TRENDS AND DEVELOPMENTS

California

ANCHOVIES ABUNDANT IN SOUTHERN CALIFORNIA WATERS: Despite fishing pressure that has steadily increased since 1951, there are now more anchovies in Southern California waters than you can scoop up in a season of heavy netting. This report should make pleasant news for commercial fishermen, ocean sport fishermen, and researchers, although biologists of California's Department of Fish and Game temper their enthusiasm on a note of caution.

While there is an abundance of anchovies, they do not appear to be as old, on the average, as they once were. Biologists consider this a warning sign that a downward population fluctuation may be indicated.

Agencies taking part in the California Cooperative Oceanic Fisheries Investigations program, now only four years old, have found that fishing pressure hasn't hurt the southern anchovy population at all.

From 1951 to 1955 commercial landings of anchovies in Southern California (Point Concepcion to San Diego) amounted to 80,204 short tons and the live bait catch to 31,152 tons, a total of more than 111,000 tons. But the evidence shows that nature has provided the anchovy with four consecutive years (1951-1954) in which survival of its spawn was abundant enough to more than compensate for all deaths occurring during this period.

For instance, the number of larval anchovies taken in the area from Point Concepcion to Point San Juanico, Baja California, has doubled from 1951 to 1955. This means that either the spawning population has doubled or there was a decided increase in the survival rate of eggs and newly hatched larvae over previous years.

That the spawning population actually has increased is substantiated by data from other sources. Results of the State's aerial survey show a marked increase in the number of schools sighted in 1956 over the previous two years in the 500-mile stretch between Morro Bay and Punta Baja in Baja California

The same cannot be said for the anchovy population off Monterey and San Francisco. There was a peak concentration in Central California in 1952, but since that date only limited numbers have appeared. Apparently, total mortality (including fishing mortality) was greater than the addition of young fish into the population. Fish born in early 1954 contributed to a slight comeback of the anchovy in Central California in 1955, but this did not compare to the increase in the southern part of the State.

Between 1951 and 1955 only 37,633 tons were landed at Monterey and San Francisco.

Does this mean that anchovies may have moved to Southern California in early 1953 when they "disappeared" from Central California waters? Or does it mean that heavy fishing, coupled with poor survival of eggs and larvae, lowered the population to a level where it was no longer economically feasible to continue fishing?

Can anchovy populations be expected to vary considerably in abundance from natural causes alone and will these variations occur, fishing or not? Also, will a continual state yearly catch of 35,000 tons never endanger Southern California stocks?

Some of these questions can be answered now, but others await the results of continuing and intensive research.

Samplings from 1952 to 1955 proved that the anchovies did not move to Southern California from the central area. In fact, up to now all information on the fish points to the fact that there is a marked separation between the stocks to the north and south of Cape San Martin, southern Monterey County, and that the two "populations" should be considered separately, especially concerning problems of fishery management.

Fortunately, laws prevent uncontrolled take of anchovies in California waters. The Fish and Game Commission has steadfastly denied permits to reduce whole anchovies into meal and oil, and in 1954 the Legislature enacted a law setting a maximum yearly take. Up to now this legislation has not had an effect upon the anchovy population, for the catch has been less than the maximum set by law.

The economic demand for anchovies has lessened considerably since the peak demand year of 1953, and the catch is not expected to reach the 35,000-ton bag limit allowed for the the period between April 1, 1956, and March 31, 1957, unless new markets for canned anchovies arise. Should the markets for anchovy products arise, the abundant stocks now available in Southern California could furnish the desired fish--at least for a year (Outdoor California, December 1956).

* * * * *

TUNA TAGGING TRIP SUCCESSFUL (M/V Sun Pacific Cruise 56-C-5): Biologists of California's Department of Fish and Game tagged 912 tuna with the help of the crew of the tuna clipper Sun Pacific during a trip (October 28-December 9, 1956) to the fishing grounds off Lower California, Los Muertos Bay, and the Las Tres Marias islands. In addition to the tagging of yellowfin and skipjack tuna, the objectives of the cruise were (1) to test the relationship of color (red, white, and blue) and the tagging position on the fish on recovery of type "G" tags, (2) to assess the occurrence of marine life by bait-net hauls, hook-and-line fishing, and night light stations, and (3) to make oceanic observations.

Sun Pacific tuna tagging cruise (Cruise 56-C-5), Oct. 28-Dec. 9, 1956.

A majority of the tuna, 99 yellowfin and 741 skipjack were tagged and released in the vicinity of the Las Tres Marias Islands, Mexico. Of the remaining tagged fish, 70 skipjack were tagged and released in the Gulf of California off Los Muertos Bay and 2 yellowtail were released off Punta Abreojos, Baja California. Table 1 lists the number of fish released by tag colors.

The surface water temperatures in the fishing areas around the Las Tres Marias Islands ranged from 25.8° C. to 27.9° C. In contrast to this range of slightly over 2° C, the water temperatures off Los Muertos Bay were quite stable, ranging only 0.4° C., 26.8° C. to 27.1° C.

A small collection of specimens were obtained from night light stations, bait hauls and hook and line fishing.

Table 1 - Number of Fish Tagged and Released

Species	No. of Colored Tags Used			Total
	Red	White	Blue	
Skipjack	269	272	270	811
Yellowfin	35	32	32	99
Yellowtail	2			2
Total.........	306	304	302	912

Cans--Shipments for Fishery Products, January-October 1956

Total shipments of metal cans during January-October amounted to 100,876 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 91,353 tons in the same period of 1955. During the month of October packers of canned shrimp, California sardines, and tuna were active. The pack of Maine sardines during October was fair.

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.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, NOVEMBER 1956: The U. S. Military Subsistence Market in November 1956 purchased 2,162,888 pounds (value $1,118,194) of fresh and frozen fishery products for the use of the Armed Forces. This was about one percent less in quantity but 1.9 percent more in value than the purchases in October 1956, and 11.0 percent more in quantity and 30.2 percent more in value than November 1955.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (November and the First 11 Months of 1956 with Comparisons)

QUANTITY				VALUE			
November		Jan.-Nov.		November		Jan.-Nov.	
1956	1955	1956	1955	1956	1955	1956	1955
....(1,000 Pounds)....				.......($1,000)........			
2,163	1,948	24,580	23,202	1,118	859	12,321	10,031

Purchases of fishery products during the first 11 months of 1956 totaled 24,579,500 pounds valued at $12,320,723--5.9 percent more in quantity and 22.8 percent more in value than the purchases for the similar period in 1955.

Prices paid for these fishery products by the Department of Defense in November averaged 51.7 cents a pound as compared with 50.3 cents the previous month and 44.1 cents a pound in November 1955.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces make some local purchases which are not included above. Therefore, actual purchases are higher than indicated, but it is not possible to obtain data on the local purchases by military installations throughout the country.

Fish-Hatchery Food From Anchovies Caught Near Santa Barbara, California

Enormous numbers of fish are raised in the various fish hatcheries of this country. In the rearing of these fish, large quantities of food are used. Among the matrials employed to feed the hatchery fish are frozen ground anchovies.

The principal steps in the production of fish-hatchery food from anchovies at Santa Barbara, Calif., are as follows:

1. The anchovies are caught with a modified lampara net in the waters off Santa Barbara and then are taken to port.

2. At the Santa Barbara wharf, the anchovies are pumped from the hold of the fishing vessel and are loaded into a truck.

3. The truck carries the anchovies to a production plant, where they are ground, extruded into paper bags, rapidly frozen, and then stored for subsequent shipment to the fish hatcheries.1/

The remainder of this article gives a photographic report of these various steps.

Fig. 1 - The Captain of the trawler Linda shows a portion of the type of net used in catching anchovies. This net is a modified lampara. Note the fine mesh used for catching small fish.

Fig. 2 - Lowering the suction hose into the hold of the Linda of Santa Barbara. Note the end of the hose near the hold.

1/The feeding of hatchery fish is a complex science beyond the scope of this article to discuss. Many factors, for example, must be considered in the use of a feed, such as the presence of thiaminase, a substance that is found in anchovies and and other fish.

Fig. 3 - Pump and pump operator. This suction pump has an unloading capacity of 3,200 pounds of anchovies per minute. The pump is operated by a 40-horsepower 220-volt electric motor actuating a vacuum pump producing 25 inches of vacuum.

Fig. 5 - Scale house, operator, and tank truck. The operator weighs the anchovies as they come off the elevator. The weighing is done by means of a trip bucket. When the bucket is filled with 500 pounds of anchovies, the operator releases the bottom, and the anchovies then are carried by endless belt to the chute leading into the tank truck.

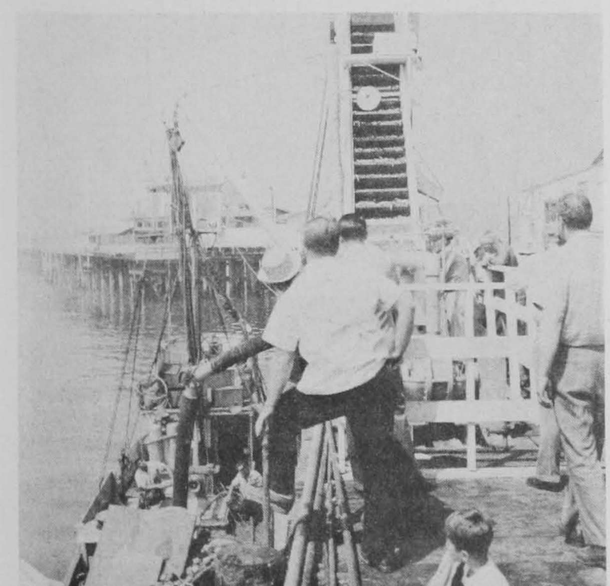

Fig. 4 - Pumping anchovies into the elevator. To facilitate pumping, the captain fills the hold partially with sea water. The rubber suction hose and pump then carries the anchovies to the elevator scale house.

Fig. 6 - Tank truck partially filled. This truck, when filled, contains 9 tons of anchovies. These anchovies are about $6\frac{1}{2}$ inches in length.

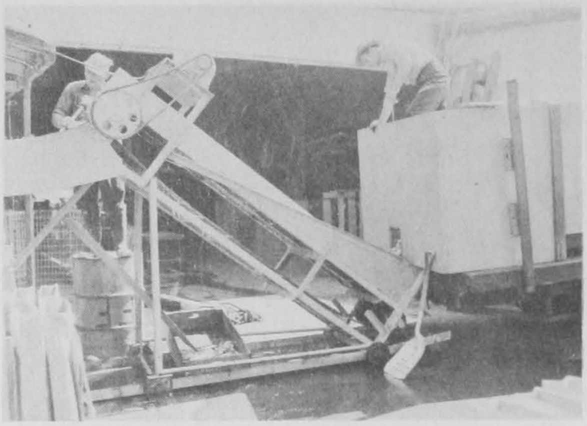

Fig. 7 - Feed conveyor. This conveyor feeds into the grinder.

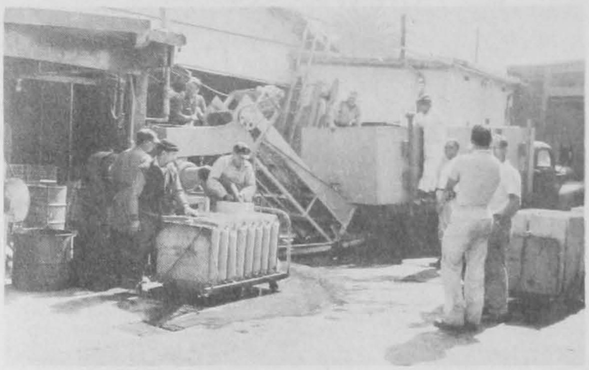

Fig. 8 - Over-all view of grinding operation.

Fig. 9 - Grinder. The grinder has a capacity of 40 tons of anchovies per day. A spiral shaft operated by an electric motor forces the anchovies through any size hasher plate desired. In the photograph, a $\frac{1}{4}$-inch hasher plate is being used.

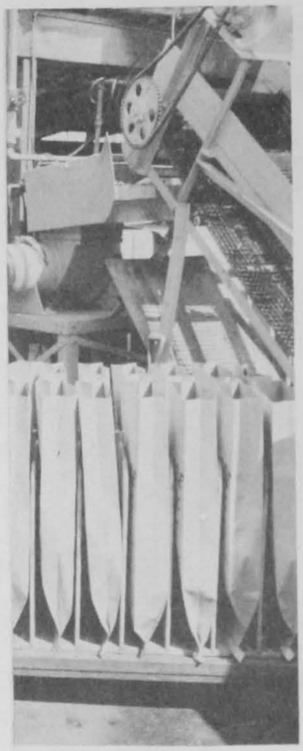

Fig. 10 - Multiwall paper bags and cart. The bags are 13 x 4 x 31 inches in size, and each one accommodates 50 pounds of groundfish. The inner wall of the bag is 60-pound, wet-wax, wet strength. The outer wall is 50-pound, natural kraft paper printed to indicate the type of fish, the size of grind, and the date the fish were placed in the freezer. The printed bag eliminates hand stenciling and thereby reduces labor costs. The carts hold 16 bags, totalling 800 pounds of ground fish when the bags are filled. Note that the bags are inserted into a partitioned plywood frame that prevents sagging of the bags and provides a uniform package. The frame is removable from the cart for cleaning purposes.

Fig. 11 - Extruder. After the anchovies pass through the hasher plate, they are extruded from this rubber inner tube. The purpose of the inner tube is to speed up the bag filling. As one bag is filled, the end of the tube is pinched and moved to the next bag in the line. When the bags on one side of the cart are filled, the cart is reversed, and the operation is continued without loss of motion.

Fig. 12 - Closure of bags. The tops of the bags are folded double and are fastened with four staples across the top. As the bags on one side of the cart are filled, those on the other side are stapled.

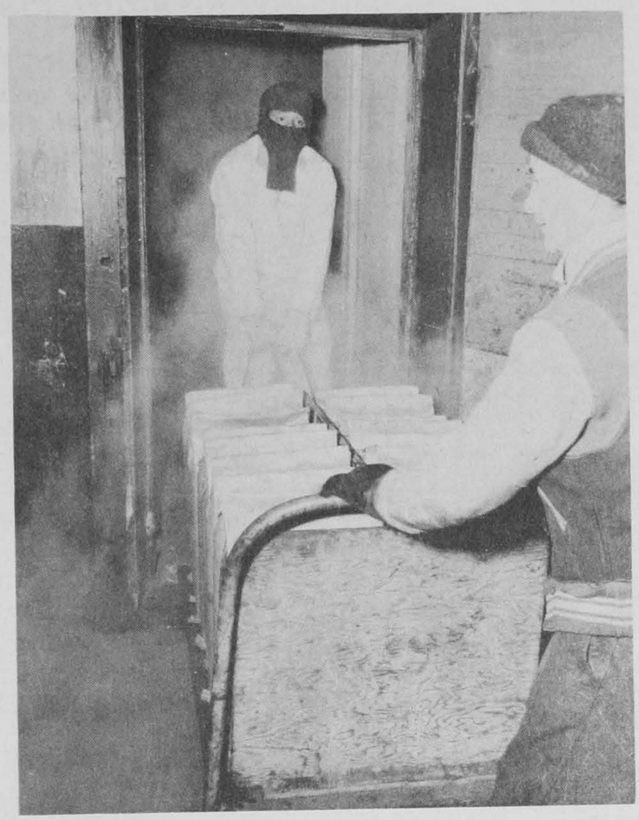

Fig. 13 - Cart of filled bags being taken into the sharp freezer.

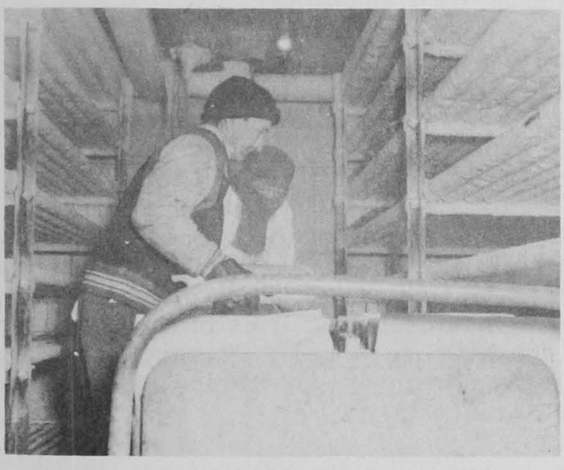

Fig. 14 - Loading bags onto the coils of the sharp freezer. The temperature in this freezer is -30° F. The capacity of the coils is 360 50-pound bags or 9 tons of fish. The bags remain on the coils for 48 hours to insure thorough freezing. The anchovies shown in these photographs were caught, brought to port, unloaded, processed, and placed in this sharp freezer within 6 hours.

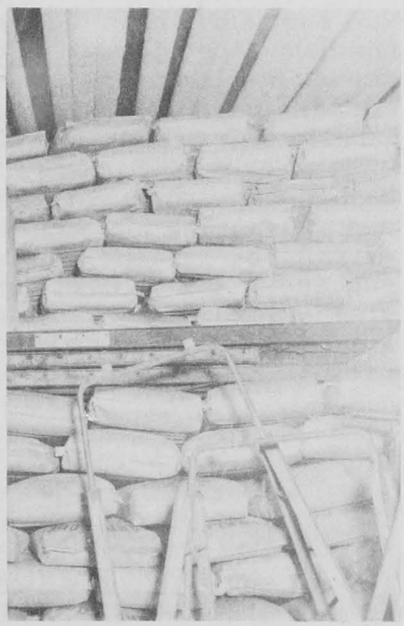

Fig. 15 - Storage of the bags. After the fish have been sharp frozen, they are removed to frozen storage at 0° F. Lying on top of the bags in the foreground is a part of the gravity conveyor used to remove the fish from the sharp freezer to this storage room. The metal pipe stands are of graduated height and are used to support the gravity conveyor. This storage room has a capacity of 40 tons.

Note: The author gratefully acknowledges the aid of George W. Schreck, President of Farallone Fisheries of Santa Barbara, and Captain Lloyd Lindwall of the trawler Linda.

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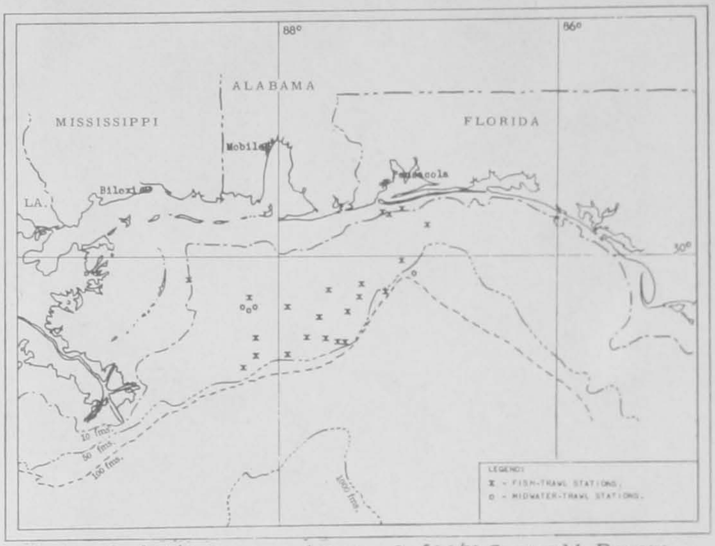
Gulf Exploratory Fishery Program

BOTTOM AND MIDWATER TRAWLS TRIED IN GULF (M/V *Oregon* Cruise 42 and *George M. Bowers* Cruise 8): Gear trials, using New England-type otter trawls and midwater trawls, were carried out in the Northeastern Gulf of Mexico from January 7-25, 1957, by the Service's Exploratory fishing vessels *Oregon* and *George M. Bowers*.



Cruise 42 of M/V *Oregon* and Cruise 8 of M/V *George M. Bowers* (Jan. 7-25, 1957).

Twenty-three drags were made over rough and broken bottom using 60' and 52' "eastern" and No. 36 New England-style trawls. Each net was fished with 70' of rollers, standard V-D gear, on 10-fathom legs. These drags were made, for the most part, in areas where bad bottom had prevented previous sampling with shrimp trawls by the *Oregon*. Only one net was damaged during the trials.

During the midwater trawl tests by the *Oregon*, telemeter readings were checked by depth recorders aboard the *George M. Bowers*. Accuracy of the telemeter was found to be within one fathom at all depths tested. Thirty- and fifty-foot square midwater trawls were used.

Large numbers of scrap species were caught during the bottom-trawl tests. Catches of porgies (*Stenotomus*), croakers, and spot varied from 1,500 to 3,000 pounds per hour drag. Several species of larger food fishes not common to shrimp trawl catches were landed, including 283 red snappers ($\frac{1}{2}$ to 30 pounds each), and large porgies (*Pagrus*) weighing five to eight pounds each.

During the cruise, 106 subsurface schools of fish were recorded on the *Oregon* depth recorders. The two largest schools were in excess of 300 yards in diameter. Attempts to sample schools with both midwater and fish trawls were generally unsuccessful. Several of the drags, however, caught small quantities of anchovy, sardine (*Sardinella*), chub mackerel, and rough scad (*Decapturus*). On several occasions large numbers of anchovy and sardine were observed "showering" through the relatively large mesh (2" to 5") as the trawls surfaced.

Hawaii

GRANTS FOR RADIOACTIVE MARINE RESEARCH: The U. S. Atomic Energy Commission has renewed a two-year contract with the University of Hawaii increasing its grant for investigation of radioactivity in marine organisms. The new contract allows the University $34,000 for continued radioactive marine research at Coconut Island. Instead of using one radio isotope at a time, as the Marine Laboratory has been doing previously, emphasis will now be on use of mixtures of radioactive materials as encountered in wastes from atomic power plants.

Future experiments outlined will attempt to find out what happens to fish and other marine organisms that live their entire lives in surroundings slightly more radioactive than they are now. (*Current Affairs Bulletin*, Indo-Pacific Fisheries Council.)

Maine Sardines

CANNED STOCKS JANUARY 1, 1957: Distributors' stocks of Maine sardines totaled 344,000 actual cases as of January 1, 1957, an increase of 18,000 cases, or 6 percent, over the 326,000 cases held by distributors on January 1 a year ago, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on January 1, 1957, as reported by the Maine Sardine Industry were 879,000 cases (100 $3\frac{1}{4}$-oz. cans), as compared with 475,000 cases on the same date in 1956.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1956 with Comparisons

		1956/57 Season		1955/56 Season				
		1/1/57	11/1/56	7/1/56	6/1/56	4/1/56	1/1/56	11/1/55
Distributor	1,000 Actual Cases	344	388	154	160	268	326	354
Canner	1,000 Standard Cases 1/	879	1,016	315	64	152	475	625

1/ 100 $3\frac{1}{4}$-oz. cans equal one standard case.

The pack of Maine sardines from the beginning of the season on April 15, 1956, to the end of the packing season on December 1, 1956, totaled 2,221,793 standard cases.

Market Outlook for Fishery Products

JANUARY-MARCH 1957: Adequate supplies of most fish and shellfish are foreseen for January-March 1957, despite the seasonal lull experienced by the Nation's commercial fishing industry. This is reported in the Commercial Fisheries Outlook, January-March 1957, a quarterly publication of the United States Fish and Wildlife Service.

Oysters will be in their prime and in demand; Pacific Coast dungeness crab will be in good supply; imports, frozen stocks, and canned supplies plus some fishing, which will continue despite winter storms, will keep most supplies adequate.

Because of a number of promotional and educational campaigns conducted in 1956, the buying public should be better informed on matters pertaining to food fish in 1957; also the late Lenten season may have a strengthening effect upon demand.

The East Coast oyster industry, still not fully recovered from the hurricane damage of recent years, will be active during the quarter but will probably not be able to meet the demand. Pacific oyster producers have reported unusually heavy demand this season from soup and stew packers and even with new oyster beds coming into production in California, the industry will be pushed to satisfy consumers.

Shrimp landings in the Gulf picked up in October, but November storms cut production considerably. Imports during the quarter will be substantial but will probably not be as high as during last winter. Cold-storage supplies are lower, but probably sufficient. Canned supplies are about the same as a year ago.

Salmon, largely because of the 25-percent increase in the Alaska catch during the 1956 season, is in better supply than a year ago, but is far from being plentiful.

Cold-storage holdings of frozen salmon are higher and mild-cured supplies are lower. Canned salmon supplies are somewhat higher than a year ago. Imports of fresh salmon from Japan and Canada were lower in recent months, but canned salmon imports were considerably higher.

Swordfish, whiting, and canned Maine sardine supplies are moderate, but canned tuna and California mackerel stocks are heavy. Halibut is in good supply because of a good seasonal catch. Haddock and ocean perch supplies are liberal, with cod, pollock, flounder, and sole stocks moderate.

Fish sticks, the first fishery product to bear the U. S. shield and grade label, are available in greater quantities and are meeting an increased demand.

The demand for clams and lobsters is good and the amounts available light; sea scallops are available and the market is firm.

Oregon

ELECTRONIC FISH COUNTER TESTED: The first extended field trials of a transistorized electronic fish counter in the United States was begun in Oregon in November 1956, according to a November 27, 1956, news release of the Fish Commission of Oregon.

The device was installed in a fishway at Bonnie falls on the north fork of Scappoose creek, a lower Columbia river tributary. The Fish Commission biologist in charge of Columbia river projects said fish tallies recorded by the electronic counter will indicate the status of steelhead and silver salmon runs utilizing the 11 miles of spawning and rearing area made available by construction of the Bonnie falls fishway in 1952.

Use of the counter at Bonnie falls will also provide the U. S. Fish and Wildlife Service with detailed information on extended field performance of the device, including maintenance costs on a "production" basis. The biologist and the engineer of the U. S. Fish and Wildlife Service who installed the counter said preliminary short-term tests of the system have been made in Alaska and Washington.

This is how the electronic fish counter works. Fish movement is channeled through two plastic "tunnels" that lie on the bottom of the uppermost pool of the fishway. Within each tunnel, two distinct electrical fields of low voltage are created electronically.

As a fish moves through one of the tunnels, it causes more electricity to flow, since fish meat is a better conductor of electricity than water. Then the increased flow of electricity trips a series of electronic relays. These relays actuate a "logic device" that records passage of the fish, either upstream or downstream, depending upon the sequence in which the tunnel relays are tripped.

Small fish can be eliminated from total counts by setting the device to record only fish above a certain size. Fish under 15 inches will be excluded from counts at Bonnie falls.

Fish are not injured by the electrical fields in the tunnels due to the low voltage. German scientists have found that fish can swim through fields of electricity of up to one volt in strength with no injury. About three-tenths of a volt is created in the fish-counter tunnels.

The transistorized electronic fish counter is a product of several research teams. N. C. Lethlean first used the conductivity method to count fish in Scotland. Electronics specialists and biologists at the U. S. Fish and Wildlife Service Fish Counting Laboratory in Seattle invented a new system which also uses this principal. A private Los Angeles firm engineered and produced the counter now being used at Bonnie falls by biologists and engineers of the Oregon Fish Commission.

About 25 electronic fish counters will be in use throughout the United States in the near future, according to the U. S. Fish and Wildlife Service biologist.

* * * * *

SOFT SHELL CLAMS PLENTIFUL IN SOME AREAS: Clam diggers have apparently been overlooking good beds of soft-shell clams in Nehalem Bay, Oregon, according to a 1956 survey by an Oregon Fish Commission shellfish biologist.

The biologist considers the condition of the Nehalem soft-shell beds excellent from the standpoint of size, abundance, and quality of clams present. In some areas of Nehalem bay, more than one clam per square foot of bed was discovered. An average of 1 soft-shell clam per 3 square feet of bed was found for 4,600 square feet of all clam flats checked in the survey.

Softshell clams were also found to be abundant on 8,000 square feet of clam beds on the Kilchis-Wilson river flats in Tillamook Bay. The quality of the Tillamook Bay bivalves from a meat yield standpoint was considered only fair, but these clams had not yet recovered from the effects of spawning.

A third survey of 9,500 square feet of soft-shell clam beds at the mouth of the Siuslaw river indicated that fewer clams are present than in earlier years. Experiments are being conducted to see if transplanted soft shell clams from other bays can be used to help improve the condition of the Siuslaw beds.

Oysters

PRELIMINARY EXPERIMENTS TO DEVELOP A NEW MECHANICAL METHOD FOR CONTROL OF OYSTER DRILLS: Some biologists and oyster growers believe that the oyster drill, *Urosalpinx cinerea*, is not able to emerge when buried beneath several inches of bottom substrate. However, no reliable field observations or results of experiments, conducted under controlled conditions, are available to support these conclusions. The primary purpose of the experiments described in this bulletin was, therefore, to determine the extent of mortality of drills, *Urosalpinx cinerea*, when buried at different depths beneath a mixture of mud-sand or mud alone. The studies were made by the Service's Biological Laboratory at Milford, Conn., and described in Bulletin No. 13, November 27, 1956.

The experiments were conducted in enamel pans, measuring 4" x 10" x 14", through which a stream of water flowed continually. Each pan was divided into two equal sections by plastic screening. This arrangement rendered it possible to observe simultaneously two groups of drills in the same pan. Mud or a mixture of mud and sand was taken from the tidal flats near the laboratory. The material was washed a number of times to eliminate the excess of decomposed organic matter and then passed through a $\frac{1}{8}$-inch-mesh screen to remove any large pieces that could aid drills in their vertical movements. During the period of observation, the temperature of the running sea water ranged between 18.0° (64.4 F.) and 21.09° C. (69.8° F.), and the salinities, between 24.0 and 25.0 parts per thousand.

In the earlier experiments, the mud-sand mixture was allowed to settle over the drills, thus burying them. This method, however, was considered unsatisfactory since it was found difficult to distribute the mixture evenly over the drills. Therefore, in all the experiments described here, the drills were pressed into the substratum by means of forceps. The depth was determined by a plastic ruler held against the forceps and was measured from the top of the drill shell to the mud-sand water interface. Various sizes of U. cinerea, ranging between 8.0-25.0 millimeters ($\frac{1}{8}$-inch), were used. The criterion of emergence was the time the drill was free to breathe, i.e., when the siphon was exposed above the bottom layer.

When the drills were buried beneath 2.0 centimeters or less of bottom material there was virtually no mortality. When buried at a depth of 3.0 cms., approximately 40 percent could not reach the surface and eventually died; at 4.0 cms., 75 percent died; and at a depth of 6.0 cms., 92 percent did not emerge. Emergence from soft mud was higher than from harder substrate. The drills experienced no difficulty in moving along the mud surface. Both large (25.0 mm.) and small (8.0 mm.) drills moved through the mud, even though submerged to half their height.

At the temperature prevailing during these experiments a heavy mortality usually began after three days, and at the end of six days practically all buried drills were dead. Further studies will determine the effect of different temperatures on the ability of drills to emerge from under a bottom material. They will also be extended to evaluate the method in connection with the control of another species of drill, Eupleura caudata.

To determine any difference in rate of emergence in relation to the size of the animal, both large (average 24.0 mm.) and medium (average 14.0 mm.) drills were buried in mud-sand substrate. The smaller drills emerged in approximately one-half the time needed by the larger individuals.

In those instances in which the drills did not emerge they were at the same depth at the termination of the experiment as originally placed. This observation indicates that there had been little or no movement. It also appeared that those U. cinerea, which started the ascent to the surface, were always successful in reaching their goal. In other words, they never stopped at any intermediate depth. Those that remained in their original position eventually perished.

On the basis of these experiments a simple method which may be practical for controlling oyster drills in many areas is suggested. The method consists of burying the drills under several inches of bottom material. This can be easily accomplished by using modified types of such devices as agricultural plows to turn over layers of bottom soil several inches deep and, thus, bury the drills. Prior to the use of such plows, however, it may be necessary, in some instances, to dredge from the bottom any accumulation of shells that is heavy enough to hinder the plowing.

We believe that bottom plowing, as a method of drill extermination, will be especially effective if repeated at approximately two-week intervals. In that case, the second plowing should bury the drills that escaped the first time.

Further studies may indicate the time of year that plowing will be most effective. Possibly, one such period is late fall or early winter when the temperature becomes low enough to render drills inactive. Under such conditions, the drills should not be able to emerge from even a thin layer of bottom deposit and, regardless of the lowered metabolic activities, should eventually suffocate and die.

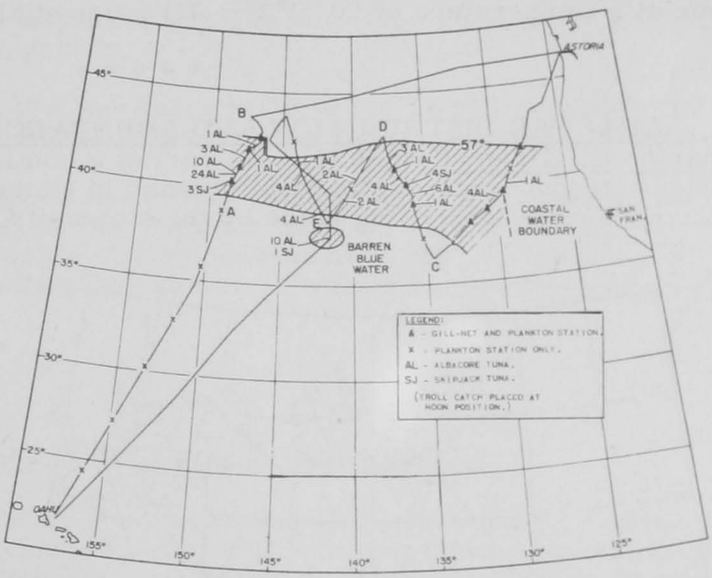
If the mechanical aspects of the suggested method can be properly developed and refined, it should become of considerable help to the oyster growers in many sections of this country and abroad where the bottom is soft enough for plowing.

Furthermore, the construction and use of plows should be considerably cheaper than such complicated and expensive devices as suction dredges. Yet, it appears quite probable that the efficiency of plows will be considerably greater than that of small suction dredges or other devices, such as drill traps.

Since the Milford Laboratory will continue the work for developing this method, comments and suggestions from oyster biologists and members of the oyster industry would be appreciated.

Pacific Oceanic Fishery Investigations

ALBACORE DISTRIBUTION AND ABUNDANCE INVESTIGATED NORTH OF HAWAII (M/V *John R. Manning* Cruise 33): The fall distribution and abundance of albacore tuna in the oceanic area between Hawaii and the coastal-water boundary off the United States west coast was investigated by the Service's research vessel *John R. Manning* (October 17-December 11, 1956). This cruise was made in conjunction with that of the Service's research vessel *Charles H. Gilbert* (October 22- December 11, 1956).



John R. Manning Cruise 33 (Oct. 17-Dec. 11, 1956).

Nine to twelve shackles of gill nets were set on 11 stations. Due to weather conditions these were confined to only three sections, A to B, Astoria to C, and C to D (see chart). Three albacore were caught by this means. In addition to numerous sharks and Bramidae, 7 skipjack and 1 porpoise were also caught.

Six lines were trolled at between 6 and 7 knots on the 5 sections crossing the area mentioned above, except where weather conditions forced a reduction in the number of trolling lines to prevent tangles. By this means 79 albacore tuna were caught which broke down into 3 distinct size groups: 34 albacore 8 to 10 pounds, 38 albacore 13 to 18 pounds, and 7 albacore 22 to 25 pounds. In addition there was one troll-caught skipjack tuna.

Of the troll-caught albacore, 59 were tagged with California-type vinylite tags and released; 22 were labeled with a metal tag and frozen for canning--all of these were sexually immature. Seven gonads and 10 stomachs were preserved and morphometrics were taken on 12 albacore.

Length, sex, and spawning condition were obtained of 7 skipjack caught. Other biological and environmental observations were also made.

Although the results of gill-netting were disappointing, the troll catches when fitted into the environmental conditions provided interesting information. All catches were made in an area with well defined limits: the 57° F. isotherm on the cold side and on the warm side the boundary of the barren and blue central northeastern Pacific water. The latter could be readily determined from the bathythermograph sections and to a lesser degree from Secchi disk readings.

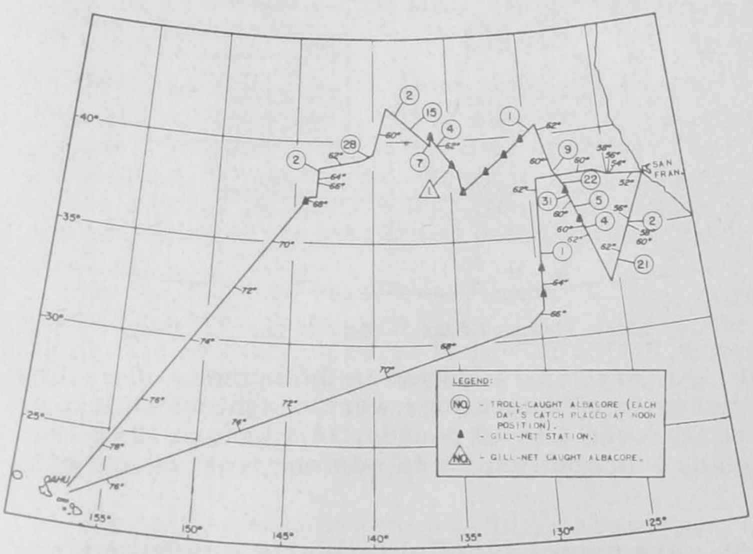
In the central water the disk could generally be seen at a depth of 16 to 18 fathoms with a blue color, Forel No. 2. Proceeding northward into the water where albacore were found, the depths were between 10 and 12 fathoms and the color blue-green, Forel No. 3 or 4. In the coastal water the depths were 7 to 9 fathoms and the color was green, Forel No. 6.

Of interest were also the surprisingly small samples obtained from the half-hour surface plankton hauls. This, together with a very stable 200-foot deep mixed surface layer and relative high transparency and blueness of the water in the albacore zone, suggests that the dormant period of organic production had set in.

Finally, it is worthy to note that this has been the first time that skipjack were caught by means of POFI gill-nets. In the first instance, 3 were taken at 40° N., and 148° W.; the temperature was 64° F. Later, at 40° N. and 136° W., 4 were taken at a temperature of 60.3° F. All weighed close to six pounds each.

* * * * *

<u>ALBACORE DISTRIBUTION AND ABUNDANCE SURVEYED EAST OF HAWAII</u>: (<u>Charles H. Gilbert</u> Cruise 31): As part of a continuing study of the seasonal fluctuations in abundance of albacore tuna and in conjunction with surveys of the inshore albacore populations being made by the states of California, Oregon, and Washington, the Service's research vessel <u>Charles H. Gilbert</u> surveyed (October 22-December 11, 1957) the area off the Pacific west coast between latitude 35° to 41° N. and longitude 145° to 126° W.



M/V <u>Charles H. Gilbert</u> Cruise 31 (Oct. 22-Dec. 11, 1956).

Eleven gill-net stations were occupied during the cruise (see chart). At each station 11 or 12 shackles of nylon gill nets were fished. The nets were 50 fathoms in length and the stretched-mesh size varied from $4\frac{1}{2}$ to $7\frac{1}{2}$ inches. With a complete set of 12 shackles there were 2 shackles of $4\frac{1}{2}$" mesh, 4 of $5\frac{1}{2}$", 4 of $6\frac{1}{2}$" and 2 of $7\frac{1}{2}$". In addition to the gill nets, two shackles of trammel nets were fished on the first station. Because of extensive tangling and damage sustained on the first station the trammel nets were omitted from subsequent sets. Only one albacore (7 pounds) was taken on the nets. The albacore was caught at 38°30' N. latitude, 134°54' W. longitude and was found gilled in one of the $6\frac{1}{2}$" mesh shackles. In addition to the albacore, the gill-net catch consisted of 127 great blue sharks, 2 mako sharks, 181 pomfrets, 33 squid, and part of the head of a spearfish.

A total of 154 albacore were caught in 4,365 hours of trolling. A maximum of 8 lines were fished at any one time using a variety of feather and plastic jigs. Two big-eyed and 11 dolphin were also taken by trolling. The best single day's catch was 31 albacore landed from 42 strikes at about 37° N. latitude, $127^{\circ}30'$ W. longitude.

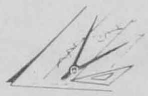
Seventy pounds of small tilapia were carried in the bait tank with the intention of chumming albacore and fishing them by pole and line. The procedure followed was to chum tilapia whenever three or more simultaneous strikes occurred on the trolling lines. Although we were unsuccessful in raising any fish, we did catch one albacore by trolling which contained several small tilapia and one piece of cut bait in its stomach. The mortality of the tilapia was very low (generally less than six a day) in spite of crossing several temperature discontinuities. The greatest change occurred just west of San Francisco with a 7.5° F. rise in surface temperature within two hours. The range in temperature the tilapia were subjected to was a maximum of 81.5° F. southwest of San Francisco.

A total of 114 albacore and 1 big-eyed were tagged and released using the California-type white plastic tags. Three of the tagged fish were double-tagged using an experimental dart tag as a second tag.

Morphometric measurements were taken on 26 albacore tuna. Forty-one stomachs and gonads were saved for detailed study. The majority of the albacore were sexually immature with ribbonlike gonads.

A 30-minute surface plankton tow was taken at 10 of the 11 gill-net stations. In addition 24 30-minute oblique plankton hauls down to 140 meters were taken.

The "Sea Scanar" was operated on the cruise with the hope of locating albacore without visible surface signs. Only in one instance were we able to attribute returns as those being made by albacore. This occurred at $37^{\circ}18'$ N. latitude, 127° $45'$ W. longitude and positive identification was made when albacore were observed jumping.



Rough Fish Control Measures Intensified

States are attacking the rough fish menace chemically, electrically, and mechanically in their efforts to find ways and means of controlling those unwanted populations with a minimum of injury to game species, U. S. Fish and Wildlife Service officials report. If an effective method is developed, one of the most difficult fish-management problems of the present time will be rendered much less complicated, state and Federal fishery biologists agree.

Much of the work which the states are doing is being carried on with Federal Aid funds which come from a 10-percent tax on sport fishing rods, reels, creels, and lures. The attack on rough fish has been going on for years but if the Federal Aid projects are a criterion the tempo was increased in 1956. During that year when five states which had immediate problems were "cleaning up" 20 lakes and ponds with rotenone, 16 States were conducting 29 research projects on how to control rough fish without damage to the fish the sportsmen seek.

One of the mechanical ways of controlling rough fish in a lake is to lower the level of the water immediately after the rough fish have spawned along the shallow edges, exposing the eggs to the drying sun and wind. This system presupposes two things--that the lake is inhabited by a game species which spawns at a time different from that of the rough fish, and that it is feasible to reduce the lake level at the proper time.

During the year South Dakota, with the cooperation of the Corps of Engineers, fluctuated the level of the new Fort Randall Reservoir, preventing successful reproduction of a large portion of the trash fish without harming the game species.

Several states have turned to the field of electricity for the answer to the problem of selective killing of rough fish. Wisconsin has carried on some basic research in the relations between electrical factors and electrode design as well as the amount of electrical energy fish receive when in various electrical fields. Studies indicate that carp can be electrically "herded" or concentrated in a small area from which they can easily be removed. More work must be done on this project before any definite decisions can be made. New York, Florida, and Kentucky have also done research on electrical control of fish.

Texas, Florida, and Kentucky have continued to secure promising results with low concentrations of rotenone for selectively killing gizzard shad, drum and, to some extent, carp. (Previous experiments in other States have indicated that some fish which have been rendered helpless can be revived if the rotenone is removed with other chemicals, making it possible to save game fish which have been victims along with the unwanted species. Rotenone, officials point out, is not an internal poison but rather paralyzes a fish's gills, making breathing impossible).

Washington reclaimed 843-acre Cavanaugh Lake with rotenone; Idaho cleared up its Stanley Lake of 179 acres in the same way; Minnesota killed the rough fish in another seven lakes which have a total of 89 acres; and Maine used rotenone in six ponds totaling 270 surface acres. Oregon continued its vigorous chemical attack on trash fish--it used rotenone to rid its 1,113-acre Lake of the Woods in Klamath County and three of its tributary streams of tons of carp and yellow perch. Oregon also rehabilitated Malheur Reservoir, Beulah, Warm Springs, Thompson Valley Reservoirs, and the tributary streams. (The Fish and Wildlife Service previously rehabilitated Malheur Lake on the Malheur refuge.)

Saltonstall-Kennedy Act Fisheries Projects

COMMERCIAL FISHERIES STUDIES ALLOTTED ADDITIONAL FUNDS: Funds allotted for market, technological and biological research, and for the exploration and development of American commercial fisheries were increased by $3,595,000 by the Secretary of the Interior. With the $3,000,000 currently allotted for this work, the total now available is $6,595,000.

The Secretary's action was based upon provisions of the Fish and Wildlife Act of 1956 which increased the amount of money available to the United States Fish and Wildlife Service under the Saltonstall-Kennedy program to aid the domestic fishing industry. Funds for this activity are provided from customs receipts on fishery products. Expenditure of $6,595,000 now available for the fiscal year ending June 30, 1957, will be under the direction of the Bureau of Commercial Fisheries.

In some instances long-range projects will be contracted with state, college or private research organizations during this fiscal year but the work performed over a longer period.

Funds available through the Saltonstall-Kennedy sources are larger this fiscal year than normal because the Fish and Wildlife Act of 1956 permitted the use of some accrued receipts. In the future the amount of money available through this source will approximate $4,500,000 a year.

The new allocations increased the amounts available for fishery biological studies in the commercial fishery field from $1,376,500 to $3,394,000, an addition of $2,017,500.

Other commercial fishery studies, which include exploration and gear research, economic research, market reports, market development, and education, and technological research, have been allotted $2,814,000, an increase of $1,395,500 over the initial amount granted. Miscellaneous items including administration, total $387,000 under the new allotment, compared with $205,000 previously.

The additional funds will help the Bureau of Commercial Fisheries begin work on the backlog of fishery problems which have been calling for attention for some years but for which funds were not available.

An allotment of $630,000 will finance a three-year research program on tuna. Studies will be undertaken in the area fished by the Pacific Coast tuna men, a vast region north of the equator and extending for several hundred miles into the Pacific ocean. This work will include research of hydrographic fronts, food prevalence under varying oceanic conditions, tuna and tuna bait fish behavior under changing conditions, and numerous other items which will help technicians understand and forecast tuna abundance.

Coastal and offshore biological research was granted an additional $1,009,500, making $2,073,200 available for that purpose. Alaska salmon research will get $389,600 of this money which will give a big impetus to research in that important fishery. Total available for the Alaska salmon research is $572,600. Projects include development of methods for more accurately predicting salmon runs and measuring escapement, studies of migration patterns of red and pink salmon and causes of pink salmon mortality during the fresh-water phase of its life history. Nearly $84,000 of the new money was earmarked for Pacific herring studies in Alaska and $130,000 was allocated to study Alaska's king crab.

Because more biological data is needed on sea scallops, flounders, whiting, and ocean perch, $145,000 was added to the $294,000 designated for the North Atlantic trawl fishery. North Pacific ocean fisheries got $90,000; menhaden research got $121,000, principally for work in the Gulf of Mexico; Atlantic striped bass work got $20,000 added to $32,000; and $30,000 was added to the Gulf of Mexico expenditures for improvement of research facilities.

Oyster problems got the bulk of the extra shellfish research money, $108,000. Under the previous allocation, the New England, Gulf, and Middle Atlantic oyster fisheries each had $25,000 for research matters and $75,000 was allocated for new blue crab research. The total now set up for shellfish research is $258,000.

Inland commercial fisheries, principally the Great Lakes, which had no Saltonstall-Kennedy research funds originally, received $195,000 of the new funds.

Of the $1,395,500 added to commercial fishery studies, exploratory fishing and gear research got $453,300; technological studies, $386,700; fishery statistics, $50,500; economic studies, $104,000; market development and education, $300,000; and market news, $101,000. Total available for these various studies from fiscal 1957 funds is now $2,814,000.

The added exploratory fishing and gear research funds will permit the Service to expedite and expand its survey of resources available to domestic vessels. More adequate information on the extent and character of potential resources and the best means of harvesting them will be sought. The new money will permit more extensive exploration work in the North Atlantic for trawl fish and scallops, shrimp in the South Atlantic, bottom or midwater varieties in the North Pacific, as well as more thorough exploration of shrimp and other potentialities in the Gulf and Caribbean. The total amount available for exploration and gear research is $757,300.

Research in fishery technology has been along two major lines. One is to devise ways and means of retaining fish freshness for a longer period to give inland America an opportunity to enjoy "ocean fresh" fish and fish products. The other is to devise new uses for industrial products such as fish meal and fish oil.

To the $459,000 originally set aside for this work has been added $386,700 to make a total of $845,700. Nearly $80,000 of the new funds have been allocated to the new laboratory under construction in Mississippi for work on Gulf technological problems. This is in addition to $40,000 now available for Gulf oyster-processing and transporting problems.

About $50,000 has been added to the $127,000 designated for development of standards for prepared fishery products, and $100,000 has been allotted for developing improvements in blue crab processing techniques to meet new standards. And $80,000 has been provided for radiation preservation research on fishery products as part of the President's Atoms for Peace programs; $50,000 for extending tuna-quality studies to the processing stages; and smaller amounts for development of a chemical index for fish meal, and for new uses for fish oil and meal.

Economic studies, especially on fish consumption, have been allotted $242,000 under the revised plan, of which $104,000 represents added funds. For the promotion of the use of domestic fishery products by marketing studies and educational means $300,000 was added to the original $317,500

The bulk of the added money--$250,000--is for market development activities, including special marketing programs, and intensive studies of market patterns. Because the Nation is only partially covered with respect to school-lunch and similar programs, the balance will be devoted to filling these gaps.

The additional funds also permit an opportunity to strengthen the Fishery Market News Service in the major fish marketing and producing areas of the Nation. For this work $101,000 of the additional funds was allocated.

Pacific Troll Salmon

Standards

Guidelines

FRESH FISH QUALITY IMPROVEMENT RULES AND STANDARD PROCEDURES: The program to put into effect the Rules and Standard Procedures for quality improvement of fresh fish began on January 1, 1957. These rules are for both fishermen and primary wholesalers, wholly on a voluntary basis. They were developed by the

II—1M—January, 1957

To Be Posted in All Places of Business

RULES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT

For Use on a Voluntary Basis by
NEW ENGLAND PRIMARY WHOLESALERS

(Prepared by members of the industry, the Technology Division of the National Fisheries Institute and the Bureau of Commercial Fisheries)

Removal of Fish from Boats

1. Conveyances (Carts, Boxes, Trucks, etc.) must be in a clean and sanitary condition before receiving fish.
2. Conveyances must never be overloaded.
3. Covers must be provided for use on all conveyances and covers must be used immediately the conveyance is loaded regardless of location.
4. Fish stored in conveyances, or stored in areas awaiting handling, must be iced at all times.
5. Fish that have been iced awaiting handling must be inspected periodically for ice renewal when needed.

Plant Procedure

1. Forks and hooks used in direct handling of fish must be abolished wherever possible.
2. Containers used for shipment of fresh fish must be clean and new.
3. The practice of returning packages (Barrels, Boxes, etc.) for credit or REUSE must be abolished entirely except for tight containers where fish are floated.
4. Fish (Fillets, etc.) awaiting handling (to and at freezer) must be racked to relieve pressure, if possible, on racks requiring no additional handling.
5. Fillets, etc., in a fresh condition, to be transferred from one place to another for any reason whatsoever, must be carried in containrs provided for the purpose, each container to be covered and iced regardless of destination.

Sanitation

1. Carts, boxes and conveyances of any kind must be washed thoroughly, immediately after they become empty of fish.
2. Plant and equipment must be subject to constant washing down when plant (or store) is in operation.
3. Responsibility for plant cleanliness must be specifically assigned to a person (or persons).
4. Exterminators (individuals or firms) must be employed for the control of rodents, vermin, flies, etc.
5. Fish operations (filleting, cutting, etc.) practiced in the open must be abolished. Proper cover and facilities must be available.
6. Clothing of all personnel must be kept in a clean condition consistent with the requirements demanded in the handling of food.
7. Smoking in filleting rooms and wrapping rooms — on lines, tables or benches used for processing — must be abolished.

This poster is white and gives fresh fish quality improvement rules and standard procedures for use by New England Primary Wholesalers.

I—1M—January, 1957

To Be Posted at Sea and Ashore.

RULES AND STANDARD PROCEDURES FOR QUALITY IMPROVEMENT

For Use on a Voluntary Basis by
NEW ENGLAND TRAWLERS

(Prepared by members of the industry, the Technology Division of the National Fisheries Institute and the Bureau of Commercial Fisheries)

Handling of Catch

1. Fish must be gutted thoroughly, leaving no part of the gut (livers, etc.) to start spoilage.
2. All sizable fish (over 2 lbs.) must be gilled winter and summer.
3. Gutted fish must be washed thoroughly.
4. Water in washing box must be changed frequently — do not depend on the overflow.
5. Fish must be put down and out of the weather as quickly as possible.
6. Fish coming out of the hold must be sorted with care to cut down on number of culls.

Icing

1. Ice bed in pen must be at least six inches (6") thick.
2. Jagged edges in crushed ice must be pounded out (bottom fish carry the weight).
3. At least three inches (3") of space must be left between fish, pen boards and hull so that when you build up the ice will enter this area for proper keeping.
4. All layers of fish in pens must be gauged to the size of the variety so that ALL fish get the benefit of ice.
5. Never neglect to shelve fish. Protect your investment in labor of catching and handling by relieving pressure.
6. Plenty of ice must be used at all times. Ice is cheaper than fish. Protect against breakdown, bad weather and accident or sickness.

Sanitation

1. The hold must be dried out and painted thoroughly at least once a year.
2. The hold must be washed completely after the discharge of each trip. After thorough washing, sprinkle entire area with salt or any other similar agent.
3. Pen boards must be washed and scrubbed immediately after they come out of the hold. Keep pen boards painted. Replace worn or beat-up boards immediately.
4. Working tools, which come in contact with fish, must be kept clean and free of rust.
5. Culls must be handled quickly when discharging trip. Do not throw them back on deck. Place them immediately in iced container on the dock.
6. Facilities provided for personal cleanliness must be used.

REMEMBER ALWAYS THAT YOU ARE HANDLING FOOD

This poster is colored yellow and gives fresh fish quality improvement rules and standard procedures for use by New England Trawlers. salmon trollers

Technology Division of the National Fisheries Institute under the terms of its contract with the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service, through discussions with the various state and Federal agencies, universities, unions, associations, and other groups which are interested in the problem of product quality improvement in the fishery industries. The contract was financed by funds provided by the Saltonstall-Kennedy Act of 1954.

This is the initial application of the Rules on the Atlantic Coast. As developed and adopted, the rules consist in reality of two sets: one set designed for use on the New England trawlers; the second for use by New England primary wholesalers. As an important part of its contract, the N. F. I. Technology Division will prepare for distribution as supplementary information simplified versions of the extensive technical literature which has been developed by the U. S. Fish and Wildlife Service and other agencies in the fisheries research field. The expansion of the program will proceed as rapidly as is consistent with a thorough job at each stage. Appropriate rules will be developed for each of the other levels in the distribution chain. The basic Rules will then be adapted to conform to the many varieties of fish found on our national market. Each set of Rules will be prepared on a different colored background so that it may be easily identified as pertaining to a specific variety of fish, geographical area, or stage in the distribution chain.

United States Fishing Fleet[1] Additions

DECEMBER 1956: A total of 36 fishing craft of 5 net tons and over were issued first documents as fishing craft during December 1956. This was 20 vessels more than the reported number for the corresponding month of 1955, reports the Bureau of Customs.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft, December 1956 with Comparisons

Area	December		Annual Totals			
	1956	1955	1956	1955	1954	1953
			(Number)			
New England	1	-	15	18	23	20
Middle Atlantic	3	-	26	13	15	19
Chesapeake	18	3	138	54	93	83
South Atlantic	8	1	119	65	119	116
Gulf	4	6	100	103	313	264
Pacific	2	5	76	117	117	164
Great Lakes	-	-	6	9	6	7
Alaska	-	-	40	35	27	53
Hawaii	-	-	1	3	1	3
Puerto Rico	-	-	-	-	2	-
Virgin Islands	-	1	-	1	-	-
Unknown	-	-	-	-	1	-
Total	36	16	521	418	717	729

Note: Vessels assigned to the various areas on the basis of registered home ports.

During December 1956 the Chesapeake area led all other localities with 18 newly-documented fishing vessels, followed by the South Atlantic States with 8, the Gulf area with 4, the Middle Atlantic States with 3, the Pacific States with 2, and the New England States with 1.

YEAR 1956: A total of 521 vessels was documented for the first time as fishing craft during 1956 compared with 418 during 1955--a gain of 25 percent. The increase in newly-documented fishing craft during 1956 occurred in the Middle Atlantic, Chesapeake, and South Atlantic areas. Decreases were noted in all other areas.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, 1938-56

Year	Number	Year	Number
1946	1,085	1956	521
1945	741	1955	418
1944	635	1954	717
1943	358	1953	729
1942	358	1952	675
1941	354	1951	780
1940	320	1950	812
1939	357	1949	1,002
1938*	376	1948	1,184
		1947	1,300

*Data partly estimated.

Historical data covering the years 1938 to 1956 inclusive, reveal that during the 19-year period 12,722 vessels were issued first documents as fishing craft.

1/ Includes both commercial and sport fishing craft.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during April 16 through December 31, 1956, at the $12\frac{1}{2}$-percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from April 16-December 31, 1956, amounted to 27,741,867 pounds, according to data compiled by the Bureau of Customs. This left a balance of 1,015,526 pounds of the quota which was not utilized during the calendar year of 1956. Since the quota for the period indicated in 1956 was not exceeded, no imports of tuna canned in brine were entered at the duty of 25 percent ad valorem.

* * * * *

EDIBLE FISHERY PRODUCTS, OCTOBER 1956: United States imports of edible fresh, frozen, and processed fish and shellfish in October increased 62 percent in quantity and 48 percent in value as compared with September 1956. Compared with October 1955 the imports for October 1956 were higher by 23 percent in quantity and 41 percent in value. October 1956 imports averaged 28.4 cents a pound as compared with 24.7 cents a pound for the same month in 1955. Both groundfish fillets (including ocean perch) and canned salmon during the month were up sharply from October 1955.

Table 1 - United States Imports of Edible Fishery Products, October 1956 With Comparisons

Item	Oct.		Year	Oct.		Year
	1956	1955	1955	1956	1955	1955
	(Millions of Lbs.)			..(Million of $)..		
Imports:						
Fish and shellfish:						
Fresh, frozen & processed 1/........	91.2	74.3	769.9	25.9	18.1	206.4
Exports:						
Fish and shellfish:						
Processed 1/ only (excluding fresh & frozen)..................	11.8	5.7	91.0	2.9	1.6	21.6

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

Exports of processed fish and shellfish in October 1956 increased about 168 percent as compared with the previous month and 107 percent above October 1955. The October 1956 value of these exports was 71 percent higher than the previous month and 81 percent above the same month in 1955. The sharp increase over September 1956 and October 1955 was due primarily to heavier exports of California sardines.

* * * * *

GROUNDFISH FILLET IMPORTS: Year 1956: Imports of cod, haddock, hake, cusk, and ocean perch fillets (including blocks) into the United States totaled an estimated 138.6 million pounds in 1956. This was an increase of approximately 1.1 million pounds above the previous record of 137.5 million pounds in 1954. Compared with 1955, it represented an increase of about 8.5 million pounds.

Eleven countries exported groundfish fillets to the United States during 1956. Canada (99.8 million pounds) led all other countries and accounted for 72 percent of the total. Iceland (27.1 million pounds) was in second place with 20 percent of the import total, followed by Norway (4.1 million pounds), Denmark (3.0 million pounds), West Germany (2.0 million pounds), and France (919 thousand pounds). Imports from the United Kingdom, the Netherlands, Greenland, Miquelon and St. Pierre, and the Union of South Africa accounted for only 1 percent of the total.

December 1956: During December 1956, a total of 4.3 million pounds of groundfish fillets (including blocks was received in this country. This was an increase of 4 percent (160 thousand pounds) as compared with the corresponding month of 1955.

Groundfish and ocean perch fillets received from Canada during December 1956 totaled 3.7 million pounds and amounted to 84 percent of the month's total receipts.

Iceland accounted for 10 percent, and the remaining 6 percent was received from Norway, Denmark, and West Germany.

Note: See Chart 7 in this issue.

Wholesale Prices, December 1956

December 1956 was a month of light production for many of the United States fisheries due to low seasonal abundance for some important varieties, curtailed fishing effort before and after the Christmas holidays, and bad weather. Some unusually bad fishing weather was reported in the middle and north Atlantic areas. The December 1956 wholesale prices index (116.1 of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) declined about 2 percent from the previous month, but was 3.1 percent higher than the December 1955 index.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1956

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Dec. 1956	Nov. 1956	Dec. 1956	Nov. 1956	Oct. 1956	Dec. 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					116.1	118.4	112.5	112.6
Fresh & Frozen Fishery Products:					126.6	130.9	122.0	121.1
Drawn, Dressed, or Whole Finfish:					118.6	128.0	122.5	117.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.09	.12	92.7	122.1	67.4	124.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.35	.37	108.3	112.9	133.5	85.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.64	.65	143.8	144.9	150.6	133.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.61	.59	151.2	146.3	135.9	131.4
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.71	.74	143.6	149.6	161.8	136.5
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.71	.70	145.4	143.4	153.6	132.2
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.36	.34	84.4	80.3	83.3	102.0
Processed, Fresh (Fish & Shellfish):					134.7	135.5	125.4	124.1
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.30	.35	103.8	117.4	91.9	132.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.82	.82	129.6	128.8	112.2	113.4
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	148.5	136.1
Processed, Frozen (Fish & Shellfish):					118.2	118.6	106.2	114.2
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	102.1	104.7
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.28	87.9	87.9	86.3	91.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.27	110.8	108.8	108.8	112.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.82	.83	126.0	127.3	105.7	116.5
Canned Fishery Products:					101.2	100.6	99.0	100.5
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	114.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.20	11.20	80.8	80.8	78.2	85.1
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	9.00	8.35	105.0	97.4	90.4	81.7
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.70	7.70	81.9	81.9	81.9	92.6

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.

The drawn, dressed, and whole finfish subgroup index for December decreased 9.3 percent as compared with November and exceeded that for the same month in 1955 by only 1.4 percent. Although there was a drop of 24-25 percent in fresh drawn haddock ex-vessel prices at Boston, this has little significance due to the wide fluctuations from day to day for fresh haddock, as well as for other fresh fish, during periods of temporary fluctuations in landings. Prices for the other six items in this subgroup in December varied only slightly from November and were higher than a year earlier in all cases except for lower yellow pike prices.

No significant changes in the fresh processed fish and shellfish subgroup occurred from November to December. A drop of 11.6 percent in fresh haddock fillet prices at Boston in December was offset largely by fractionally higher prices for fresh shrimp. When compared with December 1955, this subgroup index for December 1956 was higher by 8.5 percent with lower (down 21.8 percent) fresh haddock fillet prices more than offset by increases in fresh shrimp prices. Prices for fresh shucked oysters, which are in short supply, remained unchanged from November to December 1956 and were 9.1 percent higher than for December 1955.

The December 1956 subgroup index for frozen processed fish and shellfish was almost unchanged (down less than 1 percent) from November and up 3.5 percent from December 1955. Frozen fillet prices were unchanged for haddock and flounder and up slightly for ocean perch. Frozen shrimp prices at Chicago were lower by one percent in December 1956, but higher by 8.2 percent when compared with the same month in 1955.

Prices for canned fishery products in December 1956 continued the tendency to creep upwards first noted in September. Prices were unchanged for all items in this subgroup except California sardines, which advanced 7.8 percent from November and were 28.5 percent higher than in December 1955. After a promising start, the California sardine season, as it advanced, fell far short of estimates and prices were withdrawn by the packers in order to conserve stocks for commitments. Maine sardine prices this December were down about 11.5 percent from the same month in 1955 because this season's pack was almost double the abnormally low pack in 1955.

CORRECTION

The news item "U. S. Fish Catch May Set All-Time Record in 1956!" on page 51 of the December 1956 issue of Commercial Fisheries Review contained an error in the first sentence, which should have read: "United States and Alaska fishermen may catch more than 5 billion pounds of fish in 1956 and . . . ."