulation (section 170) governing the packaging of catfish. This order becomes effective on the 30th day from the date of filing with the California Secretary of State. The new regulation states:



"170. Commercial Packaging of Catfish: Catfish domestically reared within the state under license, or legally imported, if not tagged pursuant to Section 8435 of the Fish and Game Code, shall be packaged in sealed containers designed for and delivered to the consumer without being opened; said containers to be securely sealed; to indicate the name and address of the producer, the number and weight of the catfish therein; and whether the fish were domestically reared or imported; the container to be held by the consumer until all the fish are used, and to contain no more than five (5) pounds of catfish, net weight."

* * * * *

SELLING TUNA CATCHES BY AUCTION STARTED IN AUGUST 1957: Selling raw fresh and frozen tuna at a weekly auction was inaugurated in Southern California on August 24. The American Tuna Boat Association (ATA) at San Diego is offering catches of member clipper bait boats to the highest bidder. San Diego and San Pedro tuna canners are participating in the auction.

The auction method of selling tuna from clipper bait boats is new in the history of the Southern California tuna industry. Prior to this tuna was sold at contract ex-vessel prices, usually established at the beginning of the season. The prices established were negotiated annually prior to 1957.

The first auction on August 24 was conducted informally. The manager of ATA telephoned all tuna canners in Southern California. A block of 6,500 tons of tuna was sold to two San Pedro tuna canners at a price of $230 a ton for yellowfin and $190 a ton for skipjack, with unloading to start the following week. These prices were $40 a ton less than the previous contract price of $270 for yellowfin and $230 for skipjack. Another canner, besides the successful bidder, also bid the same prices, but offered an unloading schedule which was not satisfactory to the Association.

Other weekly auctions have been held since August 28 at the San Diego office of the American Tuna Boat Association. At the third auction held on September 4, a block of 500 tons of tuna sold at a high bid of $240 a ton for yellowfin and $200 a ton for skipjack. A newly-adopted provision in this auction was at $10-a-ton premium for yellowfin tuna over 14 pounds and for skipjack tuna over 7.5 pounds. This is the first time in the history of the California tuna fishery that tuna have been graded for size and priced on the basis of size.

During September a total of 4,209 tons of tuna were sold at 4 weekly auctions held by the American Tuna Boat Association in San Diego. Selling prices ranged from $200 to $230 a ton for skipjack tuna, and from $250 to $270 a ton for yellowfin.

At the weekly tuna auctions of the Association in San Diego, a total of 12,715 tons of bait boat tuna was sold from August 24 through September 30 at 6 auctions. Tuna landings by vessels of the Association account for about 66 percent of the total clipper bait boat landings in Southern California.

Prior to the inception of the auction selling method on August 24, the regular clipper bait fleet in Southern California landed 62,300 tons of tuna between

January 1 and August 23, 1957. A flat price per ton of $230 for skipjack and $270 for yellowfin was paid for such landings by tuna canners in San Diego and San Pedro.

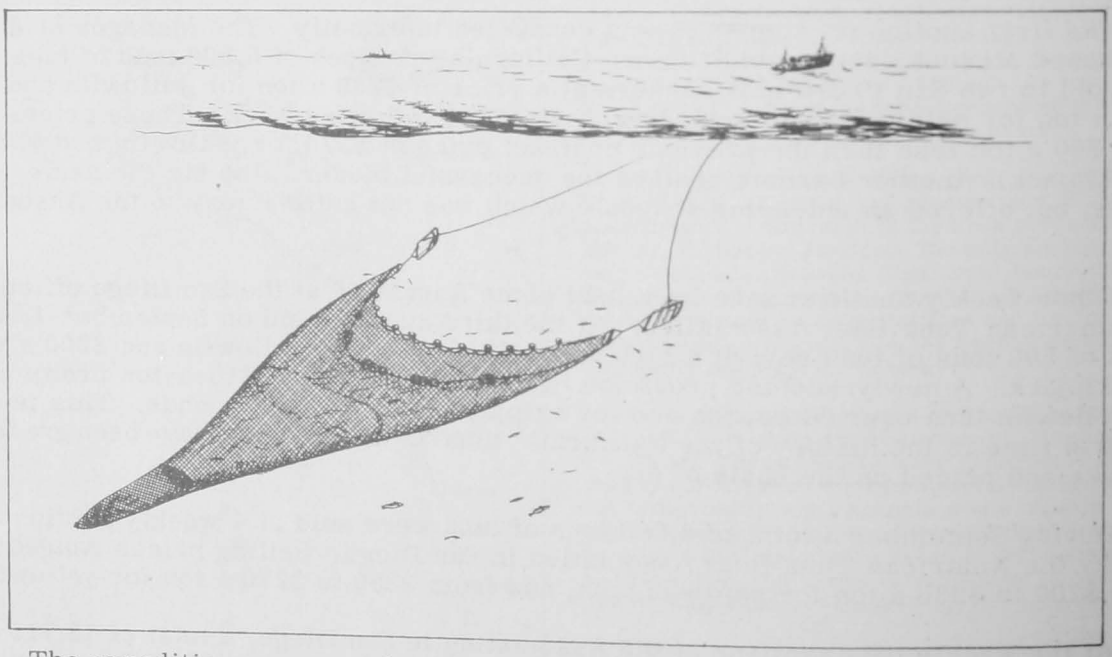
Cans--Shipments for Fishery Products, January-September 1957

Total shipments of metal cans during January-September amounted to 94,888 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 86,019 tons in January-September 1956. Canning of fishery products in September was confined largely to tuna, Maine sardines, salmon, shrimp, and mackerel. The canning of fish for animal food has been an important factor in the increased tonnage of steel used for the canning of fishery products.

NOTE: STATISTICS COVER ALL COMMERCIAL AND CAPTIVE PLANTS KNOWN TO BE PRODUCING METAL CANS. REPORTED IN BASE BOXES OF STEEL CONSUMED IN THE MANUFACTURE OF CANS, THE DATA FOR FISHERY PRODUCTS ARE CONVERTED TO TONS OF STEEL BY USING THE FACTOR: 23.0 BASE BOXES OF STEEL EQUAL ONE SHORT TON OF STEEL.

Chesapeake Bay

SURVEY OF RESIDENT AND MIGRATORY FISHES OF CHESAPEAKE BAY: The new 55-foot research vessel Pathfinder of the Virginia Fisheries Laboratory, in cooperation with Maryland Chesapeake Biological Laboratory, conducted an exploratory trawling survey of Chesapeake Bay waters from Cape Charles, Va., to the head of the Bay from September 16-19, 1957.



The expedition was one of the cooperative scientific fishery studies to find ways of bringing about better and sustained fishing for recreation and food. Specifically, the survey was also undertaken to investigate methods of determining the relative abundance of resident and migratory fish. Details on the biology of game, food, and forage fishes, as well as on other animals found on the bottom, were also recorded.

The Pathfinder, the new research vessel of the Virginia Fisheries Laboratory was manned by biologists from the two laboratories. The 24 Bay stations were made seven miles apart from the lower Virginia portion to the upper Maryland portion of the Bay. The fish trawl (a 30-foot balloon type, with slightly less than one-inch stretched mesh at the cod end) was towed for 15 minutes on the bottom at each station at depths averaging 40 feet with a range of about 15 feet in the upper Bay to 80 feet in the mid-Bay.

Many important and interesting species were caught. They were predominantly bottom-dwelling species, although a few surface and shallow water species were caught. In the lower Bay, scup, butterfish, gray sea trout, bay and striped anchovies dominated the catches. In the mid-Bay, croaker, spot, silver perch, harvestfish, gray sea trout, and bay anchovies dominated the catch. In the upper Bay, the catch consisted largely of white perch, spot, silver perch, hogchokers, and channel catfish. Gray sea trout, bay anchovies, spot and silver perch, occurred consistently from waters of high salinities near the ocean to almost fresh water at the head of the Bay.

Over 5,400 fish were caught during the survey, comprising 36 different species. These were identified, measured and a large number were returned alive to the Bay immediately after their capture. A few fish were preserved for future study. The experimental trawl was designed to capture small young fish of fingerling size so that estimates of relative abundance can be made on a seasonal and geographical basis from year to year. Actually, many adult fish were also caught.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-OCTOBER 1957: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.6 million pounds (value $0.8 million) of fresh and frozen fishery products were purchased in October by the Military Subsistence Market Centers. This was lower than the purchases in September by less than 1 percent and 26.3 percent less than the purchases in the same month a year earlier. The value of purchases this October was lower by 4.6 percent as compared with the previous month and lower by 26.3 percent from October a year earlier.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, October 1957 with Comparisons

QUANTITY				VALUE			
October		Jan.-Oct.		October		Jan.-Oct.	
1957	1956	1957	1956	1957	1956	1957	1956
(1,000 Lbs.)				($1,000)			
1,609	2,182	20,324	22,417	809	1,097	10,491	11,203

For the first ten months of 1957 purchases totaled 20.3 million pounds, valued at $10.5 million--a decrease of 9.13 percent in quantity and 6.4 percent in value as compared with the same period of 1956.

Prices paid for fresh and frozen fishery products by the Department of Defense in October averaged 50.3 cents a pound, 2.4 cents less than the 52.7 cents paid in September, and unchanged from the 50.3 cents paid during October 1956.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, August 1957 with Comparisons

Species	QUANTITY	
	October	Jan.-Oct.
	1957	1957
	(1,000 Lbs.)	
Tuna	406	1,882
Salmon	1,056	2,276
Sardine	2	1/ 125

1/ REVISED

Canned Fishery Products: Salmon and tuna were the principal canned fishery products purchased for the use of the Armed Forces during October 1957.

NOTE: SOME LOCAL PURCHASES ARE NOT INCLUDED; ACTUAL TOTAL PURCHASES ARE HIGHER THAN INCLUDED SINCE IT IS NOT POSSIBLE TO OBTAIN LOCAL PURCHASES.

Department of Defense

FREEZE-DRIED RATIONS FOR ARMED FORCES: The Foods Laboratories of the Quartermaster Food and Container Institute of the Armed Forces, U. S. Department of Defense, are working on the development of more convenient, quickly prepared, top quality meals to boost the morale and fighting efficiency of the Armed Forces. These meals are designed to feed servicemen in any one of the four field areas, namely, Base, Reserve, Support, or Contract.

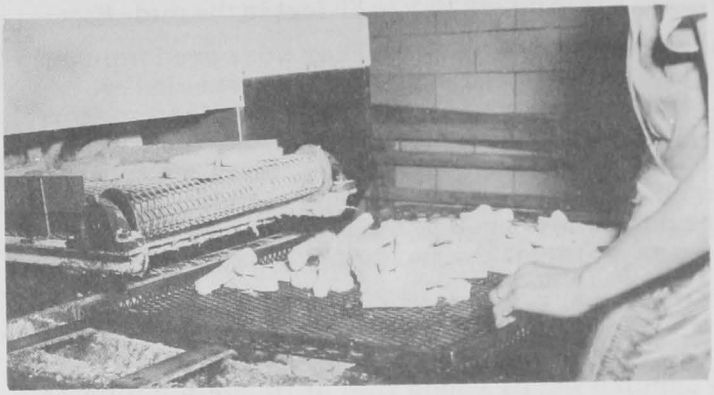


FIG. 1 - FISH STICKS COMING OFF A CONVEYOR BELT SYSTEM AFTER THEY HAVE BEEN BREADED.

The types of quick meals that are prepared are (1) uncooked meals, (2) precooked meals, and (3) ready-to-eat individual rations. The first attempts to produce these quick-serve meals resulted in a reorientation of available dehydrated foods. New freeze-drying methods (the product is first frozen, then the moisture content is lowered by a slight amount of heat under a high vacuum, but without thawing) are now being used in the "new 25-man uncooked meal." Products treated in this way are referred to as "freeze-dried." At the present time, they have developed suitable recipes for a 10-day menu. Some of the products used in these meals are freeze-dried fish sticks or portions, beefsteaks, pork chops, and ground beef.

For example, fish sticks or portions are made from blocks of frozen fish and then freeze-dried to a moisture content of less than 2 percent. While savings in space are not large, savings in weight are great, and the stability of the product is excellent--very acceptable after one year of storage at 40° F., 70° F., and 100° F. The fish portions and fish sticks are reconstituted by soaking in water 2 to 3 minutes, breaded, and deep-fat fried. The cooked fishery products have an excellent flavor and acceptability.

These new freeze-dried products, raw or precooked, add variety and interest to the soldier's diet. The new rations save space and weight in shipping as well as time and energy in preparation. These foods are packaged entirely in paper and plastic containers of rectangular shape and exhibit excellent logistic and storage qualities.

Fish and Wildlife Service

FISH AND WILDLIFE ADVISORY COMMITTEE HOLDS SECOND MEETING: The Advisory Committee on Fish and Wildlife held its second meeting on November 14 and 15, 1957, Assistant Secretary of the Interior Ross Leffler reports. The sessions were held in the Department of the Interior Building, Washington, D. C.

The Committee was established last spring with the approval of Interior Secretary Fred A. Seaton. The first meeting was held on June 12 and 13, 1957. The meetings serve as a forum for the interchange of ideas on preparing for the fish and wildlife problems of the future and for a discussion of current problems facing the United States Fish and Wildlife Service.

The Committee is composed of 24 individuals from different parts of the country who advise on wildlife conservation, sport fishing, and commercial fishing matters.

Frozen Foods

HANDLING PRACTICES TO BE STUDIED: The problem of improving the handling of frozen foods from the packer to the consumer will be studied by a 15-man task force named by the National Association of Frozen Food Packers. The first meeting of the task force was held in Washington, D.C., on September 26, 1957.

The President of the Association and also Chairman of the Task Force stated that "everyone who has a stake in frozen foods is aware that mishandling does exist, and that it is having a detrimental effect on industry expansion, and that it can be eliminated."

The task force's objectives are: (1) to impress upon all handlers of frozen foods the downgrading effects which exposures to temperatures above zero have upon the products, and (2) inform and educate, by every means available, on proper handling methods.

All phases of processing and distribution in the frozen food industry are represented on the task force. The fishing industry is represented by the General Manager of the National Fisheries Institute.

Hawaii

COMMERCIAL FISHERIES LANDINGS, JULY 1956-JUNE 1957: Hawaiian landings of salt-water (sea and pond) fish and shellfish during the fiscal year ending June 30, 1957, totaled 14.9 million pounds, valued at $3.0 million ex-vessel (table 1), according to a statistical summary prepared by the Hawaiian Division of Fish and Game. As compared with the previous fiscal year, the 1956/57 fiscal year's catch declined 254,000 pounds (about 2 percent) in quantity and about $22,000 (0.7 percent) in value. The decrease this year, as compared with last, was due largely to a decline in the catch of big-eyed tuna which was lower by 223,000 pounds (9.9 percent) in quantity and $27,000 (3.8 percent) in value. Smaller catches this fiscal year also occurred for black marlin, jack crevalle, big-eyed scad, and mackerel. An increase of about 1.4 percent occurred in the skipjack catch.

Prices paid to the producers were relatively high as compared with prices

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1956-June 1957

Species		1956	
English	Hawaiian	Quantity	Value
Ocean Catch:		1,000 Lbs.	$1,000
Amberjack	Kahala	78	20
Big-eyed scad	Akule	162	125
Dolphin	Mahimahi	216	77
Goatfish	Weke-ula, Weke, Moana, Kumu	131	85
Crevalles	Ulua, Omilu	128	52
Mackerel	Opelu	238	80
Sea bass	Hapuupuu	43	17
Snappers:			
Gray	Uku	97	37
Pink	Opakapaka, Kalekale	201	85
Red	Ulaulu Koae, Ulauluehu	133	89
Swordfishes & Spearfishes, Marlins	A'u	693	169
Tuna & Tunalike Fish:			
Albacore	Ahipalaha	10	2
Big-eyed & Bluefin	-	2,019	680
Yellowfin	Ahi	400	107
Skipjack	Aku	9,635	1,112
Bonito	Kawakana	87	14
Unclassified Fish	-	452	180
Shellfish:			
Crabs	-	14	8
Limpet	Opihi	23	9
Lobster	Ula	14	8
Octopus	Hee	15	7
Shrimp	Opae	2	3
Squid	Muhee	6	3
Total Shellfish		74	38
Total Ocean Catch		14,797	2,969
Pond Catch 1/			
Clam	Olepe	13	4
Crabs	-	3	1
Milkfish	Awa	46	19
Mullet	Amaama	51	41
Tenpounder	Awaawa	8	2
Miscellaneous	-	11	6
Total Pond Catch		132	73
Grand Total		14,929	3,042

1/ SALT-WATER

received at mainland United States fishing centers with one exception. Ex-vessel prices paid for skipjack averaged about $230 a ton, which is about the same as the price paid at west coast United States ports. The landings of aku or skipjack in fiscal year 1956/57 accounted for about 65 percent of the total landings in terms of quantity and about 37 percent of the total value.

The 1956/57 fiscal year catch from the island of Oahu made up 76.3 percent of the total quantity and 74.8 percent of the total value. The island of Hawaii accounted for 15.4 percent of the total quantity and 15.7 percent of the total value. The best single month for landings was July when 18 percent of the landings for the fiscal year were unloaded. Close to 64 percent of the landings were made in July through December 1956. The lightest landings occurred in February 1957 when only 457,000 pounds (or 3 percent) were reported.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, DECEMBER 1956, P. 40.

Maine Sardines

CANNED STOCKS, NOVEMBER 1, 1957: Distributors' stocks of Maine sardines totaled 298,000 actual cases on November 1, 1957--90,000 cases or 23 percent less than the 388,000 cases on hand November 1, 1956. Stocks held by distributors on January 1, 1957, amounted to 344,000 cases, and on June 1, 1957 totaled 230,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on November 1, 1957, totaled 1,337,000 cases (100 $3\frac{1}{4}$-oz. cans), an increase of 321,000 cases (32 percent) as compared with November 1, 1956, and an increase of 49 percent (442,000 cases) over the 895,000 cases on hand July 1, 1957.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, November 1, 1957, with Comparisons

Type	Unit	1957/58	1956/57 Season					1955/56 Season				
		11/1/57	7/1/57	6/1/57	4/1/57	1/1/57	11/1/56	7/1/56	6/1/56	4/1/56	1/1/56	11/1/55
Distributors	1,000 Actual Cases	298	212	230	295	344	388	154	160	268	326	354
Canners	1,000 Standard Cases 1/	1,337	895	416	465	879	1,016	315	64	152	475	625

1/ 100 $3\frac{1}{4}$ OZ. CANS EQUAL ONE STANDARD CASE.

The packing season ended on December 1, 1957. Packing operations were curtailed sharply during the last four months of the season because of poor market conditions. The 1957 pack is estimated to be about 2.1 million cases, or about 5 percent below the 1956 pack of 2,221,793 standard cases, but 67 percent higher than the 1,254,222 standard cases packed in 1955.

On April 15, 1957, the beginning of the new season, the canners' reported a carryover of 426,000 standard cases. Adding the season's pack of 2,035,000 cases to November 1, 1957, on that date the canners' total supply was 2,461,000 cases as compared with 2,221,000 cases on the same date in 1956. From April 15-November 1, 1957, total shipments amounted to 1,124,000 cases as compared with 1,205,000 cases in the same period of 1956.

Maryland

LAW PROHIBITING PURSE-SEINING UPHELD BY SUPREME COURT: The Maryland law prohibiting purse-seining in its coastal waters was upheld in a decision handed down by the United States Supreme Court on November 12, 1957.

The constitutionality of the law was questioned when a menhaden fishing boat captain was arrested for purse-seining in the coastal waters of Maryland. Although the Maryland law applies to all species of fish, it is of special interest to menhaden fishermen, as this species appears in great numbers close inshore at times and is used only for processing into meal and oil.

The case involved a Delaware fisherman operating a vessel leased by a New Jersey menhaden firm, but he was joined in challenging the Maryland law by other Delaware and New Jersey fishery interests.

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RED DISCOLORATION OF SHUCKED OYSTERS AND SOFT CLAMS UNDER STUDY: An investigation of the causative agent or agents that caused red discoloration in shucked oysters and soft clams was started by the Maryland Chesapeake Biological Laboratory and the Chesapeake Bay Institute of John Hopkins University with the opening of the oyster season in September 1957.

Oyster and soft clam packing houses in the Chesapeake Bay area occasionally experience a colorful but costly loss through "red oysters" or "red clams." It usually happens like this: oysters or soft clams, apparently no different from any others, will come to the shucking house where they are shucked, processed, and placed in containers for shipping. These containers are then stored at 35°-36° F. The oysters or clams appear to be perfectly normal at this time. After 3 to 7 days at this temperature, some of these cans are found to contain a bright red liquor in the pack, as if the molluscs had been packed in beet juice or tamale sauce. Apparently, these shellfish with red coloration are perfectly safe to eat, but are not well received on the markets; consequently, these oysters and clams are discarded. One packer this year reported dumping "a thousand dollar's worth" of oysters off the end of his dock.

This phenomenon has been reported along the Atlantic Coast sporadically since before the turn of the century. Many explanations have been offered, but to date no one has demonstrated the cause, or causes, of the red coloration of oysters and soft clams. Pink yeasts which cause a discoloration have been isolated and identified from oysters, but apparently this is a different phenomenon. Dr. Thurlow Nelson of Rutgers University once traced an outbreak of "red oysters" in the Delaware Bay to the microscopic "plant" Gymnodinium splendens. Again, this appears to be a different phenomenon.

Red discoloration in oysters from Virginia's Rappahannock River was reported in late September and the packers experiencing the difficulty were interviewed. Several facts emerged from these interviews:

(1) This phenomenon occurs generally in fall or winter.

(2) The trouble lasts only a few weeks, with oysters from the same locations giving no difficulty when harvested after this period.

(3) Some packers reported these red oysters became "watery."

(4) The tongers reported "red water" at times in the center of the Rappahannock River, but have never noticed it over the oyster bars.

A gallon of shucked oysters which showed signs of developing red color was transported to the laboratory on ice for laboratory examination. Two approaches to cultivating the causative agent are being made: (1) the extraction and identification of the pigments which would tell whether the agent is animal bacterial, or plant in nature, and (2) cultivation in various media. Preliminary examinations indicated the pigment was destroyed by heating and by making the solution acid or alkaline, and was not soluble in alcohol, petroleum, ether, acetone, or benzene. Technical difficulties were experienced with the extraction procedures and the pigment identification had to wait for further samples from the field.

Laboratory analyses were made at the Chesapeake Biological Laboratory with the following results:

(1) The red coloration developed in oysters in salt water, but not in oysters placed in distilled water.

(2) The red coloration developed in the cold, 35°-40° F., but not at room temperature, 70°-80° F.

(3) The red coloration developed in oysters, but not in the usual bacteriological culture media or in oysters sterilized by autoclaving.

During the first week of October 1957 similar difficulties were found in soft clams from the Bay. The U. S. Bureau of Commercial Fisheries at Annapolis has begun a study of the microscopic organisms which might produce this coloration. Generally, the same symptoms found in the oysters were found, but the coloration was a deeper red. One-half gallon of shucked clams and a bushel of clams dredged from the same area were returned to the State laboratory for examination. These examinations are still in progress at the laboratory and the Chesapeake Bay Institute. Preliminary results include the following facts:

(1) The red liquor from the "red clams" can cause clams from other areas to turn red.

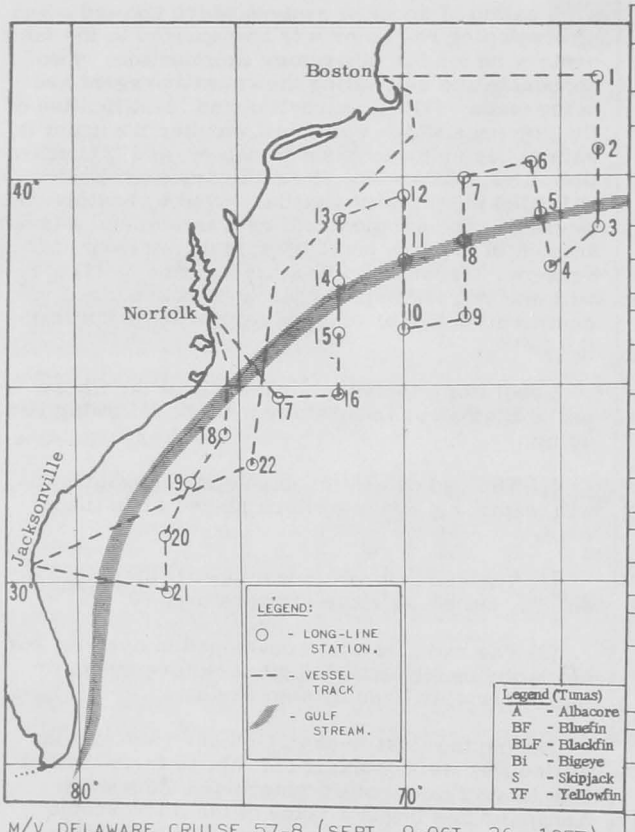
(2) About half of the clams from a "red clam" area turn red, the other half remain normal in color when shucked if kept individually.

(3) Microscopic examinations showed many microflagellates present, and the possibility that they are causative agents is being explored.

Due to the localized and temporary nature of "red oysters" and "red clams," they do not constitute a major economic loss to the industries. Several packers sample the molluscs from their harvesting areas weekly and if red coloration becomes evident from a given area, these shellfish are not harvested for several weeks. This expediency seems to be effective.

North Atlantic Fisheries Exploration and Gear Research

EXPLORATORY TUNA FISHING WITH LONG-LINES IN WESTERN NORTH ATLANTIC (M/V Delaware Cruise 57-8): Tuna long-line exploratory fishing in the Western North Atlantic, conducted by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware from September 9 to October 26, 1957, indicated a marked change from a predominance of bluefin tuna (Thunnus thynnus) to that of yellowfin tuna (Thunnus albacares). A cruise in June 1957 yielded mostly bluefin tuna.



M/V DELAWARE CRUISE 57-8 (SEPT. 9-OCT. 26, 1957)

Station	# Bkts. Set	Catch	Surface Temp. °F.
1	60	3A 1Bi 3YF	89.3
2	60	1A 12YF	78.9
3	60	2A 1S 6YF	77.2
4	60	1A 1S 21YF	76.3
5	60	8A 37YF	76.5
6	60	4A 19YF	74.0
7	60	1YF	73.1
8	40	4A 10YF	76.0
9	60	1A 27YF 1BLF	81.5
10	60	1S 51YF	78.0
11	60	12A 1Bi 12YF	73.0
12	40	1A 5YF	75.5
13	35	4YF	72.0
14	60	1Bi 34YF	79.0
15	60	2A 24YF	77.0
16	60	12YF	77.0
17	60	1A 10YF	79.5
18	60	1BF 1Bi 1S 13YF	81.2
19	60	1BF	81.3
20	60	1Bi 6YF	79.3
21	60	1Bi 1S 9YF	80.2
22	60	2A 6YF	81.0

Twenty-two stations over a broad offshore area from off Nova Scotia to north of the Bahamas were fished with significant catches being made in the northern section. The northern section, which yielded large catches of large bluefin tuna during the June 1957 cruise, now yielded only yellowfin and albacore (Thunnus alalunga) with an occasional big-eyed (Thunnus obesus) and skipjack (Katsuwonus pelamis). Only two bluefin tuna were taken during the cruise, and these were caught south of Cape Hatteras, N. C.

The largest catch with 60 baskets of gear was 2,195 pounds of yellowfin and albacore taken on station 5 (180 miles southeast of Nantucket Lightship); and the largest number of tuna taken on any 60-basket set was 51 yellowfin and 1 skipjack at station 10 (240 miles south of Nantucket Lightship). In the areas of tuna production the amount of shark damage ran from 5 to 10 percent with a figure of 6 percent for station 10.

What are believed to be northern distribution records in the Western North Atlantic for yellowfin, albacore, and big-eyed were established on September 11, 1957, when all three species were taken at station 1 (64° 02' W. longitude-42° 18' N. latitude) 95 miles southeast of Cape Sable, Nova Scotia.

During Cruise 57-5 in June 1957, the most southern station fished (85 miles southeast of Cape Hatteras) yielded over a ton of yellowfin. In order to recheck this area, the cruise line for Cruise 57-8 was extended south, but catches were disappointing, though at other seasons this area may be more productive.

Five schools of bluefin tuna were sighted during a short period on September 10, 1957, in the North Channel area off Cape Cod soon after leaving Boston; and two schools of skipjack were spotted in the Gulf Stream area, one south of Georges Bank and the other south of Cape Hatteras. No other evidence of surface schooling tuna was observed during the cruise.

The supply of good quality frozen herring bait (Clupea harengus) was limited during the cruise and undoubtedly is reflected in the catch per basket. Comparative bait tests were made between herring and small whiting (Merluccius bilinearis). No tuna was taken on the baskets baited with whiting; and seven tuna were taken by the baskets baited with herring.

Other species and numbers of fish and sharks taken during the cruise consisted of 10 wahoo (Acanthocybium petus), 2 opah (Lampris regius), 16 common dolphin (Coryphaena hippurus), 35 lancetfish (Alepisarus ferox), 2 sea bream (Taractes princeps), 15 white marlin (Makaira albida), 3 blue marlin (Makaira ampla); sharks included 33 white-tipped (Pterolamiops longimanus), 26 blue (Prionace glauca), 3 dusky 1/ (Eulamia obscurus), 7 silk 1/ (Eulamia floridan), 2 mako (Isurus oxyrenchus) and 17 scythe-fin 1/ (Eulamia falciformis).

During the cruise, hurricane "Carrie," tropical disturbance "Freda," and mechanical difficulties caused interruptions in the cruise schedule.

During the southern leg of the trip, over 15,000 pounds of tuna and marlin was unloaded in Jacksonville, Fla., for shipment to processors.

In cooperation with the Woods Hole Oceanographic Institution, bathythermograph casts, surface temperatures, and other oceanographic data were collected at each fishing station. Night lighting was conducted at most stations and collections of biological material was made.

1/ SOME CONFUSION BETWEEN SPECIES.

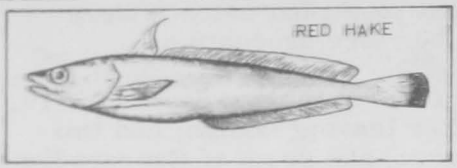
North Atlantic Fisheries Investigations

HADDOCK AND COD TAGGED AND O-GROUP HADDOCK COLLECTED (M/V Albatross III Cruise 105): During an October 28-November 8, 1957, cruise the U. S. Bureau of Commercial Fisheries research vessel Albatross III caught and tagged 2,116 haddock and 326 cod at trawling stations occupied on fishing grounds in the Gulf of Maine and on Browns Bank. Young-of-the-year or 0-group haddock were sampled at trawling stations on Lurcher Shoal, Grand Manan Bank, and Cashes Ledge. Most of haddock were tagged on Browns Bank, Lurcher Shoal, Grand Manan Bank, and Cashes Ledge and the cod on Grand Manan Bank. Other trawling stations were made off Long Island (Canada), Fipennies Ledge, Platts Bank, Stellwagen Bank, and off Cape Cod Light. In addition, 34 halibut were tagged.

Oblique meter net hauls were made and drift bottles released at all stations, bathythermograph casts were made at all stations and while steaming between stations. Cod and haddock taken near Cape Cod Light were kept in running salt-water tanks and brought in alive to the station at Woods Hole.

* * * * *

RED HAKE SAMPLES COLLECTED AND GEAR TESTED IN BLOCK ISLAND AREA (M/V T-79 Cruise 17): The Service's small research vessel T-79 occupied trawling stations in the Block Island area between October 15-17, 1957, in search of scup (porgy) for tagging, samples of red hake or ling for biological studies, and to test equipment on the vessel.



Although no scup were caught, some excellent samples of red hake were caught for age and stomach-content studies. The fishing gear worked well.

* * * * *

YELLOWTAIL FLOUNDERS AND INDUSTRIAL SPECIES SAMPLED OFF NAUSET BEACH (T-79 Cruise 18): During a one-day (October 30, 1957) trawling trip made in 25-30 fathoms off Nauset Beach (Mass.), lengths, weights, scales, and otoliths were collected from yellowtail flounders (Limanda ferruginea) by the Bureau's North Atlantic Fishery Investigations small research vessel T-79. In addition, species utilized for fish meal were measured and scale samples collected. Samples of whiting and 0-group haddock were preserved for other research projects. Three tows were made with a 45- by 65-foot otter trawl with a $\frac{3}{4}$-inch liner in the cod end.

North Atlantic Herring Research

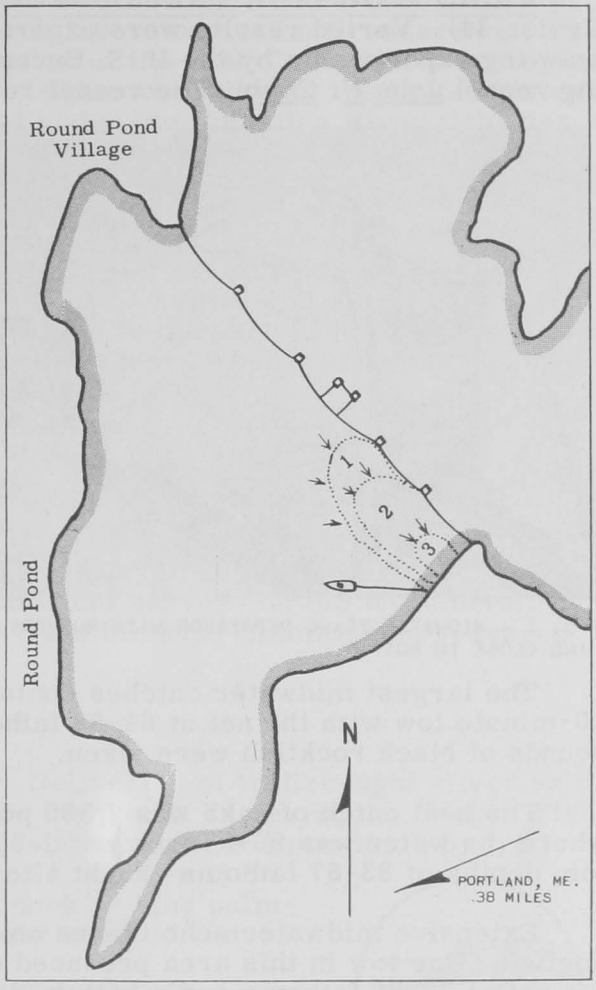
DRIVING HERRING SCHOOLS WITH COMPRESSED AIR CURTAIN: A second series of herring driving trials using an "air curtain" was made during the last week in October 1957 by the Boothbay Harbor, Maine, exploratory fishing staff of the U. S. Bureau of Commercial Fisheries. The gear used was essentially the same as that used in earlier trials except that 700 feet of perforated plastic pipe were used instead of 500 as in the earlier work and a larger compressor (rated at 130 cubic feet per minute at 75 pounds per square inch pressure) was employed to supply the air. As in the previous work observations were made from an airplane and from the water's surface, of herring schools and the effect of the air curtain upon them.

The first trial made in August and early September 1957 demonstrated that herring schools, particularly in open waters, strongly resist passing through the curtain of air bubbles. The movements of schools through a channel were altered in some of these trials and the progress of schools completely stopped in one trial when the passage between two islands was blocked off with the air curtain.

It was the objective of the October experiments to learn if the schools could be not only stopped or guided by a stationary air curtain, but driven before an advancing air curtain. In pursuit of this objective the Muscongus Sound area was searched for several weeks for herring schools occurring in locations where their movements could be readily observed and where the sea bottom was smooth enough to sweep the air pipe across it. However, as the season's end drew near and schools of herring became less plentiful, it became necessary to abandon the search for "wild" fish and to experiment with impounded or "shut off" fish.

Driving trials were made on herring that had been shut off by commercial fisheries in Round Pond on Muscongus Sound during the night of October 22-23. The sardine seine had been set across the center of the "pond" from the dock at the Round Pond Village to the southeast side of the entrance to the "pond" after herring schools moved into the south end of Round Pond during the night (see the diagram). In the forenoon of October 23, the air discharge pipe was laid near the

seine where the herring were concentrated and then doubled back to the shore in a "U" shape as shown in position 1 on the diagram. The air compressor was then started and the air turned into the perforated pipe, setting up the air curtain around part of the herring schools.



With herring thus enclosed, the ends of the air pipe were pulled slowly ashore progressing to position 2 on the diagram and finally to position 3. The pipe was left in this position, reaching approximately 60 feet from the shoreline while observations were made. From shore and from boats, small groups of herring were seen swimming rapidly around inside the air-curtain "enclosure," apparently searching for an escape passage to deeper water. An attempt was made to drive one of these small schools through the air curtain with a boat oar. This school headed for the curtain when frightened but turned upon reaching it and swam along it rather than pass through. These fish had retreated before the advancing air curtain and had been driven from the deeper water near the center of the bay shoreward into shallow water where they normally are not found during the bright daylight hours. When the pipe was pulled the remainder of the distance to the shore, the fish were forced through the air. Some of them were seen diving under the pipe as it was lifted over a large boulder.

Two more similar trials were made on October 24 and 25 with comparable results. However, the longer the fish remained impounded and the more they were disturbed, the less responsive they appeared to driving trials. During the second trial part of the fish ran through the curtain when an outboard motor boat was run continuously at the end of the "curtain" nearest the seine. On the third trial, however, the fish were driven close inshore again where they milled around inside the air-curtained enclosure. Occasionally small groups rushed to the surface and flipped in the air as they often do when chased by predators.

These trials complete the work on air-driving for the 1957 season. The results to date have demonstrated quite clearly that Atlantic herring, particularly wild schools in open waters, will avoid crossing through an air curtain that is set up in the manner described. More work is tentatively planned for the 1958 season to devise practical gear using the air-driving principle that may make more herring available to seiners and weir operators.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, DECEMBER 1957, P. 28.

North Pacific Exploratory Fishery Program

THIRD MIDWATER TRAWLING CRUISE COMPLETED (M/V John N. Cobb Cruise 34): Varied results were experienced during several weeks of midwater trawling experiments by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. The vessel returned to Seattle on November 8, 1957, from a cruise in waters off the Washington and British Columbia coasts--the third midwater trawling trip this year to determine commercial fishing potential for this new type of gear.

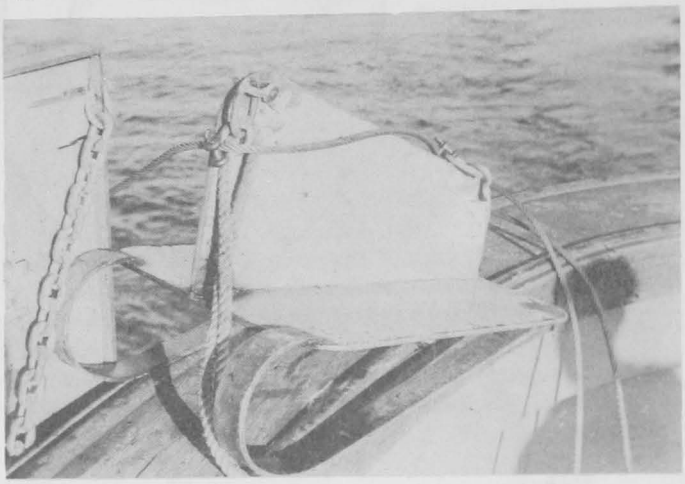


FIG. 1 - MIDWATER TRAWL DEPRESSOR WITH RUNNERS FOR TOWING CLOSE TO BOTTOM.

Using nylon midwater trawls with square openings of approximately 60 feet and 70 feet, the John N. Cobb made fair to good catches of several species of fish over the offshore continental shelf. However, as on previous trips, no significant quantities of the more valuable commercial species, such as cod or Pacific ocean perch, were located in midwater.

The largest midwater catches contained black rockfish, hake, and dogfish. In a 20-minute tow with the net at 64-68 fathoms over a bottom depth of 70 fathoms, 930 pounds of black rockfish were taken.

The best catch of hake was 2,500 pounds in 45 minutes, towing at 79-83 fathoms where the water was 90-97 fathoms deep. Another tow at 53-69 fathoms over bottom depths of 83-87 fathoms caught a ton of hake in 30 minutes.

Extensive midwater echo traces on Swiftsure Bank were verified as schools of dogfish. One tow in this area produced 6,500 pounds of dogfish in 15 minutes with the net at 27-30 fathoms and a bottom depth of 37 fathoms. Another 30-minute tow caught 4,500 pounds of dogfish and 25 pounds of herring. Both herring and saury were observed over a good part of Swiftsure Bank, but neither species was sufficiently schooled for good midwater trawling results.

In cooperation with the Washington State Department of Fisheries, several days were spent attempting to test the midwater trawls in the newly-opened San Juan Island-Georgia Strait herring fishing area. It appeared that the main run had not yet entered these waters, and only small bunches of herring were located yielding catches of a few hundred pounds.

As on previous cruises, a "Sea Scanar" and a standard recording echo-sounder were used to locate and record fish in midwater. The new electrical depth telemeter continued to operate satisfactorily, with a few minor breakdowns which were readily repaired at sea. As a further refinement to the instrument, the depth-sensing element was moved from the trawl door to the port wing of the net to allow more accurate positioning of the net when fishing near the bottom.

Oregon

FISHERIES RESEARCH LABORATORY ESTABLISHED: The establishment of an Oregon Fish Commission fisheries research laboratory at La Grande, Ore., was announced on November 19, 1957. The expansion of the Fish Commission's program in eastern Oregon has been made possible through cooperation of the United States Fish and Wildlife Service with funds allocated under the Columbia River fisheries development program. Up until 1956, the program had been limited to Columbia River tributaries below McNary Dam. Two fishery research biologists will be headquartered at the new laboratory.

A five-phase program for systematic study of Oregon streams of the upper Columbia River system has been outlined by the Fish Commission. (1) Inventory of all existing or potential salmon-producing streams in the area to become familiar with physical characteristics of the streams and to learn what species are present--now under way. (2) Field surveys to determine where various stream improvements are needed. (3) Introduction of selected species of salmon into barren or underutilized streams by means of egg plantings or fish transfers. (4) Search for potential new hatchery sites. (5) Appraisal of stream improvement projects after projects have been completed.

The Fish Commission has also received additional funds under the Columbia River development program for expanded biological surveys on the Willamette River system. These surveys will be continued from the Fish Commission research headquarters at Clackamas.

* * * * *

REVIEW OF 1957 SALMON FISHERIES: Deliveries of troll-caught silver salmon to Oregon fish buyers during 1957 were the highest in 22 years, the Oregon Fish Commission announced on November 19, 1957. The silver salmon catch by trollers during a $4\frac{1}{2}$-month season that ended October 31, 1957, will be close to 3.5 million pounds. Trolling for chinook or king salmon was only fair in 1957 along the Oregon coast south of Astoria.

Poor chinook trolling at the mouth of the Columbia River prevailed most of the summer of 1957, resulting in a total chinook salmon catch in that area considerably less than the catch in 1956. April 1957 landings of troll-caught chinook in the Astoria-Warrenton area totalled only 46,000 pounds. The catch during April 1956 was 290,000 pounds. The poor chinook catch in 1957 off the Columbia River is, at least in part, an indication of the continued serious condition of the Columbia River fall chinook salmon run.

Commenting on the high silver salmon catch off Oregon in 1957, a Commission salmon research biologist said excellent weather conditions in the summer of 1957 contributed greatly to the successful season. Many smaller boats were able to spend more time fishing, with fewer days in port.

Several oddities were noted by the biologist in connection with ocean trolling this year. The pink or humpback salmon catch of roughly 100,000 pounds by trollers was comparatively higher in 1957 off the Columbia River. During July the humpback catch at times exceeded the chinook salmon catch. Another peculiarity on the Oregon coast this past summer was the inshore movement of warm water that brought with it several fishes rarely seen in Oregon waters. A number of white sea bass, more common off California, were caught by Oregon trollers this year.

What influence did the albacore flurry in mid-summer have on salmon trolling? The salmon fishing intensity was somewhat reduced when albacore were first reported

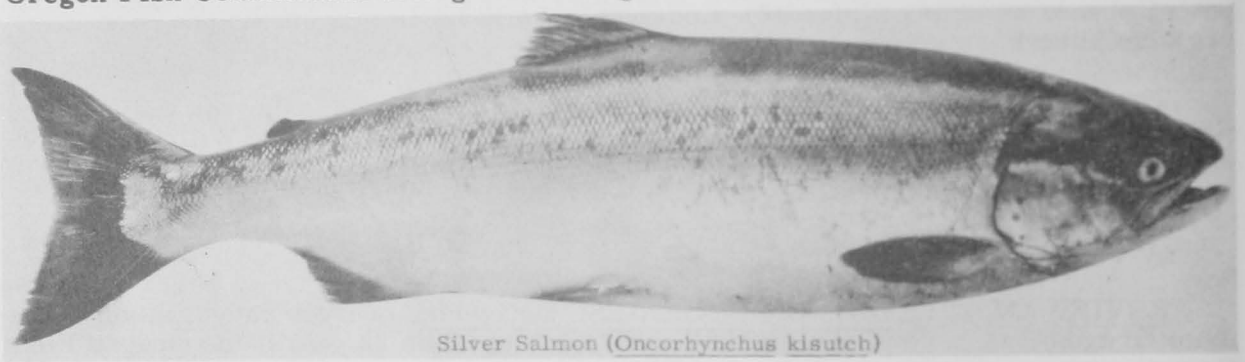
off Oregon, the biologist reported, but due to the elusivness of the tuna many trollers returned to salmon fishing after a few trips.

Research was initiated in 1957 by the Fish Commission to determine the mortality of undersized salmon that are hooked and released by trollers. The Commission chartered a Winchester Bay troller, the Patricia T, to catch small salmon that were held for observation in a live tank.

No conclusions were reached in 1957 on the mortality of hooked salmon, but the matter will be given further attention this next summer to evaluate the effectiveness of present trolling regulations.

* * * * *

SALMON COUNTS AT WILLAMETTE FALLS: Preliminary counts of salmon moving over the falls at Oregon City up to November 13, 1957, indicated another encouraging silver salmon run in the Willamette River in 1957, according to an Oregon Fish Commission biologist in charge of the Willamette River studies.



Silver Salmon (Oncorhynchus kisutch)

Through November 13, better than 1,650 adult silvers plus 1,026 silver jacks were counted through the fishway. The 1957 Willamette River silver salmon run was composed of more adult fish than the run that was observed at the falls in 1956. Roughly two-thirds of the total count of 8,635 silvers in 1956 were jack salmon. The run in 1956 was the largest of three years of Willamette River counts at the falls.

Approximately 71 fall chinook salmon were also counted at Willamette Falls since October 18, but only 7 of this total were adult fish. The fall chinook count in 1957 was disappointing, particularly in view of heavy liberations of fingerlings in the upper Willamette in 1954-55 that could have returned to the river in the fall of 1957.

A significant factor in the increased silver salmon runs into the Willamette system in recent years has been the liberation of hatchery-raised silver salmon fingerlings in several Willamette tributaries. The only native run of silvers of any magnitude occurs in the Tualatin River, although there is a small silver salmon run in the Luckiamute River. The Fish Commission has had good success recently with silver salmon releases in the Yamhill and Molalla Rivers.

Silver salmon migration into the Willamette was expected for at least another month. Fish counting at the falls was to be continued as long as water conditions permitted.

Oysters

NEW METHOD FOR CONTROL OF ENEMIES WITH COMMON SALT: Because of recent reversals in the oyster production of New England and New York, due chiefly to successive years of poor sets, it becomes necessary to employ all means to save and bring to marketable size as many oysters as possible. A measure that will help to achieve this is the development of better methods for controlling enemies and competitors which, at present, destroy a high percentage of the oysters before they are ready to be harvested.

In the past the Milford, Conn., Marine Biological Laboratory of the U. S. Bureau of Fisheries offered the industry several methods of controlling shellfish enemies, including starfish and barnacles. More recently it developed a series of effective methods for the chemical control of undesirable species of crabs, such as green and mud crabs, which are great destroyers of small clams and oysters. These methods are already in use in this country and abroad. Furthermore, a mechanical method for destroying oyster drills, by burying them under a thin layer of bottom deposit, was also found extremely effective under experimental conditions and its principles were offered to the industry to be tried under various field conditions.

Regardless of the above progress and realizing the necessity of further development of effective and versatile methods, a search for new means of protecting commercial species of shellfish was continued. Among these approaches was "screening" of chemical compounds to find some that would be useful in controlling oyster pests. At the beginning of these studies it was thought that boring sponges, because of their structure and anatomical characters, would be among the first to succumb to chemical attack. However, after trying approximately 2,000 different chemicals, mostly of organic nature, no compound was found that would kill sponges without seriously endangering oysters. Finally, it was decided to try dipping sponge-infested oysters in a saturated solution of common salt for various lengths of time. This method, described below in more detail, proved to be effective. Moreover, it was also found extremely promising in the control of several other oyster enemies and competitors.

The method is simple, consisting of immersing sponge-infested oysters or cultch, in which enemies, such as starfish, or competitors, such as limpets (Crepidula), are found, in a saturated salt solution and then keeping the treated material in the air for some time before returning it to sea water. The cheapest kind of salt can be used. Rock salt, of the type used to melt ice and snow on sidewalks in winter, was used in the experiments. Since it is easy, during the operation, to dilute a strong salt solution to a level where it will become too weak to be effective, it should be standard practice to keep crystals of undissolved salt always on the bottom of the vats in which the cultch and sponge-infested oysters are dipped. The crystals will indicate that the solution remains saturated. The solubility of common salt is quite great; approximately 360.0 grams (12.7 oz.) of salt will dissolve in one liter (about 1.06 qts.) of water at room temperature.

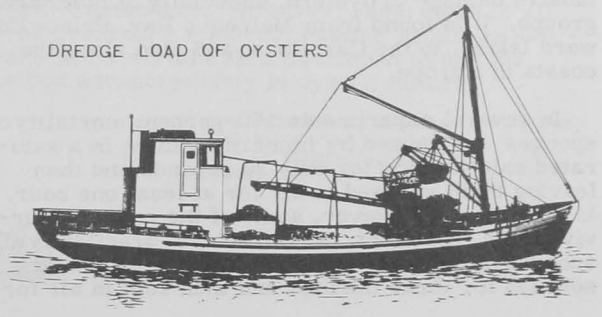
A salt concentration considerably stronger than that of our sea water, but weaker than a saturated solution, will undoubtedly kill sponges and the other pests considered in this report, but the periods of immersion required will probably differ from those established for a saturated solution. The water temperature, at which dipping in salt solution takes place, and the air temperature, during the period between dipping and returning to sea water, may also be of significance. Further tests are contemplated to study the importance of varying these factors.

Attempts to control sponges or other invertebrates considered oyster pests, by rapid changes in salinity or by prolonged exposures to unfavorable conditions, are not new. For example, literature offers many suggestions for placing infested oysters in fresh water to kill the sponges. It is also well known that starfish can eventually be killed by immersion in water of reduced salinities. This approach, however, is less satisfactory than the method we recommend here because a much longer period of immersion in fresh water would be required to achieve the same result as dipping for only a few minutes in a saturated salt solution.

Further, carrying large quantities of fresh water for a day's work on oyster boats may not always be feasible. Frequent changes of this water would be necessary because its salinity would rapidly increase when the dredgeloads of material saturated with salt water would be dipped in it. We know, for example, that if the salinity of this water were increased to about only 1.0 parts per thousand it would require several days of immersion to kill the oyster pests. Because of this, the method would be actually worthless. Taking boatloads of oysters to shore, to treat them there with fresh water, would, of course, be prohibitive because of the cost of extra labor and the time involved.

Sponges and other oyster enemies can be killed in several ways. This can be accomplished by dipping them in a saturated salt solution for comparatively long periods and then returning them immediately to sea water, or by dipping the material for only a brief period and leaving it on deck for some time before planting it overboard. During this period of remaining on deck the salt will continue to exert its effect on the unprotected tissue of the oyster enemies, causing further harm. The latter will probably be the most convenient method for oyster farmers in their ground cleaning or transplanting operations because they normally leave the dredged material on deck for several hours, sometimes overnight, before returning it to sea water.

DREDGE LOAD OF OYSTERS



Still another way to combat the enemies is to spray the dredgeloads of oysters, cultch, or different types of spat collectors with a saturated salt solution. However, according to the results of the experiments, this method is less effective, especially in treating sponges, than total immersion because usually only one side of the oysters' shells is covered by the spray, while the other side remains untreated and the pests attached to it are unaffected. Nevertheless, by spraying tunicates and then leaving them in the air for at least one hour, 100 percent mortality can be effected. Similar results were obtained by spraying starfish and then keeping them in the air only five to 10 minutes before returning them to sea water.

The experiments indicate that the oysters will not suffer ill effects and mortality from the salt treatment if their shells are not so damaged in handling that the strong salt solution will gain access inside the shells where it can injure the soft oyster bodies. In the experiments healthy oysters subjected to a saturated salt solution at a temperature of about 20.0° C. (68° F.) for 30 minutes suffered no ill effects. Longer exposures, however, killed some of the oysters. Furthermore, certain other forms, for example, small hard clams (Venus mercenaria), may be affected by continuous exposures of only 15 minutes. The method, therefore, should be used with some discretion.

The results of the studies, designed to devise and evaluate the method of controlling several oyster enemies by use of strong salt solutions, can be summarized as follows:

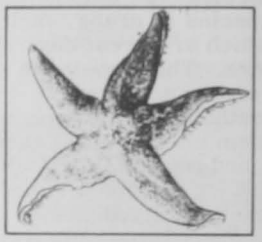
Sponges: Among the numerous oyster enemies on our Atlantic Coast, the group of boring sponges belonging to the genus Cliona occupies an important position. Although not actually parasitic, the sponges honeycomb the shells of oysters by excavating anastomizing, irregular tunnels. This honeycombing is often so extensive that the shells become brittle and are easily damaged during handling. The unsightly appearance of oysters with shells heavily infested with sponges also lessens their market value. Moreover, the vitality of seriously-infested oysters is considerably lowered by continuous efforts to produce large quantities of shell material to close the openings of the burrows made by sponges. Sometimes the shells are disintegrated to such an extent that the oysters are unable to survive.

According to recent studies on distribution and taxonomy of boring sponges, there are seven species of the genus Cliona on our Atlantic Coast, of which four--C. celata, C. lobata, C. vastifica, and C. truitti--are found in Long Island Sound. C. celata is the most common, causing serious and extensive damage to oysters, especially of older age-groups. It is found from Malpeque Bay, Prince Edward Island, to the Carolinas, and also along the coasts of Europe.

In several experiments 100-percent mortality of sponges was caused by immersing them in a saturated salt solution for only 30 seconds and then leaving them exposed to air for at least one hour. In other tests, however, some of the colonies survived this treatment. Nevertheless, practically all sponges were killed if immersed in a saturated solution for three minutes and then kept in air for one hour. Somewhat longer exposures may be needed to achieve a 100-percent kill under other conditions, but the period need not exceed 10-minutes of immersion and one hour of air exposure in most instances. By prolonging the exposure to air the immersion period may be decreased.

The differences in the resistance of sponges to the treatment may be due to their physiological condition, thickness of the oyster shells they infest, temperature at which they are dipped in the salt solution, and perhaps specific differences. In the summer, when the temperatures are high, death and disintegration of sponges, manifested by a change in color from yellow to grayish-black, can usually be observed within 24 to 36 hours after the treatment.

Starfish: It was found that immersion of starfish in a saturated salt solution is an even better method than sprinkling lime over dredged material while it is on the deck of the boat. The advantage of this method is that all starfish, even those hidden in such places as empty conch shells, will be reached by the solution, something that cannot be accomplished by sprinkling lime.



STARFISH

The experiments showed that even those starfish that were immersed in the saturated salt solution for only 30 seconds and then returned immediately to sea water died in the majority of cases. One minute of immersion, especially if the starfish were then kept on deck for some time before they were returned to sea water, caused 100-percent mortality, regardless of the size of the starfish.

The effectiveness of the treatment is, of course, based upon sharp changes in osmotic pressure within the bodies of the starfish. Upon return to normal sea water the bodies of the starfish, subjected for a short time to a saturated salt solution, soon shrank and became flat. Curling of the tips of the rays and autotomy or self-mutilation, consisting of casting off rays, was often observed. The delicate membrane sometimes called "skin gills" covering the starfish body, through which the exchange of gases between the body of the starfish and the surrounding water takes place, disintegrate usually within a few hours after treatment. At a temperature of about 20.0° C. (68° F.) decomposition of the starfish was quite advanced at the end of 24 or 36 hours.

It is of interest that the starfish kept in a saturated solution for longer periods became "pickled" and because of this, even though their death occurred soon after immersion, they retained their shape for a longer period than the starfish dipped in the salt solution for only a short time.

Since the use of a salt solution may be cheaper, safer, and easier, the new method can probably be advantageously substituted for the present practice of dipping mops with entangled starfish in hot water. Moreover, because starfish killed by immersion in a salt solution become soft and flabby almost immediately after treatment, they will rapid-

ly disintegrate and fall out of the mop. We suggest that the members of the industry compare the relative merits of the new method with those of the old one.

Crepidula: These snail-like animals, commonly called "slipper limpets" or "quarter-decks," are not direct enemies, but competitors of oysters that often deprive them, especially young ones, of space and food. They become so numerous at times that they virtually smother beds of oysters. The most common form of Crepidula in Connecticut and New York waters is C. fornicata, and the next is C. plana. C. fornicata usually forms "chains," consisting of groups of several individuals attached to each other.

The setting period of Crepidula coincides to a large extent with that of oysters, but because young Crepidula increase in size much more rapidly than does oysters with their own bodies. In one instance we counted as many as 20 recently-set oysters under the body of a single Crepidula.

The salt method is effective in controlling both species of Crepidula. Immersion of Crepidula "chains" in a saturated salt solution for only 30 seconds and then keeping them in air for an additional 30 minutes was found sufficient to break the "chains" and separate the individuals many of which had been seriously injured.

By immersing Crepidula in a salt solution for 3 to 5 minutes, and then keeping them on deck for 30 to 60 minutes, complete disintegration of the "chains" was usually achieved and the snails were so strongly affected that they all died by the fifth day after return to sea water. Under natural conditions they, undoubtedly, would have been eaten by crabs and fish long before the end of that period. The water temperature in these tests varied between 18.0° and 21.0° C. (64.4°-69.8° F.)

It is believed that the method will be especially valuable in destroying Crepidula of all species on collectors with recently-set oysters.

Tunicates: Still another competitor of oysters and several other commercial mollusks is the common marine form known as the tunicate. There are numerous species of these pests along the Atlantic Coast, Molgula manhattensis being especially common in the Long Island Sound Area. During a large part of the year this and closely-related forms, commonly called "sea grapes," are among the chief fouling organisms virtually covering all types of spat collectors placed in shallow water. In addition to competing for space with mollusks, tunicates also deprive them of food.

Experiments have shown that tunicates can be seriously injured by immersing them in a saturated salt solution for only 30 seconds and then keeping them in air for another hour. Approximately 80 percent mortality can be effected in this way. A total kill may be achieved by a one- to three-minute immersion followed by one hour of air exposure.

If tunicates have to be thrown overboard immediately after treatment, at least a 10-minute immersion is necessary to cause approximately 100-percent mortality. Incidentally, it has been noticed that small, young tunicates are more resistant to the salt treatment than large ones. Differences between species may also be considerable. Further work along these lines is necessary.

The method should be especially useful in treating cultch or spat collectors fouled with a large number of tunicates. As usual, during this operation care should be exercised not to damage mechanically the shells of recently-set oysters, to avoid killing them with the salt solution.

Oyster Drills: Preliminary experiments have indicated that a saturated salt solution may also be helpful in controlling drill populations of the two species, Urosalpinx cinerea and Eupleura caudata, by killing their eggs and embryos while still in egg cases. Heavy mortality was observed even when egg cases containing developing drills were immersed for only three minutes in a saturated salt solution and then kept in air for several additional hours before being returned to running sea water. Immersion for five minutes caused considerable, sometimes complete mortality, even if the embryos were returned to sea water immediately after treatment.

Since the results of the initial experiments to reduce the drill population appear promising, more detailed studies of the effectiveness of this method are being undertaken. It is hoped that a comprehensive report of these studies will become available to biologists and members of the oyster industry before the next breeding period begins.

In conclusion, it should be emphasized that the method described here, and its variations, should be considered as still undergoing laboratory and field trials. If intelligently used, it may become a powerful means of controlling several other enemies and competitors of oysters not mentioned in this report. For example, it is known that on the Pacific Coast biologists have been successfully using a strong salt solution to kill a destructive flatworm of the genus Pseudostylochus, which attacks young oysters. This was also used last summer in the Milford Laboratory's pond work on Martha's Vineyard to control a related species of the flatworm, Stylochus ellipticus, which set in large numbers on spat collectors and killed oyster set. The Laboratory also has experimental evidence that by this method oysters and cultch can be kept cleaner because the saturated salt solution often kills many small fouling forms, including protozoa, hydroids, bryozoa, algae, and even small crustaceans. However, regardless of all these promising features, caution should be exercised and a certain skill developed to use the method advantageously in oyster culture.

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Pacific Coast Fishing Ports

GARIBALDI, ORE.: Garibaldi is a small fishing port located on the northern coast of Oregon near the entrance to Tillamook Bay. This article, which is one in a series of photographic reports on the fishing centers of the United States and its territories, shows the activities at Garibaldi in September 1956 and in June and July 1957.

FIG. 1 - GARIBALDI, OREGON. FISHERMAN'S WHARF IS IN THE CENTER OF THE PICTURE. TO THE LEFT, VESSELS OF THE U. S. COAST GUARD ARE HOUSED IN THE ISOLATED BUILDING BEYOND WHICH LIES THE OPEN OCEAN. THE MOUNTAINOUS POINT OF LAND PROTECTS THE PORT FROM OCEAN STORMS. THE ROW OF STAKES IN THE FOREGROUND ARE SET NETS FISHED PRIMARILY FOR CHUM SALMON (ONCORHYNCHUS KETA) DURING THE MONTH OF NOVEMBER.

FIG. 2 - THE TROLLING VESSEL OMAR HEADING FOR SEA DURING STORMY WEATHER. NOTE HOW THE JETTY IN THE RIGHT BACKGROUND HELPS TO PROTECT THE ENTRANCE TO THE BAY.

The principal fishery products in Garibaldi are salmon, crab, and bottom fish.

Salmon constitutes a substantial source of income to the port. During the month of November, Tillamook Bay is open for 30 days to set-net fishing and to gill-net fishing. On the open ocean, usually within 25 miles of the entrance to the bay, salmon are taken by trolling.

FIG. 3 - ONE OF THE THREE COMMERCIAL FIRMS HANDLING AND PROCESSING FISH AND CRABS IN GARIBALDI MAINTAINS PART OF ITS PROCESSING AND RETAIL FACILITIES ON U. S. HIGHWAY 101.

Another substantial source of income to the port is the fishery for dungeness crab (Cancer magister). The crabs are sold as live crab, whole cooked crab, or as picked crab meat packed in cans and iced. The bulk of the trade is in whole cooked crab and in crab meat.

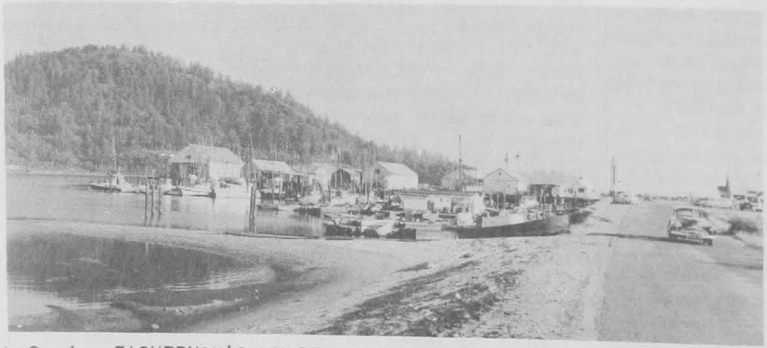

FIG. 4 - FISHERMAN'S WHARF. THIS WHARF LIES ON MAN-MADE LAND, WHICH WAS FILLED IN DURING THE 1940'S. ADDED DREDGING, PLANNED TO START DURING THE MONTH OF SEPTEMBER 1957, WILL ENLARGE THE BASIN TO THREE TIMES ITS PRESENT CAPACITY.

Processing the whole cooked crab is relatively simple. The crabs are cooked in boiling salt water for 15 to 20 minutes, are cooled by water and air, and finally are packed with ice in wooden boxes for the retail market.

Processing the crab meat is more involved. The backs of the crab are pulled

off; the viscera are removed; and the crab are washed in fresh water, cooked in fresh boiling water for 10 to 15 minutes, and cooled for 10 to 15 minutes in cold running water. The crab meat is picked from the shells, and the shells are discarded. The picked crab meat is packed in cans, and the cans are iced and placed in a refrigerator until ready for shipment.

FIG. 5 - PORT-OWNED FLOATING DOCK. NOTE THE GILL NET ON RACK IN FOREGROUND.

Only a limited amount of bottom fish are handled in Garibaldi. The principal species are Dover sole (Microstomus pacificus), English sole (Parophys vetulus), petrale sole (Eopsetta jordani), lingcod (Ophiodon elongatus), and various rockfishes of the genus Sebastodes. All are filleted, and the fillets are sent to the retail market.

FIG. 6 - ONE OF THE THREE COMMERCIAL FISH-PROCESSING FIRMS LOCATED ON FISHERMAN'S WHARF.

The filleting waste is not discarded--it is sold to mink farmers in the nearby area. These farmers also use the less marketable species of bottom fish. James 1/ reports that the Fish Commission of Oregon, by regulation 2/, has placed a restriction on the use of whole Dover, English, or petrale sole for animal food or reduction purposes.

FIG. 7 - FISHERMAN'S WHARF ON WHICH IS LOCATED THE THREE COMMERCIAL FISH-PROCESSING COMPANIES IN GARIBALDI.

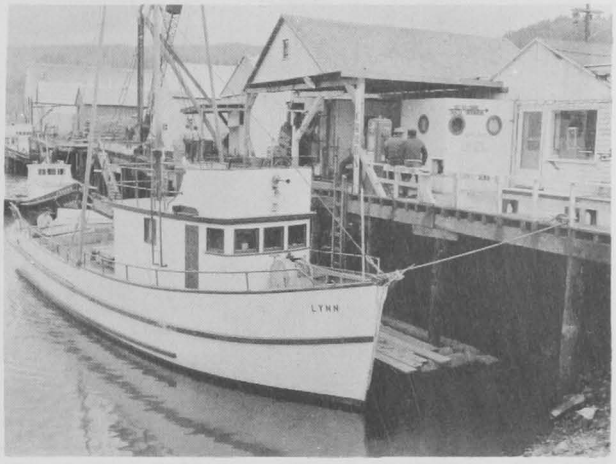

FIG. 8 - ANOTHER OF THE COMMERCIAL FISH-PROCESSING FIRMS. THE VESSEL IN THE FOREGROUND IS A LARGE TROLLER.

1/ PERSONAL COMMUNICATION (OCTOBER 25, 1956) FROM M. C. JAMES, OREGON STATE FISHERIES DIRECTOR.
2/ GENERAL ORDER NO XXVI; EFFECTIVE JUNE 1, 1955; REVISED ON JUNE 20, 1956.

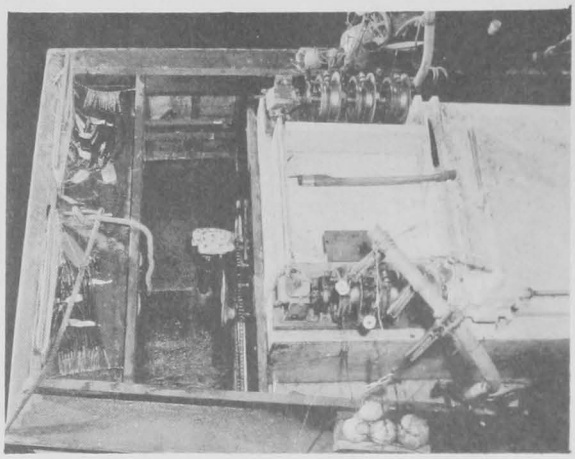

FIG. 9 - AFT END OF A TROLLER. FISHING THIS GEAR ON THE OPEN OCEAN REQUIRES GREAT SKILL.

FIG. 10 - BOX AND GEAR USED BY FISH-BUYING FIRM TO LIFT TROLL-CAUGHT SALMON FROM THE TROLLER TO THE DOCK. NOTE THE IMMACULATE CONDITION OF THE TROLLER. THE CARE WITH WHICH FISH ARE HANDLED ABOARD THE VESSEL CONTRIBUTES VERY GREATLY TO THE QUALITY OF THE PRODUCT.

FIG. 11 - UNLOADING TROLL-CAUGHT SALMON. THREE-FINNED STABILIZERS ARE STOWED IN RACKS ON THE RAILS OF THE FAR VESSEL. THEY ARE CHAINED TO OUTRIGGER BOOMS, ONE ON EACH SIDE, AND TOWED UNDERWATER TO REDUCE THE ROLL OF THE VESSEL WHILE FISHING. THE SALMON TAKEN ON THIS TRIP WERE CHINOOK (ONCORHYNCHUS TSHAWYTSCHA), HUMPBACK (ONCORHYNCHUS GORBUSCHA), AND SILVER (ONCORHYNCHUS KISUTCH); THE NUMBERS CAUGHT WERE ROUGHLY IN THE PROPORTIONS 1:3:7, RESPECTIVELY.

FIG. 12 - WEIGHING SALMON. NOTE THAT THE SALMON CORRECTLY ARE BEING PEWED IN THE HEAD AND NOT IN THE BODY WHERE THE EDIBLE MEAT IS FOUND. THE CORRECT USE OF THE PEW IS HIGHLY IMPORTANT, SINCE OTHERWISE THE MEAT MAY BE OPENED TO BACTERIAL INVASION AND SUBSEQUENT SPOILAGE.

FIG. 13 - WEIGHING SALMON. THE ROPE-HANDLED BOX SHOWN HERE IS USED EXTENSIVELY FROM ALASKA TO MEXICO AND IS A GREAT AID IN THE HANDLING OF FISH.

FIG. 14 - HAND TRANSFER OF SALMON, ANOTHER CORRECT METHOD OF HANDLING.

FIG. 16 - CHINOOK SALMON ON LEFT SIDE OF PICTURE; SILVER SALMON, ON RIGHT. TROLL-DRESSED (VISCERA AND GILLS OUT, BUT HEAD ON), THE CHINOOK SALMON WEIGHED 16½ POUNDS; THE SILVER SALMON, 6½ POUNDS.

FIG. 15 - CONVENIENT METHOD OF GRASPING TROLL-DRESSED SALMON WITH FOUR FINGERS THROUGH OPERCULAR OPENING UNDER FISH'S COLLAR AND THE THUMB PLACED DIRECTLY AT THE BASE OF THE PECTORAL FIN. A LARGE SALMON CAN BE LIFTED AND CARRIED THUS WITHOUT DAMAGING THE MEAT.

FIG. 17 - A DAY'S CATCH OF TROLL-CAUGHT SALMON FROM A TWO-MAN BOAT.

FIG. 18 - ICING SALMON. IN THIS CASE, THE SALMON ARE BEING ICED IN A STAINLESS-STEEL VAT, THE OTHER CONTAINERS BEING FULL AT THE MOMENT. UNLESS PROPERLY CHILLED WITH ICE, FISH BEGIN TO SPOIL IMMEDIATELY.

FIG. 19 - CLOSE-UP OF IRON CRAB POT SHOWING THAT ELECTROLYTIC ACTION IS MOST RAPID AT THE POINTS OF CONTACT OF THE WIRE NETTING WITH THE FRAME. TO PREVENT THIS ACTION BETWEEN THE WIRE AND THE FRAME, FISHERMEN OFTEN INSULATE THE FRAMES BY WRAPPING THEM WITH STRIPS OF RUBBER FROM OLD INNER TUBES. THEY ALSO MAY GROUND THE WIRE NETTING TO THE POT WEIGHTS SO THAT THE ELECTROLYTIC ACTION WILL BE ON THE WEIGHTS SO THAT THE ELECTROLYTIC ACTION WILL BE ON THE WEIGHTS AND NOT ON THE POT ITSELF.

FIG. 20 - NEW STAINLESS-STEEL CRAB POT CONSISTING OF FRAME, WIRE NETTING, IRON WEIGHTS, AND BAIT CAN. A CRAB POT SHOULD WEIGH ABOUT 100 TO 110 POUNDS TO KEEP TIDES AND CURRENTS FROM CARRYING IT OVER THE OCEAN FLOOR. EVEN POTS WEIGHING 110 POUNDS WILL SOMETIMES BE MOVED AS FAR AS 2 TO 10 MILES IN A SINGLE STORM.

FIG. 21 - IRON BAR PROVIDES FOR WEIGHT AND ALSO ACTS AS A SACRIFICIAL ELECTRODE TO PRESERVE THE POT FROM CORROSION.

FIG. 22 - HINGED TOP FOR CONVENIENT REMOVAL OF CRAB.

FIG. 23 - STAINLESS-STEEL BAIT CAN. CLAMS ARE THE PREFERRED BAIT.

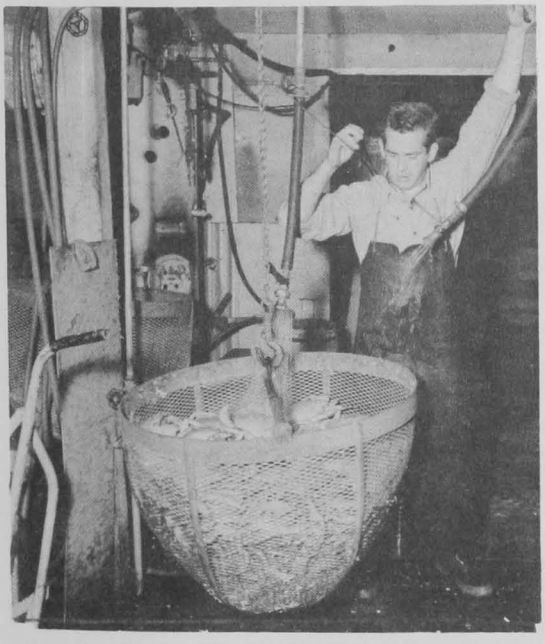

FIG. 24 - RINSING WHOLE COOKED CRAB.

FIG. 25 - ICING WHOLE-COOKED CRAB IN WOODEN BOXES FOR SHIPMENT TO THE RETAIL MARKET. THE UPPER SHELL OF THE DUNGENESS CRAB IN THE NATURAL STATE IS A DARK BROWN OR PURPLE, WHICH CHANGES TO RED DURING COOKING. THIS SHADE OF RED REGISTERS ALMOST WHITE ON THE PHOTOGRAPHIC FILM USED.

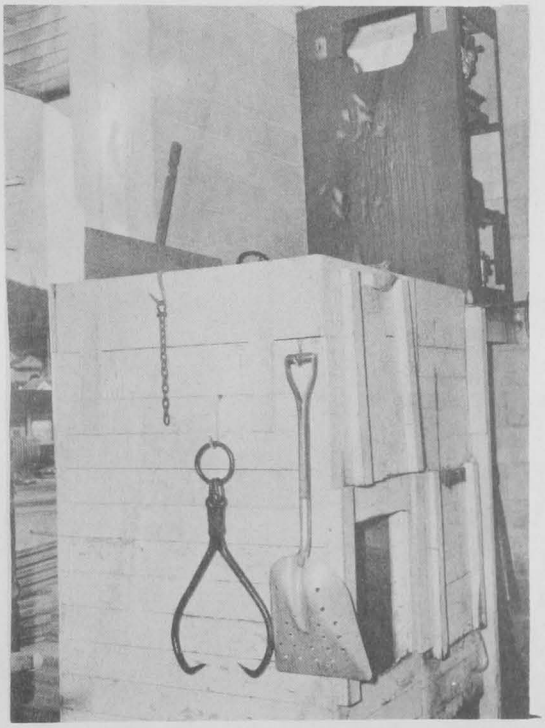

FIG. 26 - FLAKE-ICE MACHINE ABOVE BOX USED TO STORE ICE. NOTE THE FLAKES FALLING FROM THE OPENING AT TOP OF THE MACHINE.

FIG. 27 - WORKER IN THE RIGHT FOREGROUND IS KILLING CRAB, THE FIRST STEP IN THE PROCESS FOR OBTAINING CRAB MEAT. ONLY LIVE CRABS ARE USED IN ORDER TO INSURE THE FRESHNESS OF THE FINAL PRODUCT.

FIG. 28 - CLEANING CRAB. THE BACKS (SHELLS) AND VISCERA ARE REMOVED FIRST AND DISCARDED INTO BARRELS. THE CRABS THEN ARE WASHED IN FRESH WATER IN THE SMALL RECTANGULAR TANK IMMEDIATELY BEYOND THE TWO WORKERS.

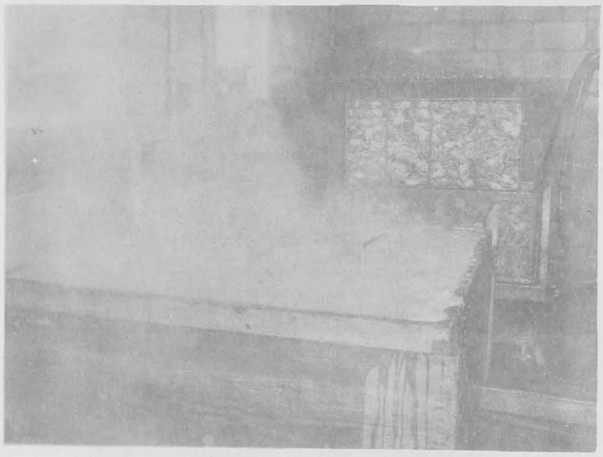

FIG. 29 - COOKING CRABS IN BOILING FRESH WATER. CRABS ARE COOKED 10 TO 15 MINUTES.

FIG. 30 - REMOVING COOKER BASKET FROM STAINLESS-STEEL-LINED COOKER VAT. NOTE OVERHEAD TROLLEY AND ELECTRIC BLOCK FOR LIFTING.

FIG. 31 - COOKING CRABS IN A SPRAY OF COLD FRESH WATER. CRABS ARE COOLED FOR 10 TO 15 MINUTES.

FIG. 32 - CRACKING AND SHAKING COOKED CRABS TO REMOVE THE MEAT. THE GARIBALDI CRAB INDUSTRY FURNISHES EMPLOYMENT FOR MANY LOCAL PEOPLE.

FIG. 33- WASHING CRAB-PROCESSING EQUIPMENT AFTER USE. PROPER SANITATION IS OF UTMOST IMPORTANCE IN MAINTAINING THE QUALITY OF CRAB MEAT. IN THE BACKGROUND ARE THE NO. 10 CANS THAT ARE USED AS CONTAINERS FOR FRESH VACUUM-PACKED CRAB MEAT. EACH CAN HOLDS 5 POUNDS OF CRAB MEAT WHEN FILLED AND SEALED. THE SEALED CANS ARE CHILLED, HELD, AND SHIPPED IN CRUSHED ICE.

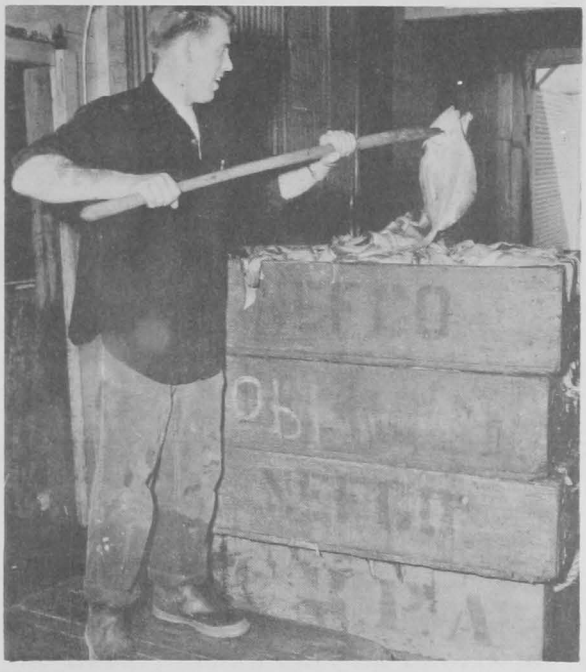

FIG. 35 - BOXES OF FILLET FRAMES. SINCE THESE PARTS ARE FED TO MINK, NONE OF THE FISH IS WASTED.

FIG. 34 - FILLETING PETRALE SOLE. PANS FULL OF FILLETS ARE SHOWN ON THE RIGHT. THE FRAMES (SKINS, BONES, AND VISCERA) ARE THROWN INTO THE BOX ON THE FLOOR TO THE LEFT OF THE FILLETER. THESE PARTS OF THE FISH ARE FED TO MINK, WHICH ARE RAISED ON FARMS IN THE NEARBY AREA.

FIG. 36 - MINK FARM AT BAY CITY, OREGON, ONLY A SHORT DISTANCE FROM GARIBALDI. FISH IS THE PRINCIPAL FOOD OF THE MINK RAISED HERE. THIS FARM AND TWO ADJACENT ONES PROVIDE A YEAR-AROUND LIVELIHOOD FOR FOUR MEN AND THEIR FAMILIES. DURING THE PELTING SEASON, TWO ADDITIONAL PERSONS ARE EMPLOYED.

FIG. 37 - PANS OF FISH ON THE SHELVES OF A SHARP FREEZER. GREAT CARE IS TAKEN TO INSURE THE ABSOLUTE FRESHNESS OF THE MINK FEED.

FIG. 38 - FEEDING MINK.

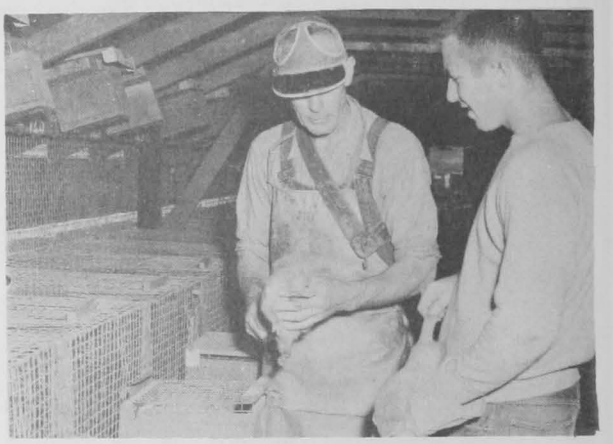

FIG. 39 - TWO SAPPHIRE KITS, 6 WEEKS OLD. NOTE HOW WELL THE KITS THRIVE ON A DIET COMPOSED LARGELY OF FISH.

NOTE: THE AUTHOR GRATEFULLY ACKNOWLEDGES THE GENEROUS AID OF JOSH BUFTON, FRED C. CLEAVER, BASIL EDMUNDS, MARK EDMUNDS, MELVIN R. GREENWOOD, BILL HOY, MARK HOY, VERNE HOY, GEORGE IMHOFF, JAMES R. PARK, GERALD PATTERSON, BILL PERRY, DON VILES, BOB WATT, AND ROBERT WATT.

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1957B. PACIFIC COAST FISHING PORTS: BAY CITY, ORE. COMMERCIAL FISHERIES REVIEW, VOL. 19, NO 4, (APRIL), PP. 20-23. (SEPARATE NO. 475.)

1957C. A PICTURE STUDY OF AN AMERICAN WHALING OPERATION. COMMERCIAL FISHERIES REVIEW, VOL. 19, NO. 5 (MAY), PP. 1-8. (SEPARATE NO. 476.) (THIS ARTICLE SHOWS FISHERY ACTIVITIES AT POINT SAN PABLO IN REDMOND, CALIF.)

1957D. MOORAGE OF FISHING VESSELS AT PORT ORFORD, ORE. COMMERCIAL FISHERIES REVIEW, VOL. 19, NO. 6 (JUNE), PP. 26-27.

Pacific Oceanic Fishery Investigations

RETURNS OF TAGGED SKIPJACK TUNA EXCEED 8 PERCENT: Skipjack tuna tagged by Pacific Oceanic Fishery Investigations biologists continued to be returned at the rate of 20 to 50 a week according to an October 1957 report from the Service's laboratory in Honolulu. At the close of the month aggregate returns were slightly in excess of 8 percent, or slightly over 600 tags. Particularly encouraging was the steady flow of tags released as early as May 1957. These latter are providing the biologists with exceedingly valuable information on the growth of skipjack. Preliminary examinations of the tagging data suggests a growth rate of about one pound a month considering fish that weighed about 5 pounds at the time of release.

Salmon

ALASKA'S BRISTOL BAY FISHERY TO RECEIVE SPECIAL ATTENTION: Priority attention is being given to a serious problem developing in the red (sockeye) salmon fisheries of the Bristol Bay area of Alaska, the Assistant Secretary for Fish and Wildlife announced on November 26, 1957.

Biologists of the United States Fish and Wildlife Service working on Alaskan problems have informed him, the Assistant Secretary said, that increasingly heavy Japanese operations in newly-developed fishing areas in the central north Pacific and Bering Sea are affecting the red salmon runs of Bristol Bay.

SOCKEYE (RED) SALMON
(ONCORHYNCHUS NERKA)

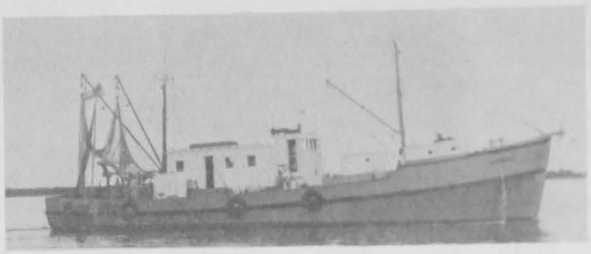
The Bristol Bay runs of red salmon are expected to be small during 1958. The Bureau of Commercial Fisheries has advised the Assistant Secretary that despite already stringent regulations now in effect it may be necessary to prohibit fishing entirely in Bristol Bay. This action will be necessary in order to achieve even a minimal escapement of spawning salmon during the coming year unless the high-seas fishery is substantially reduced in areas where salmon of North American origin concentrate.

The U. S. Department of the Interior is vitally concerned over the Bristol Bay situation because of the effect it will have on the Department's current efforts to maintain and improve the Alaska salmon runs. Concern over the Bristol Bay situation has been expressed widely within the salmon industry, and particular attention was given this subject at a meeting of the Interior Department's Advisory Committee on Fish and Wildlife in Washington on November 14 and 15, 1957.

The Department of the Interior is in contact with officials of the Department of State and active attention is being given this problem by both Departments.

South Atlantic Exploratory Fishery Program

EXPLORATORY FISHING FOR ROCK SHRIMP OFF GEORGIA AND SOUTH CAROLINA (M/V Combat Cruise 13): An exploratory fishing trip (October 2-9, 1957) for rock shrimp (Sicyonia brevirostris) was made by the U. S. Bureau of Commercial Fisheries chartered vessel Combat in cooperation with the South Carolina Bears Bluff Laboratory research vessel T-19. Working together in 20-50 fathoms the two vessels made 14 tows off the South Carolina coast with very poor results. During this series of tows on no occasion did catches exceed two pounds of heads-on

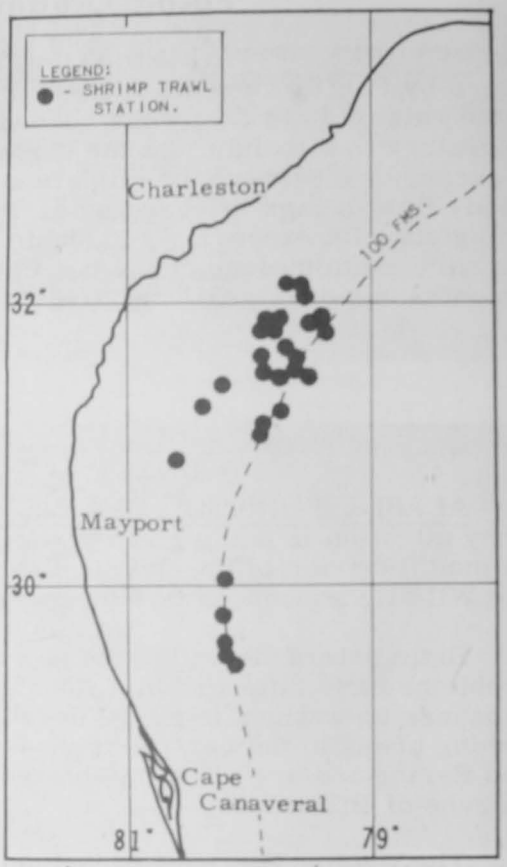


M/V COMBAT

shrimp. Previous cruises in the same area had shown more promising concentrations of the rock shrimp.

The Combat made 13 additional tows in 5-100 fathoms off the Georgia coast and failed to catch any shrimp. One two-hour tow in 75 fathoms yielded a catch of 3,000 large spot (Leiostomus xanthurus). These fish averaged one-half pound each. This cruise completed the charter of the M/V Combat.

Explorations for royal red shrimp along the South Atlantic Coast were to be continued in a series of cruises by the Service's chartered vessel Silver Bay scheduled to start in November 1957. Deepwater fishing will be carried out with experimental shrimp trawls.



M/V COMBAT CRUISE 13 (SEPT.11-12 & OCT. 2-9)

Sport Fishing

GOVERNMENT OPPOSED TO FEDERAL FISHING LICENSE: The opposition of the Federal Government to a Federal license for sport fishing was pointed out in a letter which the Assistant Secretary of the Interior for Fish and Wildlife sent to the Sport Fishing Institute. The letter follows:

"I am indeed happy to give you the views of the Department concerning the propriety of the issuance of a Federal license for sport fishing. It is important that the views of the Department on this controversial subject be given the widest possible distribution.

"The Department of the Interior has consistently supported the principle that the states should retain all possible responsibility for their internal affairs. Receipts from sale of fishing licenses provide the primary means for financing fishery management, an activity for which the states have the basic authority. On this basis alone, the Department would be opposed to the issuance of a Federal license for sport fishermen.

"Establishing a federal license would create major administrative problems. For example, if such a licensing system were put into effect with the income to be shared by the states, a suitable means of distributing the funds between the respective states would be necessary. We are doubtful that any system could be devised that would be equitable, or for that matter, acceptable to all the states."

/S/ ROSS L. LEFFLER,
ASST. SECRETARY OF THE INTERIOR

Tuna

BIOLOGISTS PROBE MYSTERIES OF ALBACORE SPAWNING: The whereabouts of the spawning grounds of the albacore may not be the sea's No. 1 mystery, but it is high on the list of the ocean's secrets which the U. S. Bureau of Commercial Fisheries hopes to solve.

The scientists not only are unaware of where or when an albacore spawns, but no one has any idea what an albacore larva looks like. Although the albacore is regarded by many as the choicest of all of the tunas or tunalike fish, what little biological information is available relates to those in the middle of the life span. Knowledge of the very young and of the old, mature fish is lacking.

In seeking these unknown spawning grounds, the fishery biologist is motivated by more than plain curiosity or academic urge. The very definite purpose of the quest is to be able to tell the fishing industry when and where it can catch albacore at the least possible cost--and how many it can harvest and keep the resource at a maximum sustained yield. Before these can be accomplished, the secrets of the spawning must be known.

Various species of fish have their own peculiarities for spawning. Some, like the salmon, run into rivers; others go into shallow waters in sheltered places along the shore; still others spawn on the high seas and put their eggs and the hatch into the care of the winds, waves, and the ocean currents. Since the albacore has the broad Pacific, the Indian Ocean, and parts of the Atlantic as its habitat, it is very likely that the spawning areas, like those of other tunas, is somewhere in the open sea. It is entirely possible that untold numbers of albacore larva have been taken, unrecognized, in the plankton hauls made in routine work.

Two approaches are being made in this quest. One is to keep an eye open for albacore about to spawn, or which have spawned, in an effort to determine when the next spawning would have occurred. The other is to develop means of identifying albacore larva, either by tracing a series backwards from known juveniles or by rearing individual specimens from eggs and then describing the identifiable features when the larval stage is reached.

Biologists also hope that by knowledge learned of the early stages of the albacore's life cycle they may find the answer to another albacore mystery--its strange disappearance from its customary areas and its unannounced return to the same areas years later. The most serious of these episodes was in 1926 when a 20-million-pound harvest off the Pacific Coast disappeared practically overnight. Twelve years later the albacore returned in numbers and has been available in California waters at the usual time ever since. The record harvest was 36 million pounds in 1943. During all these years, however, the fish have been medium-sized immature fish, 20 to 40 inches in length, with no indication of the whereabouts of the smaller or larger ones.

The albacore is known to shun water colder than 57° F. Two or three tagged albacore which have been recovered indicate that they can travel the width of the Pacific. Several fish tagged in mid-ocean about one thousand miles north of Hawaii have been recaptured off the coast of Japan. One of these grew from 15 to 50 pounds over a period of 471 days. Still others, tagged off the coast of California, have traveled clear across the Pacific.

United States

FISHERIES RANK SECOND IN WORLD: Although the United States increased its fishery landings by nearly 200,000 metric tons in 1956 as compared with 1955--from 2,739,000 to 2,936,000 metric tons--Japan still remains far in the lead of fishing nations with a total annual catch of 4,763,000 tons in 1956, according to the Yearbook of Fishery Statistics, 1955-56 (Vol. VI), published by the Food and Agriculture Organization (FAO), Rome, Italy.

United States Fishing Fleet[1/] Additions

AUGUST 1957: A total of 59 vessels of 5 net tons and over were issued first documents as fishing craft during August 1957--four more than in August 1956. The Gulf area led with 22 vessels, followed by South Atlantic with 13, Pacific 9, Chesapeake 7, Alaska 4, New England 2, and the Middle Atlantic and Great Lakes areas with 1 each.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, August 1957 with Comparisons

Area	August		Jan.-Aug.		Total
	1957	1956	2/ 1957	1956	1956
	(Number)				
New England	2	2	15	12	15
Middle Atlantic	1	2	19	21	26
Chesapeake	7	9	67	75	138
South Atlantic	13	19	84	80	119
Gulf	22	12	103	77	100
Pacific	99	55	87	67	76
Great Lakes	1	-	5	2	6
Alaska	4	6	40	37	40
Hawaii	-	-	-	1	1
Puerto Rico	-	-	1	-	-
Total	59	55	421	372	521

2/ Revised

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, August 1957

Net Tons	Number
5 to 9	16
10 to 19	15
20 to 29	10
30 to 39	14
40 to 49	1
50 to 59	2
100 to 109	1
Total	59

Note: Vessels assigned to the various sections on the basis of their home ports.

1/ INCLUDES BOTH COMMERCIAL FISHING AND SPORT FISHING CRAFT.

United States Fishery Landings

DOWN 11 PERCENT FIRST NINE MONTHS OF 1957: The catch of fish and shellfish in the United States and Alaska during the first nine months of 1957 reflected a sharp downward trend compared with the same period last year. Fisheries which yielded about 3.1 billion pounds during the first three quarters of 1957 produced 3.5 billion pounds during the same period in 1956.

Menhaden showed the greatest decline, falling to 1.4 billion pounds from the 1.8 billion pounds reported during the first 9 months of 1956. New England landings of ocean perch were down by about 22 million pounds while haddock declined 8 million pounds. On the Pacific Coast, tuna and bonito declined almost 30 million pounds while Alaska salmon dropped nearly 50 million pounds.

Only four species showed marked increases over the first nine months of 1956: herring in Maine was up over 20 million pounds; herring in Alaska (with the season over) was up nearly 11 million pounds; whiting in New England increased 36 million pounds; and industrial fish (excluding menhaden) in Massachusetts was up over 47 million pounds.

From information reported to date, it appears that the 1957 catch will fall 400 million pounds or more below the record 1956 catch of 5.2 billion pounds.

United States Catch of Fishery Products, Various Periods, 1957 and 1956 1/

Item	Period	1957	1956	Total 12 Mos. 1956
		(1,000 Lbs.)		
Maine	8 mos.	201,228	186,140	277,822
Massachusetts:				
Boston	9 mos.	108,531	115,560	147,402
Gloucester	9 "	209,550	214,322	252,038
New Bedford	9 "	77,352	68,266	87,965
Provincetown	9 "	18,911	17,927	21,151
Total		414,344	416,075	508,556
Rhode Island 2/	8 mos.	86,420	80,052	129,406
New York 2/	8 "	28,789	25,573	38,268
New Jersey 2/	8 "	34,227	34,067	46,097
North Carolina 2/	9 "	43,834	39,951	49,009
Georgia	9 "	13,396	11,975	16,711
Florida 2/	8 "	85,319	85,620	142,493
Alabama	8 "	8,254	8,284	12,320
Mississippi 2/	8 "	15,412	15,825	22,573
Texas 2/	8 "	44,453	33,406	61,993
Ohio (Mar.-Sept.)	9 "	19,962	20,686	24,928
Oregon	7 "	34,655	33,483	59,256
California:				
Certain species 3/	8 mos.	311,524	341,180	604,218
Other	6 "	54,610	45,366	156,116
Total California		366,134	386,546	760,334
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	9 mos.	1,355,896	1,720,917	2,010,393
Louisiana, shrimp (heads-on)	7 mos.	16,449	21,833	50,541
Washington (halibut only 4/)	9 mos.	15,012	15,650	16,604
Alaska:				
Halibut 4/	9 mos.	20,679	24,140	33,076
Herring (season over)	9 "	114,664	103,759	103,759
Salmon (season over)	9 "	220,000	269,898	269,898
Total above items		3,139,127	3,533,880	4,634,037
Other		5/	5/	565,963
Grand Total		5/	5/	5,200,000

1/ Preliminary.
2/ Excluding menhaden.
3/ Includes catch of: anchovies, jack and Pacific mackerel, tuna and bonito, and squid.
4/ Dressed weight.
5/ Data not available.

United States Catch of Certain Species, Various Periods, 1957 and 1956 1/

Item	Period	1957	1956	Total 12 Mos. 1956
		(1,000 Lbs.)		
Anchovies, California	8 mos.	42,074	41,674	54,282
Cod:				
Maine	8 mos.	1,655	2,001	2,361
Boston	9 "	14,966	15,180	17,518
Gloucester	9 "	1,335	1,158	1,361
Total Cod		17,956	18,339	21,240
Haddock:				
Maine	8 mos.	3,020	3,198	4,340
Boston	9 "	78,523	85,289	106,662
Gloucester	9 "	6,047	7,254	8,774
Total Haddock		87,590	95,741	119,776
Halibut 2/:				
Washington	9 mos.	15,012	15,650	16,604
Alaska	9 "	20,679	24,140	33,076
Total Halibut		35,691	39,790	49,680
Herring:				
Maine	8 mos.	106,945	86,420	140,472
Alaska (season over)	9 "	114,664	103,759	103,759
Industrial fish, Mass. 3/	9 mos.	85,362	37,949	124,429
Mackerel, California:				
Jack	8 mos.	39,670	39,340	76,784
Pacific	8 "	19,414	20,158	47,766
Menhaden	9 mos.	1,377,559	1,787,112	2,076,588
Ocean perch:				
Maine	8 mos.	43,344	48,862	64,967
Boston	9 "	2,950	2,139	2,839
Gloucester	9 "	50,750	68,347	83,303
Total Ocean Perch		97,044	119,348	151,109
Salmon, Alaska (season over)	9 mos.	220,000	269,898	269,898
Scallops, sea, New Bedford	9 mos.	12,617	11,046	14,243
Shrimp (heads-on), Gulf States	7 mos.	83,402	82,189	183,862
Squid, California	8 mos.	10,670	10,714	15,790
Tuna and bonito, California	8 mos.	199,696	229,294	409,596
Whiting:				
Maine	8 mos.	15,597	14,226	14,835
Boston	9 "	945	224	413
Gloucester	9 "	72,051	38,110	46,432
Total Whiting		88,593	52,560	61,680
Total of all above items		2,638,947	3,045,331	3,920,954
Other		500,180	488,549	1,279,046
Grand Total		3,139,127	3,533,880	5,200,000

1/ Preliminary. 2/ Dressed weight. 3/ Excluding menhaden.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, SEPTEMBER 1957: Imports: United States imports of edible fresh, frozen, and processed fish and shellfish in September 1957 were lower by 25.8 percent in quantity and 11.3 percent in value as compared with the previous month. Compared with September 1956, the imports for this September were up 15.1 percent in quantity and 20.6 percent in value. Imports in September this year were substantially lower than in August for groundfish fillets and raw tuna. These decreases more than offset increases in frozen shrimp, canned salmon, and fillets other than groundfish. Compared with the same month in 1956, imports this September were higher for canned salmon and sardines, shrimp, other fillets, and raw tuna. These increases more than offset declines in the imports of groundfish fillets and slightly lower imports of a few other items.

Table 1 - United States Foreign Trade in Edible Fishery Products, September 1957 with Comparisons

Item	Quantity			Value		
	September		Year	September		Year
	1957	1956	1956	1957	1956	1956
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen & processed[1/]	64.9	56.4	786.5	21.1	17.5	231.6
Exports:						
Fish & shellfish: Processed[1/] only (excluding fresh & frozen)	5.2	4.4	82.8	2.3	1.7	19.2

1/ INCLUDES PASTES, SAUCES, CLAM CHOWDER AND JUICE, AND OTHER SPECIALTIES.

Imports for September 1957 averaged 32.5 cents a pound as compared with 31.0 cents a pound for the same month of 1956.

Exports: Processed fish and shellfish exports in September 1957 declined 8.8 percent from the previous month, but were up 18.2 percent above the same month in 1956. The September 1957 value of these exports was up 9.5 percent over the previous month and was 35.3 percent higher than in the same month in 1956. Increases in value this September as compared with the previous month and the same month a year ago were due to larger exports of relatively high-priced canned salmon.

* * * * *

GROUNDFISH FILLET IMPORTS, OCTOBER 1957: During October 1957, United States imports of groundfish (including ocean perch) fillets and blocks amounted to 19.1 million pounds. Compared with the same month a year earlier, this was a decrease of 6.6 million pounds (26 percent). The principal cause for the lower imports was a 4.7-million-pound decrease from Iceland.

Canada in October 1957 led all other countries with 16.2 million pounds--1.1 million pounds less than in October 1956. Iceland was next with nearly 2.0 million pounds. Imports from Norway, Denmark, Netherlands, West Germany, and Greenland totaled 1.0 million pounds, 783,000 pounds less than in October 1956. There were no imports from the United Kingdom and France during October 1957, although Miquelon and St. Pierre shipped 107,000 pounds.

Imports of groundfish fillets and blocks into the United States during the first ten months of 1957 totaled 124.3 million pounds--a decrease of 4.4 million pounds (3 percent) as compared with the corresponding period of 1956. For the first 10 months of 1957 Canada accounted for 77 percent of the total imports, followed by Iceland with 15 percent; Norway, Denmark, and West Germany together accounted for 6 percent. The remaining 2 percent came from the United Kingdom, Netherlands, France, Greenland, and Miquelon and St. Pierre.

NOTE: SEE CHART 7 IN THIS ISSUE.

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IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-SEPTEMBER 1957: Imports: GROUNDFISH: During the first nine months of 1957 groundfish fillet imports totaled 65.9 million pounds, a 6-percent increase over the same period in 1956. Imports of blocks through September were 38.9 million pounds, a 59-percent increase over the same period in 1956. During September 1957, fillet imports of 6.5 million pounds were 14 percent more than for the same month in 1956 and imports of blocks of 1.8 million pounds were 47 percent less than during the same month the previous year.

FROZEN TUNA: During the first nine months of 1957, 111.0 million pounds were imported, a gain of 13 percent over the same period the previous year. Of the 111.0 million pounds, 53.9 million pounds were albacore (an increase of 42 percent over the previous year) and 57.1 million pounds of other tuna (11 percent less than the previous year). September 1957 imports totaled 5.0 million pounds, 39 percent more than in September 1956.

CANNED TUNA: Imports of 31.5 million pounds during the first nine months of 1957 represented a gain of 3 percent over the same period in 1956. Imports of tuna canned in oil from Japan totaled 505,000 pounds during the 1957 period as compared with 280,000 pounds for the 1956 period. Almost 3.3 million pounds were imported during September 1957, a gain of only 0.2 percent over the same month the previous year.

CANNED BONITO: Imports during the first nine months of 1957 totaled 12.2 million pounds, 18 percent more than in the same period in 1956. Imports of 912,000 pounds in September 1957 were 53 percent greater than for the same month in 1956.

CANNED SALMON: Total imports for 1957 through September totaled 16.4 million pounds or 29 percent more than in the comparable period of 1956. September 1957 imports of 4.6 million pounds were over five times more than in that month in 1956.

CANNED SARDINES: Total imports for this year through September 1957 of 18.3 million pounds were 31 percent greater than for the first nine months in 1956. September 1957 imports of 1.7 million pounds were 9 percent more than in September 1956.

SWORDFISH: Total imports during the first nine months of 1957 were 4 percent less than for the comparable 1956 period. September 1957 imports of 2.0 million pounds were 13 percent less than for the same month in 1956.

SHRIMP: Total imports for the first nine months of 1957 of 46.8 million pounds were 5 percent less than for the same period in 1956. September 1957 imports of 7.5 million pounds were 24 percent greater than in September 1956.

FRESH AND FROZEN LOBSTERS: Imports during the first nine months of 1957 were 40.0 million pounds or 5 percent greater than in that period of 1956. September 1957 imports totaled 2.3 million pounds and were 19 percent more than in that month in 1956.

CANNED CRABMEAT: Total imports during the first nine months of 1957 of 5.0 million pounds were 0.7 percent more than during that period of 1956. September 1957 imports totaled 613,000 pounds, 1 percent less than in that month of 1956.

FISH MEAL: Total imports during the first nine months of 1957 of 66,148 tons were 12 percent less than in the same period of 1956. Imports of 3,744 tons during September 1957 were 3 percent less than in September 1956.

Exports: CANNED SARDINES: Total exports of 10.7 million pounds during the first nine months of 1957 were 60 percent less than during that 1956 period. September 1957 exports of 402,000 pounds were 45 percent less than during September 1956.

CANNED MACKEREL: Exports during the first nine months of 1957 totaled 14.0 million pounds. September 1957 exports totaled 795,000 pounds, an increase of 79 percent over the same month in 1956.

FISH OILS: Total exports of 104.2 million pounds during the first nine months of 1957 were 9 percent less than during the same period in 1956. September 1957 exports of 24.9 million pounds were 44 percent greater than during that month of 1956.

* * * * *

IMPORTS OF TUNA CANNED IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the 12½-percent rate of duty is limited to 44,528,533 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from January 1-November 2, 1957, amounted to 34,923,285 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 9,605,248 pounds of the quota which may be imported during the balance of 1957 at the 12½ percent rate of duty.

Virginia

NEW FISHERIES RESEARCH VESSEL "PATHFINDER:" An essential part of a marine laboratory is the floating equipment from which observations are made at sea. Much can be accomplished from shore, from piers, and from small boats in protected waters, but for a well-balanced program a seaworthy vessel, adequately laid out and equipped, is a necessity. A vessel designed and built especially for marine research was put into service by the Virginia Fisheries Laboratory, Gloucester Point, Va., in 1957. She was named Pathfinder, in honor of Matthew Fontaine Maury, Virginia's distinguished citizen and America's first oceanographer. The name is doubly appropriate, for it also describes the exploratory nature of the work in which she will be engaged.

FIG. 1 - VIRGINIA FISHERIES LABORATORY RESEARCH VESSEL PATHFINDER. TOTAL CONTRACT PRICE, INCLUDING ARCHITECT'S FEES, WAS $53,000.

Several considerations dictated the size and characteristics of the Pathfinder. Because of the violent storms that sometimes sweep Chesapeake Bay, the vessel had to be capable of operating in the open sea and had to be as large and seaworthy as budget limitations would permit. On the other hand, since she must operate in the Bay and estuaries, where the water is quite shallow, she should not draw more water than consistent with length and seaworthiness. She should have a large area of unrestricted deck space for handling nets and oceanographic instruments and gear, yet should contain adequate laboratory and storage space and comfortable quarters for the crew.

The end result was a vessel that superficially resembles a shrimp trawler, but departs from trawler design in several important ways. The engine was placed as far aft as possible, to occupy space normally used as a fish-hold. This allowed more space forward for living quarters and galley, and released space in the deckhouse for use as a laboratory. Maximum space within the hull was obtained by the use of steam-bent frames in place of the sawn-frame construction typical of Chesapeake fishing boats. The dimensions of the vessel are: length over-all, 55'3"; length on waterline, 55'8"; beam, 16'8"; and draft, 5'0".

The Pathfinder is also unique in that her crew is composed entirely of biologists. The crew is selected from the scientific staff of the Virginia Fisheries Laboratory according to the nature of the work to be done on each cruise. At present the vessel is primarily engaged in surveys of Chesapeake Bay and its major tributaries to measure the distribution and abundance of fishes and other migratory marine animals, to study their movements and estimate the catch of the various commercial and sport fisheries by tagging, to estimate the success of spawning and attempt to predict the future supply. It is planned to broaden the program in the future, to investigate the effects of oceanic currents upon the survival of young fishes and their movements from the ocean spawning grounds to nursery grounds in the Bay and estuaries.

overhead. The galley is fitted with a stainless steel gas stove, an 8-cubic-foot electric refrigerator, a stainless steel sink, and built-in table and benches of marine plywood. A gas detector is mounted on the forward bulkhead, with the sensitive element in the bilge. The galley is ventilated by a blower and a 6-inch port. On the starboard side are the toilet facilities. The stateroom, also on the starboard side aft of the head contains two bunks, with foam rubber mattresses, lockers for clothing, and is ventilated with a 6-inch port. Waste water is pumped overboard by an automatic sump pump.

The engineroom contains a Diesel engine, and twin-disc hydro-troll marine gear, with 2.96:1 reduction gear ratio. The hydro-troll device permits bleeding off a portion of the hydraulic fluid, causing

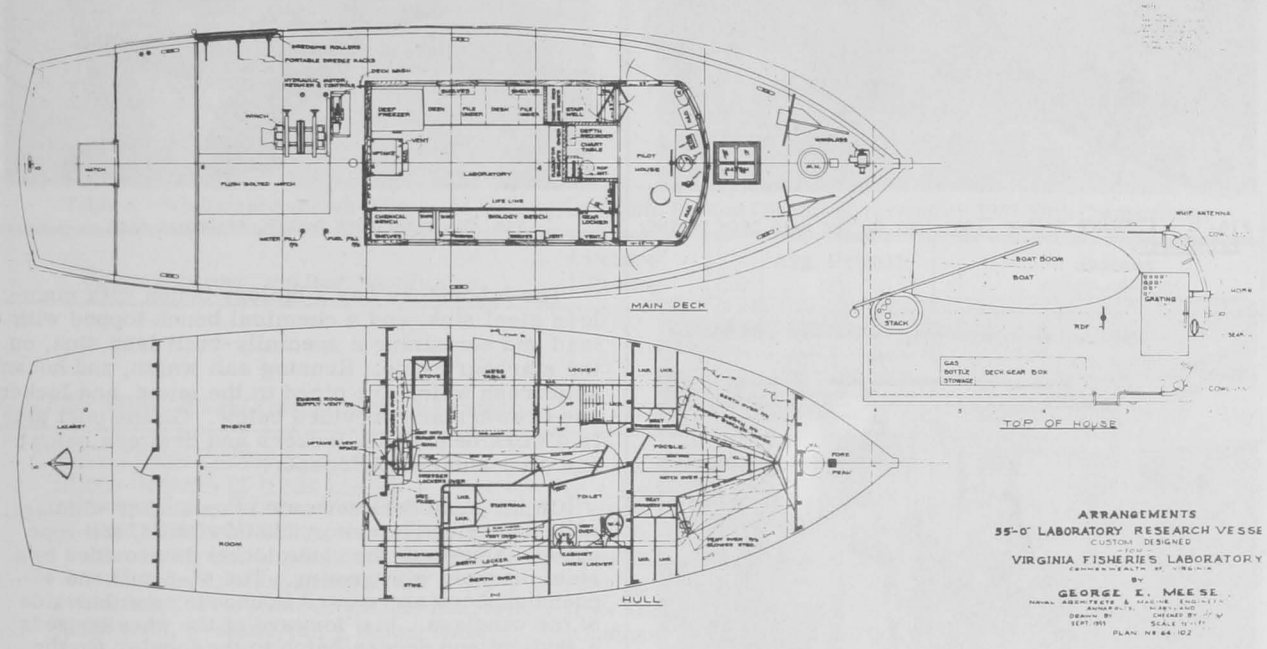

FIG. 2 - DETAILS OF M/V PATHFINDER ARRANGEMENT.

Keel and keelson of the vessel are yellow pine, each in one length, fitted with a wrought-iron worm shoe. Stem, stem knee, forefoot, cheek pieces, frames, engine girders and beds, breasthooks, and quarter knees are white oak; shaft log, deadwood, sternpost, horn timber, floor timbers, stringers, clamps, shelves, deck beams, and hull ceiling are yellow pine. Planking is cypress below the waterline, fir above, and decking and transom are fir. Bulkheads are fir marine plywood with oak stiffeners; stop waters soft white pine. The deckhouse is framed of oak and yellow pine, with external siding of cypress and sheathed inside with marine plywood. The dodger on the flying bridge is framed of pine and sheathed with plywood. The top of the house is sheathed with tongue-and-groove pine covered with 8-oz. canvas. The main deck and planking are caulked with cotton, oakum, and caulking compound.

Below decks forward is a chain locker. The forecastle contains four bunks equipped with 4-inch foam rubber mattresses, lockers for clothing, and an electric blower for ventilation. There are two 8-inch ports on each side, and a hatch in the deck

the gear to slip, and permitting an additional reduction of approximately 2:1 in shaft speed for slow-speed hauling of nets and scientific gear. The Monel-metal shaft runs in a rubber bearing and swings a 38" diameter and 30" pitch, 3-blade, bronze propeller. The auxiliary generator is a Diesel, 32-volt, 3,000-watt capacity; the electric system is 32 volts. Power is stored by two sets of batteries, each of 16 cells. A marine converter transforms 115-volt shore power to 32 volts when the vessel is docked. The main engine drives a $1\frac{1}{4}$-inch bilge pump, and a $1\frac{1}{4}$-inch salt-water service pump. The auxiliary drives a $1\frac{1}{2}$-inch centrifugal pump to take water samples for scientific purposes. Fresh water is delivered to galley, head, and laboratory by a pressure water system. Heating is supplied by a fluid heat hot-water unit, with convectors in forecastle, galley, head, stateroom, pilothouse, and laboratory. Two fuel tanks, each of 400-gallon capacity, and two water tanks, each holding 150 gallons, are fabricated of $\frac{3}{16}$" steel plate, metallized outside with zinc, and water tanks are coated inside with plastic. Fire protection in the engineroom is provided by a 75-pound capacity CO_2 cylinder, remote-controlled from the pilothouse. There are individual

extinguishers in the galley and pilothouse. Two blowers ventilate the engineroom, one leading from a galvanized hood over the battery rack, the other from the bilge.

The pilothouse is provided with engine controls and an instrument panel with gages for clutch-oil and lubricating-oil pressure, hydraulic oil and water temperature, ammeter, and tachometer. Electronic equipment includes a radiotelephone, depth recorder with ranges 0-50, 50-100, and 100-150 feet; and a radio-direction finder.

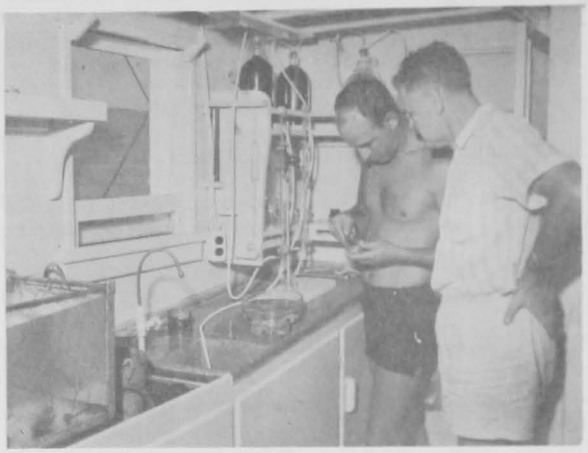

FIG. 3 - A CORNER OF THE LABORATORY ON THE MAIN DECK OF THE PATHFINDER.

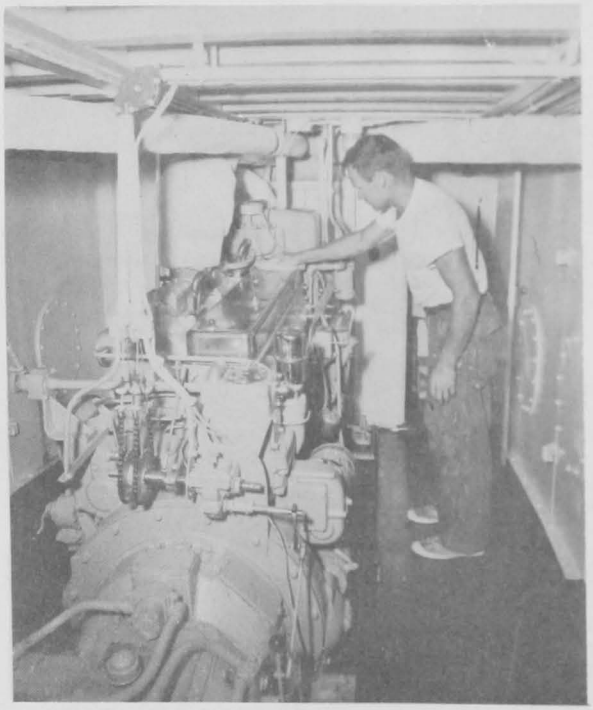

FIG. 4 - THE ENGINEROOM OF THE PATHFINDER.

NOTE: ALSO SEE COMMERCIAL FISHERIES REVIEW, MARCH 1957, P. 33.

FIG. 5 - PATHFINDER GALLEY, STARBOARD SIDE.

The laboratory has a biology bench with stainless steel sink, and a chemical bench topped with lead and containing a specially-built lead sink, on the starboard side. Running salt water, and hot and cold fresh water are piped to the sinks, and lockers and drawers are provided below. On the port side is a work bench with lockers and drawers below, and an 8-cubic-foot freezer.

On the main deck forward is an anchor windlass, with $\frac{3}{4}$ hp.-electric motor, chain wildcat, and rope gypsy. Access to the chain locker is provided by a steel manhole with grating. The 85-pound and 40-pound anchors are stowed in chocks on either side of the windlass. Just forward of the wheelhouse is a skylight and access hatch to the focsle. On the afterdeck is a trawling winch, with two drums, each containing 1,000 feet of $\frac{3}{8}$-inch plow-steel wire, and gypsy. Power from the main engine is provided by hydraulic equipment. A flush hatch gives access to the engineroom, and a smaller hatch aft leads to the lazarette. On the port size, intake and discharge pipes for the plankton pump project through the deck.

The vessel is rigged for trawling, with steel mast, a steel main boom, and smaller booms port and starboard which serve as boat hoist and trawling boom respectively. The 13-foot tender, with 10-hp. motor, is stowed on top of the deckhouse.

All hatches, doors, windows, portholes, exhaust vents, and funnels, except the wheelhouse doors and windows, are provided with bronze screens.

--J. L. MC HUGH, DIRECTOR
VIRGINIA FISHERIES LABORATORY
GLOUCESTER POINT, VA.

Wholesale Prices, November 1957

As in the previous two months, there was only a small change in the edible fish and shellfish (fresh, frozen, and canned) wholesale price index (121.2 percent of the 1947-49 average) for November 1957. It went up 1.6 percent as compared with October and rose 2.4 percent as compared with November 1956. Price changes among the individual commodities included in the index, however, were numerous.

From October to November 1957 prices declined 2.6 percent for the varieties in the drawn, dressed, and whole finfish subgroup. Sharp increases in fresh drawn large haddock prices (up 20.7 percent) at Boston and lake trout prices (up 15.6 percent) at Chicago were more than offset by declines in prices for the remaining commodities that make up this subgroup. Declines in halibut and salmon prices were artificial in that November prices were for frozen stocks only, while October prices represented a combination of fresh and frozen prices. More than seasonally-low catches of haddock by Boston trawlers resulted in high prices for this species in November as compared with the previous month and the same month in 1956. In November 1957 the wholesale price index for this subgroup was 2.2 percent above the same month in 1956, due to higher prices for haddock and for all the freshwater varieties in the subgroup except Lake Superior drawn whitefish (down 2.6 percent) at Chicago and frozen dressed halibut (down 14.6 percent).

FIG. 1 - UNLOADING FISH FROM VESSELS AT FULTON FISH MARKET DOCKS IN NEW YORK CITY.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1957 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Nov. 1957	Oct. 1957	Nov. 1957	Oct. 1957	Sept. 1957	Nov. 1956
ALL FISH &SHELLFISH (Fresh, Frozen, & Canned)					121.2	119.3	120.0	118.4
Fresh & Frozen Fishery Products:					136.1	133.1	134.3	130.9
Drawn, Dressed, or Whole Finfish:					130.8	134.3	140.5	128.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.12	142.4	118.0	97.9	122.1
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.35	96.4	109.6	136.1	112.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.64	.73	143.8	162.9	168.5	144.9
Whitefish, L.Superior, drawn, fresh	Chicago	lb.	.58	.64	142.5	158.7	179.7	146.3
Whitefish, L.Erie pound or gill net, rnd., fresh	New York	lb.	.78	.98	156.7	197.2	195.1	149.6
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.74	.64	151.6	131.1	137.8	143.4
Yellow pike, L. Michigan&Huron, rnd., fresh	New York	lb.	.49	.51	114.9	119.6	146.6	80.3
Processed, Fresh (Fish & Shellfish):					142.2	133.8	131.6	135.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.47	.39	158.2	132.7	115.7	117.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.88	.78	138.3	122.5	120.9	128.8
Oysters, shucked, standards	Norfolk	gal.	5.88	6.00	145.4	148.5	148.5	148.5
Processed, Frozen (Fish & Shellfish):					125.1	119.2	116.9	118.6
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	100.8	100.8	103.4
Haddock, sml.,skins on, 1-lb. pkg.	Boston	lb.	.33	.29	103.6	89.5	92.6	87.9
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.27	110.8	108.8	108.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.84	.83	130.0	128.1	121.9	127.3
Canned Fishery Products:					100.0	99.7	99.6	100.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.50	11.45	82.9	82.6	80.8	80.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.60	8.50	100.4	99.2	105.0	97.4
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans cs.	New York	cs.	6.45	6.46	68.6	68.7	70.1	81.9

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Fresh processed fish and shellfish prices in November 1957 were up by 6.3 percent from the preceding month, due primarily to higher prices for fresh haddock fillets (plus 19.2 percent) and fresh shrimp (up 12.9 percent). As compared with November 1956, the index for this subgroup in November 1957 increased by 4.9 percent, due to much higher fresh haddock prices and a 7.4-percent increase in fresh shrimp prices. Shucked oysters, in better supply this year, declined slightly in November 1957.

Frozen processed fish and shellfish prices increased 4.9 percent from October to November 1957 due principally to a stronger market for frozen haddock (prices went up 15.8 percent). Price increases for ocean perch fillets of 1.8 percent and for 26-30 count frozen shrimp of 1.5 percent also occurred. There was an increase of 5.5 percent in the index for this subgroup from November 1956 to November 1957 principally because frozen haddock fillets went up 17.9 percent. Ocean perch fillet prices, up about 1.8 percent from October to November 1957 and from November 1956 to November 1957, showed the first signs of reacting to the relatively low frozen inventories. November 1957 frozen shrimp prices at Chicago were higher by 2.1 percent and flounder fillet prices were down about one cent a pound as compared with the same month in 1956.

The subgroup index for canned fishery products in November 1957 remained about unchanged from the preceding month and also from November 1956. Changes in wholesale canned fish prices from October to November this year were insignificant. The most pronounced change from November a year ago was a decline of 16.2 percent in Maine canned sardine prices because of a lag in sales. At the end of November packers of Maine sardines were at the end of the 1957 packing season. Preliminary Maine sardine pack figures indicate a decline of about 5 percent from the 1956 pack. Tuna canners were active during the month and prices at the canners' level appear firmer than a year earlier. The 1957 California sardine season was a near failure as of the end of November.

Corrections For November 1957 Issue

In the article "Pacific Coast Whaling Industry Revived" in the November 1957 issue of the Review, pp. 42-43, the last sentence of the first full paragraph on page 43 should read: "Their primary interest in sperm whales is for oil and meal."

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In the article under "Washington" entitled "New Fishery for Small Shrimp" in the November 1957 issue of the Review, the illustration on page 42 is of the pink shrimp (Penaeus duorarum) found in the South Atlantic and Gulf of Mexico. The pink shrimp found off the coast of Washington referred to in the article is Pandalus jordani.

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The article "Oysters: Optimum and Minimum Salinity Tolerance Through the Setting Stage" on p. 24 of the November 1957 issue of Commercial Fisheries Review has a photograph captioned "Oyster Larvae, Highly Magnified." The correct caption is "Oyster set, highly magnified."

WHY ARE SOFT-SHELL LOBSTERS MORE DIFFICULT TO HOLD ALIVE THAN HARD-SHELL ONES?

Even though uninjured by handling, the soft-shell lobsters will not stand as extreme water conditions as hard-shell ones and are more quickly killed by high temperature or low concentrations of dissolved oxygen in the water. Much of the difficulty, however, in holding soft-shell lobsters alive is that they are injured by other lobsters in the same tank. Then, too, damage caused in handling decreases their chances of survival.

--Sea Secrets, The Marine Laboratory, University of Miami, Coral Gables, Fla.