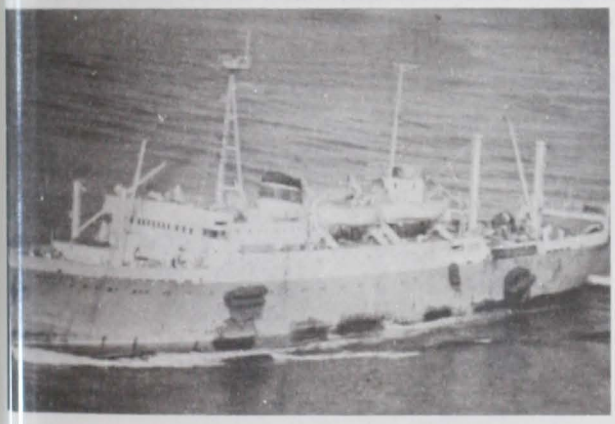
# TRENDS AND DEVELOPMENTS

## laska

REIGN FISHING ACTIVITIES F ALASKA:

U.S.S.R.: The Soviet trawl fleet off Yakutat reased steadily during February 1965, from ut 15 to more than 100 vessels. The rapid ld-up of Soviet fishing activities along the kutat coast can probably be attributed to rtailment of fishing activities in the Bering because of heavy ice-pack conditions, and fficient catches for vessels to attain dged quotas.



1 - Soviet (BMRT) stern trawler offshore of Kodiak, Alaska, May 1964.

Soviet vessels were observed in mid-February trawling for flounder and sole in outer stol Bay northeast of Port Moller. The nber of vessels operating in that fishery believed reduced somewhat by the end of month.

2 - Soviet refrigerated fish transport in Gulf of Alaska, June 64.

By the end of the month it appeared that the Soviet herring fishery in the Bering Sea, which involved over 100 vessels in the early part of February, had been completely abandoned and the fleet redeployed for species other than herring.

Japan: The Japanese factoryship Chichibu Maru, accompanied by some 12 trawlers, continued to fish for shrimp on the grounds north of the Pribilof Islands during February. It was believed the Japanese had four large stern trawlers fishing in the eastern Bering Sea. Those vessels were reported as the Aso Maru, Akebono Maru's No. 71 and 72, and the Taiyo Maru No, 82; all operating in the vicinity of Unimak Island. No Japanese vessels were seen in the Gulf of Alaska during the month.

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TWO NEW KODIAK KING CRAB PLANTS IN OPERATION:

The two new king crab plants at Kodiak were operating full time in February and helped relieve the supply situation to some extent, but many of the fishermen were still having trouble finding ready buyers for their crabs. Some vessels were laid up for as long as two weeks at the dock with full loads of king crab unable to find a buyer. Mortality was high on crabs held in vessel tanks. Fishermen on the south end of Kodiak Island run as far as Seldovia to make delivery. The increased processing facilities for about 9,000 crabs a day developed just in time to see meat recovery fall off as the crabs began to "go light," particularly from the south-end fishery. Many fishermen planned on quitting in another 2 or 3 weeks.

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SHRIMP-PROCESSING OPERATIONS AT KODIAK INCREASE:

A shrimp-processing firm in Kodiak started several months ago a second 10-hour shift

Fig. 1 - Shrimp being transported from landing dock to processing plant.

Fig. 2 - Pink shrimp being machine-peeled in an Alaska processing plant.

working in the plant it leased. In addition, arrangements were made to lease and use the four shrimp peelers installed on the upper floor of another plant. The machines in February were expected to be operating by the last half of March.

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JAPANESE FIRM INTERESTED IN ALASKA HERRING PRODUCTS:

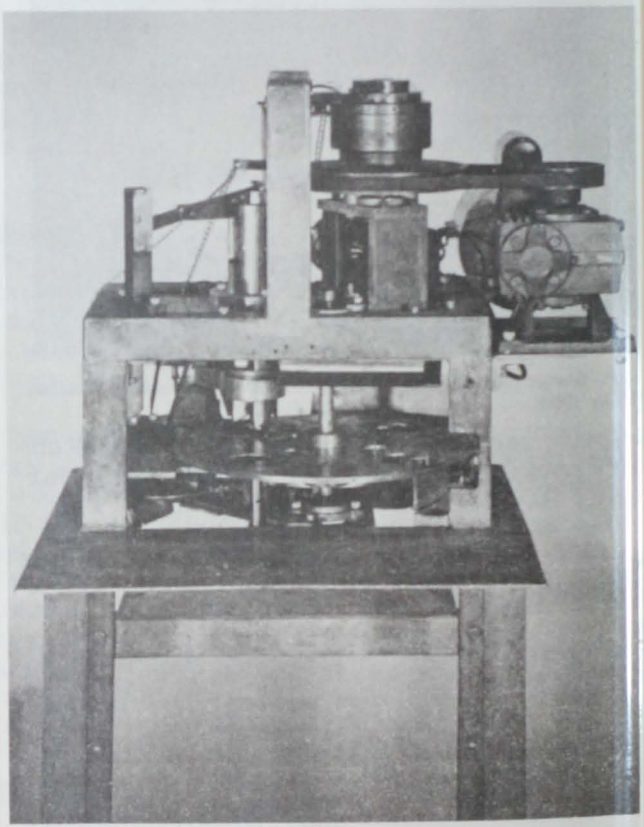
A prominent Japanese fishery firm completed negotiations in February 1964 with an Alaska firm to buy 1,200 tons of large frozen herring. The herring will be shipped to Japan where the roe will be removed and the fish processed for human consumption.

A Hawaiian company and a Japanese importing firm have also expressed interest in buying brined herring roe as a result of samples of that product extracted from herring caught in spring 1964 and frozen until the end of the year at Kodiak. A 12-percent recovery rate on herring roe from a random lot of fish frozen for bait in spring 1964 was reported by a Kodiak firm.

## Blue Crabs

SEMIAUTOMATIC CLEANER-DEBACKER MACHINE:

A semiautomatic machine that cleans and debacks whole cooked blue crabs has undergone successful in-plant trials, announced the U. S. Bureau of Commercial Fisheries Regional Office, Gloucester, Mass. The machine was designed and built by the American Scientific Corporation, Alexandria, Va., under a contract with the U. S. Bureau of Commercial Fisheries.



A semiautomatic machine that cleans and debacks whole cooked blue crabs.

When in operation, the machine, described a semiautomatic cleaner-debacker for blue bs, produces "heart-shaped" cores and oses the lump and flake meat for ready re- val. During the in-plant trials, the ma- ne was operated by three commercial crab kers who also picked the lump and flake at from the machine cores. Studies com- ing the yield from regular whole crabs sus the yield from the machine cores were ducted. The evaluation of data from the dies is still under way; however, the re- ts will be available for area demonstra- ns.

Area demonstrations of the machine are g scheduled. Plans are that the demon- tions will take place in the Gulf, South At- ic, and Chesapeake Bay areas. Notifica- n of the dates, times, and locations of the monstrations will be made later. The dem- trations are open to interested parties.

Further information about the cleaner-de- ker machine can be obtained by writing to U. S. Bureau of Commercial Fisheries hnological Laboratory, College Park, Md.

## lifornia

LAGIC FISH POPULATION RVEY CONTINUED:

M/V "Alaska" Cruise 64-A-9-Pelagic Fish vember 27-December 15, 1964): The ob- tives of this cruise by the California De- tment of Fish and Game research vessel ska in the coastal waters of central Cali- nia from Point Reyes to Point Conception e to: (1) survey the fish and invertebrates he inshore pelagic environment; (2) assess distribution, abundance, density, age and e composition, and recruitment of pelagic populations; and (3) collect live speci- ns for blood-genetic studies by the U. S. reau of Commercial Fisheries Biological oratory, La Jolla, Calif.

Midwater trawl and nightlight blanketnet tions were the principal survey methods ed. Large numbers of jellyfish and salps areas north of San Simeon prevented trawl- and as a result a complete survey was possible there. Nightlight blanketnet sta- ns were occupied extensively in that more rthern area, but these are generally less productive than midwater trawl stations and are not directly comparable with them. Very stormy weather prevented any coverage between San Simeon and Morro Bay.

A total of 39 light and 3 trawl stations were occupied north of San Simeon (the trawl net was badly torn at one station when it became overloaded with jellyfish). Ten light and 13 trawl stations were completed south of Morro Bay. A total of 235 miles was scouted while running between stations at night.

NORTHERN ANCHOVIES: As on all cruises conducted in 1964, anchovies (Engraulis mordax) were the principal species taken. They were caught in 12 of 13 midwater trawl tows south of Morro Bay and 2 of 3 tows to the north. In contrast, they were caught at only 1 of 10 light stations south of Morro Bay and at only 4 of 39 to the north.

Midwater trawl catches were generally small, with only 2 of them exceeding 500 fish. But one of the them yielded 16,500 fish weighing about 1,000 pounds.

Two of the 5 light-station catches were made between Point Sur and Cape San Martin, in an area where anchovies have seldom been seen or taken previously. A sample of those fish, and another from near Santa Cruz, were brought back alive for blood-genetic studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla.

A sizable proportion of the anchovies caught were large fish. In several catches they ranged from about 135 to 155 millimeters (5.3 to 6.1 inches), and 15 of the 19 anchovy catches contained some fish over 140 millimeters (5.5 inches) long.

Only one anchovy school was identified during night scouting, and very few dense traces were seen on the precision depth-recorder; 20 unidentified schools were seen.

JACK MACKEREL: Four jack mackerel (Trachurus symmetricus) were caught at 3 stations. Two were juveniles measuring 57 and 101 millimeters (2.2 to 4.0 inches) and the others were subadults.

SARDINES AND PACIFIC MACKEREL: No sardines or Pacific mackerel were caught or observed on this cruise.

OTHER ACTIVITIES: A new instrument for determining the depth at which the net is fishing was used during this cruise. The instrument (a Furuno Net-Sonde) has a wireless system to transmit fishing depths from the net to the wheelhouse and provides a constant check on net depth while a tow is in progress. This instrument will play a vital role in sampling fish schools that are located with the Precision Depth Recorder.

Weather and sea conditions during the cruise were about as good as could be expected for that area and time of year. Two periods of unusually good weather allowed a more thorough light station coverage than had generally been possible. Sea surface temperatures ranged from 11.1° C. (52.0° F.) near Avila to 14.0° C. (57.2° F.) off Point Arguello. Surface temperatures averaged 12.3° C. (54.1° F.) north of San Simeon and 11.6° C. (52.9° F.) south of Morro Bay.

Note: See Commercial Fisheries Review, April 1965 p. 14.

## Cans--Shipments for Fishery Products


January 1965: A total of 178,568 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January 1965 as compared with 187,044 base boxes used during January 1964.

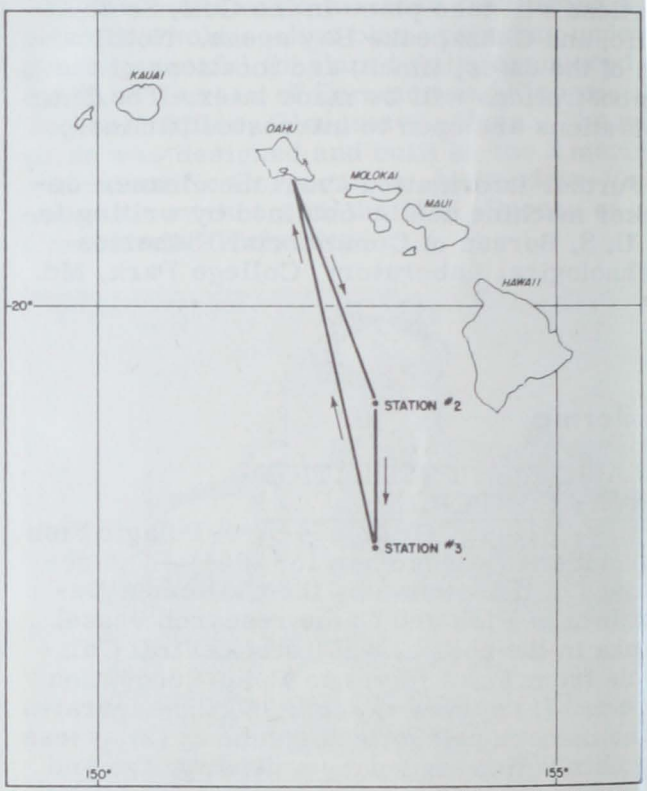
1964: A total of 2,752,126 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-December 1964, a decrease of 4 percent from the 2,874,534 base boxes used during 1963. The decline was due partially to a drop in the canning of Maine sardines and shrimp.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (timplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel. (In the year 1964 tonnage data were based on the factor 23.5 base boxes per short ton of steel; and in the years 1962 and 1963 tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

## Central Pacific Fisheries Investigations

EXPENDABLE BATHYTHERMOGRAPH EQUIPMENT TESTED:

M/V "Charles H. Gilbert" Cruise 78--Phase I (January 4-7, 1965) and Phase II (January 8-23): The objectives of this cruise by the research vessel Charles H. Gilbert, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, were to: (1) test expendable bathythermograph (XBT) equipment from the vessel, (2) fish for live scombrids (mackerels), and (3) study currents in the Kaiwi Channel. The tests were made in collaboration with Stanford University and the manufacturers of the equipment.




Shows area of operations during Phase I of M/V Charles H. Gilbert Cruise 78 (January 4-7, 1965).

The area of operations during Phase I was between 19° N. and 17°30' N. along 157° W. where the Charles H. Gilbert made XBT tests in conjunction with the Bureau's oceanographic research vessel Townsend Cromwell (Cruise 12--January 5-24). While the Cromwell was making a hydrograph cast at station No. 2, the Charles H. Gilbert, at the same time, made 5 XBT drops at half speed and 11 drops at full speed within a 53-minute period at a distance of about 197 feet from the Townsend Cromwell. En route to Townsend Cromwell

ation No. 3, six successful XBT drops were ade concurrently with mechanical BT casts. ring the Townsend Cromwell's oceano- aphic cast at station No. 3, four successful lf-speed XBT drops and 10 successful full- eed drops were made in the time of 62 min- es within 531 feet of the vessel.

Operations during Phase II of the cruise re within 25 miles of Oahu. On 2 of the 6 s spent in fishing, 19 skipjack tuna, 5 owfin, 4 little tuna, and 1 frigate mackerel re caught. None was taken on the other 4 s. Two yellowfin tuna, suitable for den- determinations, were caught by trolling. e skipjack tuna snouts and 6 tongues were ected and preserved for histological study.

For an experimental study of currents in Kaiwi Channel, a series of 21 optical tar- s (polyurethane sheets and paper) were eased at 1-mile intervals between Laau nt, Molokai, and Koko Head, Oahu. The s sel then took a position in mid-channel le an aerial photographic survey from ,000 feet was made of the target release ea.

e: See Commercial Fisheries Review, Feb. 1965 p. 16.

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ADE WIND ZONE
EANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 13 bruary 2-4 and 8-27, 1965): Measure- nts using the Hytech salinity-temperature pth (STD) in situ recorder for testing and ibration purposes were made by the re- arch vessel Townsend Cromwell during o 1-day cruises, on February 2 and 4, 1965, stations off Waianae, Oahu. The research s sel is operated by the Biological Labora- y, U. S. Bureau of Commercial Fisheries, nolulu, Hawaii.

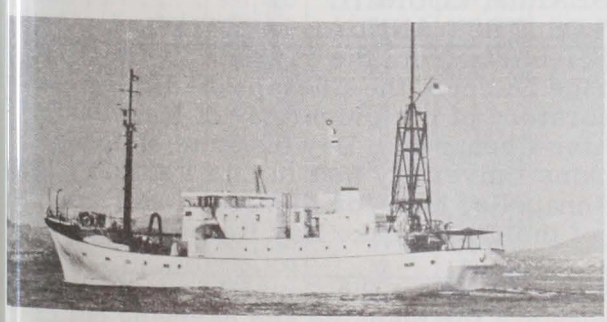


Fig. 1 - The research vessel Townsend Cromwell.

On February 8 the Townsend Cromwell started the 12th cruise in a series of oceanographic cruises to collect data on rates of change in the distribution of properties in the trade wind zone of the North Pacific. The area of operations during that phase of the cruise was in the central North Pacific bounded by latitudes 10° N., 27° N., and longitudes 148° W., 158° W., where 43 oceanographic stations were occupied along the cruise track. At each station temperatures and samples for salinity analysis were obtained at 20 depths to 1,500 meters (4,921 feet). In addition, deep casts to 5,000 meters (16,404 feet) were taken at stations 21 and 25, and a cast to 4,000 meters (13,123 feet) was taken at station 40.

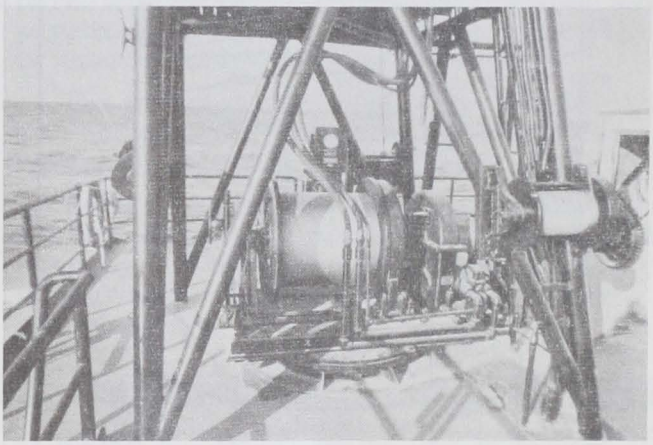
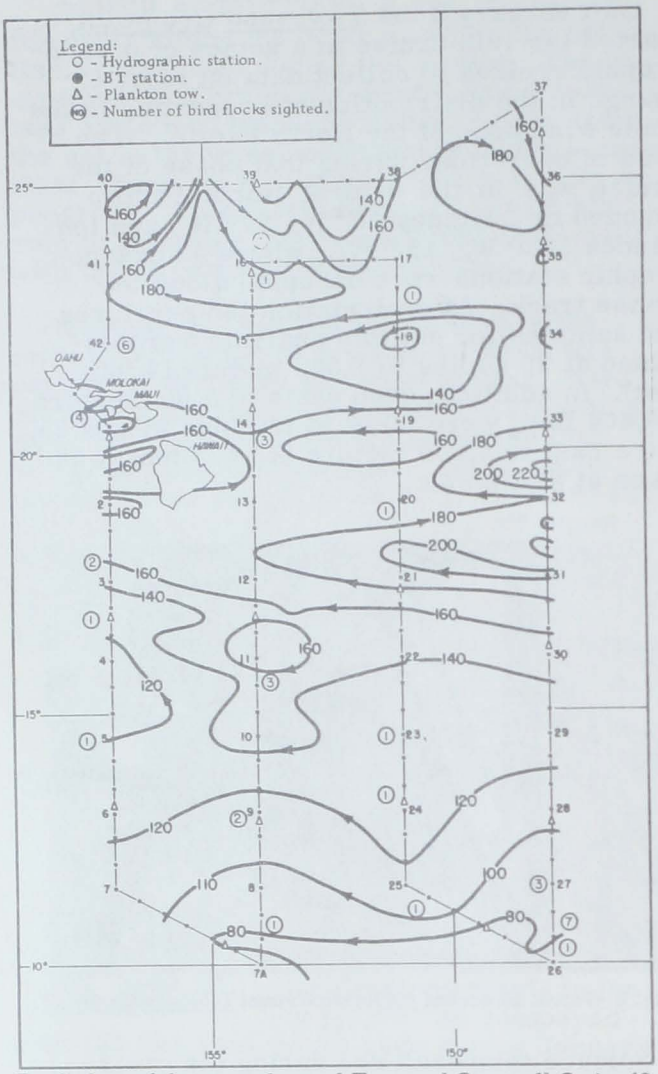


Fig. 2 - Part of the deck of the research vessel Townsend Cromwell.

Surface temperatures during the cruise showed that cooling continued to occur in the study area. This was most noticeable north of latitude 20° N. where it appeared that tongues of cool water were intruding from the northeast and northwest. The surface temperatures ranged from 21° C. (69.8° F.) in the northern sections to 25.5° C. (77.9° F.) in the southern sections. This compares with a similar range of 21.5° C. to 25.5° C. (70.7° F. to 77.9° F.) encountered during February 1964.

The February 1965 circulation pattern was similar to the previous month in January in that a more regular flow regime exists south of 18° N. while more complex patterns are seen north of that latitude. The February pattern differed mainly in that the southwesterly flow in the southern areas showed a more pronounced westerly component. The north-south gradient of isotherm depths were similar to the previous month's in all sections except the westernmost where a definite de-




Track chart of the research vessel Townsend Cromwell Cruise 13 (February 8-27, 1965), showing depth contours of the 20° C. isotherm in meters.

crease was seen, indicating a slackened flow. To the north, the cyclonic eddy within the island area seen during January, weakened greatly in February. However, a similar cyclonic eddy was seen north-east of the islands. In general this past February's flow pattern was different from last year's in that the westerly flow increased in intensity while the eddy systems decreased.

A total of 41 bird flocks were sighted during this cruise as compared with 30 during the vessel's previous cruise. Eight of the bird flocks were seen immediately north of station 26, where equatorial water of 34.0 °/oo was detected and a 1° rise in surface temperature to 25.8° C. occurred within 30 miles.

Other operations during the cruise include taking the usual series of bathythermograms, surface bucket temperatures, water samples for salinity analyses, release of drift bottles and other oceanographic data collection.

The research vessel Townsend Cromwell was scheduled to leave her home base at Honolulu on March 8, 1965, for an oceanographic research cruise covering an area of over 600,000 square miles in the vicinity of the Hawaiian Islands. The 4,400-mile voyage is the 14th cruise of the 158-foot long vessel commissioned in Honolulu in January 1964. Especially constructed for the Bureau's Honolulu Laboratory, she is one of the nation's largest and most modern oceanographic research vessels.

Except for one cruise, the Townsend Cromwell has been used exclusively for a study of Trade-Wind Zone Oceanography. One of the requirements of that study is monthly oceanographic and weather data from each of 42 locations in the Hawaiian Islands area. Each of those cruises takes 19 days.

The monthly trade-wind zone oceanographic cruises are scheduled to end in June 1965, when 16 months of data will have been collected. The Townsend Cromwell will then be used for other studies in connection with tuna and oceanography. These series of cruises are preliminary to a two-year, four-vessel operation planned for the future. The results will be of importance in the solution of many fishery and oceanographic problems.

Note: See Commercial Fisheries Review, April 1965 p. 19.

## Chesapeake Bay

### CHESAPEAKE BAY RESEARCH COUNCIL HOLDS FIRST ANNUAL MEETING:

Scientists from the Virginia Institute of Marine Science, the Chesapeake Biological Laboratory of the University of Maryland, and the Chesapeake Bay Institute of Johns Hopkins University met in late February 196 at Annapolis, Md., for the first annual meeting of the Chesapeake Bay Research Council.

The purpose of the Council is to provide a framework for planning and carrying out cooperative research projects, and an effective means for exchanging information regarding

esearch projects under way in each member aboratory. Pressing demands for informa- on needed to regulate the marine resources f Chesapeake Bay and the coastal waters of laryland and Virginia have brought about apid growth of the marine research agencies the Chesapeake area.

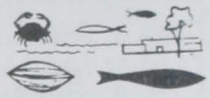
Members of the Council are standardizing eld and data treatment techniques in order more easily interchange information. Com- tible systems of data recording and proc- sing will allow reports from one group to transferred directly to the recording sys- m of another group without having first to vise the data.

At the February meeting, scientists from e Chesapeake Bay Institute reported their drographic and nutritional studies in the per Bay. Scientists from the Chesapeake y Laboratory outlined their Patuxent River ermal pollution study. The Virginia Insti- te of Marine Science delegates described sults of hydrographic and ecological work nducted on the James River, and also dis- ssed work being done for the U. S. Army rps of Engineer to establish possible ef- cts of spoil on bottom populations.

The new Council will meet annually and ay hold interim meetings when necessary.

(Virginia Institute of Marine Science, Glouces- ter Point, March 10, 1965.)

Note: See Commercial Fisheries Review, Sept. 1964 p. 17.



## Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1965:

Fresh and Frozen: Purchases of fresh and frozen fishery products in January 1965 for the use of the Armed Forces were up 16 percent in quantity and 10 percent in value from the previous month. The increase was due mainly to larger purchases of shrimp, flounder fillets, and ocean perch fillets. Compared with the same month in the previous year, purchases in January 1965 were up 12 percent in quantity and 35 percent in value.

The increase in purchases in January 1965 was about offset by moderately lower purchases in February 1965 for most items.

Total purchases in January-February 1965 were up 20 percent in value from those in the same period of 1964, but the total quantity of the purchases was about the same in both periods.

ible 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, January-February 1965 with Comparisons

| QUANTITY | | | | | | VALUE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January | | February | | Jan.-Feb. | | January | | February | | Jan.-Feb. | |
| 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 |
| (1,000 Lbs.) | | | | | | ($1,000) | | | | | |
| 2,370 | 2,108 | 2,036 | 2,300 | 4,406 | 4,408 | 1,465 | 1,088 | 1,311 | 1,231 | 2,776 | 2,319 |

Table 2 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, January-February 1965 with Comparisons

| Product | January | | | | February | | | | Jan.-Feb. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1965 | | 1964 | | 1965 | | 1964 | | 1965 | 1964 |
| | Quantity | Avg. Cost | Quantity | Avg. Cost | Quantity | Avg. Cost | Quantity | Avg. Cost | Quantity | Quantity |
| | Pounds | Cents/Pound | Pounds | Cents/Pound | Pounds | Cents/Pound | Pounds | Cents/Pound | Pounds | Pounds |
| rimp: | | | | | | | | | | |
| aw headless | 89,700 | 97 | 83,500 | 80 | 94,700 | 97 | 99,400 | 79 | 184,400 | 182,900 |
| eeled and deveined | 103,080 | 137 | 73,850 | 109 | 51,080 | 135 | 110,900 | 109 | 154,160 | 184,750 |
| readed | 361,400 | 89 | 284,800 | 66 | 242,020 | 89 | 345,500 | 63 | 603,420 | 630,300 |
| olded and breaded | 76,100 | 64 | 4,000 | 59 | 19,150 | 72 | 3,700 | 59 | 95,250 | 7,700 |
| Total shrimp | 630,280 | 95 | 446,150 | 76 | 406,950 | 96 | 559,500 | 75 | 1,037,230 | 1,005,650 |
| allops | 165,400 | 83 | 172,750 | 60 | 156,180 | 84 | 218,350 | 65 | 321,580 | 391,100 |
| sters: | | | | | | | | | | |
| astern | 39,476 | 107 | 1/ | 1/ | 99,296 | 100 | 1/ | 1/ | 138,772 | 1/ |
| acific | 38,244 | 79 | 1/ | 1/ | 23,982 | 80 | 1/ | 1/ | 62,226 | 1/ |
| Total oysters | 77,720 | 93 | 130,154 | 93 | 123,278 | 96 | 127,364 | 91 | 200,998 | 257,518 |
| llets: | | | | | | | | | | |
| Cod | 31,900 | 34 | 33,196 | 36 | 82,850 | 36 | 71,350 | 38 | 114,750 | 104,546 |
| Flounder | 388,450 | 32 | 529,744 | 29 | 236,000 | 37 | 328,072 | 33 | 624,450 | 857,816 |
| Ocean perch | 369,290 | 33 | 276,000 | 31 | 325,500 | 36 | 386,600 | 32 | 694,790 | 662,600 |
| Haddock | 126,100 | 39 | 130,594 | 40 | 145,900 | 38 | 221,000 | 39 | 272,000 | 351,594 |
| addock portions | 208,500 | 50 | 8,000 | 37 | 101,050 | 48 | 650 | 38 | 309,550 | 8,650 |
| eaks: | | | | | | | | | | |
| Halibut | 102,900 | 48 | 106,525 | 37 | 105,750 | 49 | 88,000 | 37 | 208,650 | 194,525 |
| Salmon | 5,000 | 72 | 13,157 | 65 | 9,490 | 65 | 10,410 | 66 | 14,490 | 23,567 |
| Swordfish | 540 | 59 | 800 | 51 | 320 | 61 | 1,900 | 48 | 860 | 2,700 |

1/ Breakdown not available.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, January-February 1965 with Comparisons

| Product | QUANTITY | | | | | | VALUE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | January | | February | | Jan.-Feb. | | January | | February | | Jan.-Feb. | |
| | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 |
| | (1,000 Lbs.) | | | | | | ($1,000) | | | | | |
| Tuna | 641 | 650 | - | 278 | 641 | 928 | 291 | 285 | - | 123 | 291 | 408 |
| Salmon | 1 | 679 | 5 | - | 6 | 679 | 1 | 416 | 4 | - | 5 | 415 |
| Sardines | 31 | 20 | 80 | 40 | 111 | 60 | 20 | 8 | 49 | 14 | 69 | 22 |

Average prices in 1965 were up for all the leading items, except cod fillets and haddock fillets. Prices were much higher for shrimp and scallops in 1965.

Haddock portions were purchased in much larger quantity in January-February 1965, but the increase was offset by lower purchases of flounder fillets, haddock fillets, oysters, and scallops.

Freeze-Dried: Purchases for the Armed Forces in January 1965 included 1,024 pounds of freeze-dried shrimp valued at $12.59 a pound.

Canned: Tuna and sardines were the main canned fish items purchased for the Armed Forces in January-February 1965.

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Mar. 1965 p. 29.

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## VETERANS ADMINISTRATION REQUIREMENTS DURING 1965:

Following are the estimated requirements of the Veterans Administration for fishery products to be procured in 1965:

| Item | Case Size | Quantity |
|---|---|---|
| Canned: | | Case |
| Salmon: | | |
| Medium red or coho, with skin and backbone | 48/1-lb. | 1,200 |
| Pink | 48/1-lb. | 2,000 |
| Red or sockeye | 48/1-lb. | 3,100 |
| Coho, dietetic | 48/½'s | 2,200 |
| Sardines, veg. oil, Grade A (22 to 32 per can) | 48/15-oz. | 1,200 |
| Tuna: | | |
| Lt. meat, chunk style, packed in veg. oil | 12/64-oz. | 5,900 |
| Lt. meat, solid pack, lge. pieces, dietetic | 48/½'s | 2,300 |
| Shrimp, freeze-dried (peeled, headless, precooked): | | |
| Large | 6/No. 10's | 400 |
| Pieces | 6/No. 10's | 600 |
| Frozen: | Size | Lbs. |
| Cod fillets, skinless | 4-5-oz. | 28,188 |
| Flounder (sole) fill., skinless | 4-5-oz. | 59,088 |
| Haddock fillets, skinless | 4-5-oz. | 52,74 |
| Halibut steaks, $\frac{7}{8}$-inch thick (+ or - $\frac{1}{8}$ inch) | 4-5-oz. | 33,6 |
| Salmon (red, king or silver) steaks, $\frac{7}{8}$-inch thick (+ or - $\frac{1}{8}$ inch) | 4-5-oz. | 8,95 |
| Ocean perch fillets, skin on | 8-12 fill. per lb. | 93,68 |
| Sea scallops, med. size | $\frac{3}{4}$-$1\frac{1}{4}$ in. in diameter | 21,79 |

(Table continued next column.)

Note: Requests for bids will be announced as they are issued. For additional information, contact the Marketing Division for Subsistence, Veterans Administration Supply Depot, P. O. Box 27, Hines, Ill. 60141.

## Fish Spotting

### BALLOONS TESTED FOR SPOTTING FISH SCHOOLS:

The use of balloons for spotting fish schools may turn out to be more effective than using other aircraft. Earlier this year the U. S. Bureau of Commercial Fisheries contracted with professional balloonists in testing the feasibility of using balloons to help spot schooling fish--tuna in this case--off the Pacific Coast, announced the Department of the Interior, March 6, 1965.

Instead of perching atop a 60-foot mast in "crow's nest," the tuna vessel lookout would scan a much larger area from a small gondola suspended from an inflated bag filled with hot air. According to navigational charts the horizon is a little more than 10 statute miles from a man 60 feet above the surface. At 500 feet the horizon is nearly 30 miles away.

The balloon-testing experiments were conducted January 30-February 4, 1965, by the Bureau's Tuna Resources Laboratory, La Jolla, Calif., in cooperation with the Bureau's Oceanographic Instrumentation Office, Washington, D. C. The testing area was from 2 to 4 miles off La Jolla from a 110-foot converted wartime subchaser, the Yaqui Queen,

chartered by the Bureau and used as an albacore tuna troller.

The equipment used during the tests consisted of a spherical dacron balloon, 50 feet in diameter, with a tubular aluminum frame gondola capable of holding two persons. A ducted fan driven by a one-quarter horsepower electric motor mounted at the base of the balloon was used for inflation and maintenance of an internal pressure of about 2 pounds per square foot. The air was heated by a propane burner mounted in the base of the balloon and supplied by a hose to a deck-mounted pressurized propane tank. Extra pressure was supplied to the propane tank by a 50-pound $CO_2$ cylinder to force the liquified propane to height of 500 feet. A hydraulic winch was used to handle the $\frac{5}{8}$-inch nylon tethering line.

During the testing period, 4 inflations took place, with 6 ascensions of the balloon--4 manned and 2 unmanned. The balloon was flown in a variety of weather and sea conditions, ranging from dead calm to winds of 12 knots with moderate seas. During calm weather, 5 ascents were made to a maximum height of 500 feet. Total air time was about 8 hours. The four scientists cooperating in the project made ascensions and all were impressed with the exceptional stability of the balloon and by its vertical maneuverability. This was accomplished by burner adjustments made either at the gondola or the propane tank on the vessel. It was possible to make controlled "touch and go" landings on the water.

The experiments showed that all phases of the operations of a tethered hot-air balloon were capable of being safely performed from a vessel at sea, and are practical under a wide range of working conditions.

Two professional balloonists trained biologists from the Bureau's La Jolla Tuna Resources Laboratory in techniques of inflation, mooring, and recovery. The instructors say that sitting at 500 feet in a tethered balloon is safer than driving in modern traffic. The worst that could happen, they said, is that the hot air inside the big bag would cool and the balloon would descend slowly to the sea. The gondola is equipped to float and observers have life jackets. In normal operation the balloon is brought down by a cable attached to the winch on the vessel's deck.

A number of tuna vessels on the West Coast carried helicopters for use in spotting fish schools during the past few years, but they have have not been satisfactory. According to experienced vessel owners, the biggest problem has been the difficulty of maintaining the "choppers" at sea. Other vessels have tried small seaplanes, but they also have been mostly eliminated because recovering them in rough weather proved to be hazardous and difficult. Many tuna vessels on the West Coast now hire free-lance pilots, but small planes do not have the range for working far at sea.

According to a fishery biologist of the La Jolla Fishery-Oceanography Center, the next step in the balloon project is to design a balloon with aerodynamic qualities which can be towed by a tuna vessel without hindering its speed. Other fishery experts are looking forward to an even more sophisticated approach to sighting tuna. They are working on plans to equip the aerial platforms with television equipment completely controlled from the towing vessel.

## Fish Sticks and Portions

U. S. PRODUCTION, OCTOBER-DECEMBER 1964:

United States production of fish sticks and fish portions amounted to 50.8 million pounds during the fourth quarter of 1964, according to preliminary data. Compared with the same quarter of 1963, this was an increase of 4.7 million pounds or 10.2 percent. Fish portions (30.8 million pounds) were up 5.4 million pounds or 21.0 percent, and fish sticks (19.9 million pounds were down 658,000 pounds or 3.2 percent.

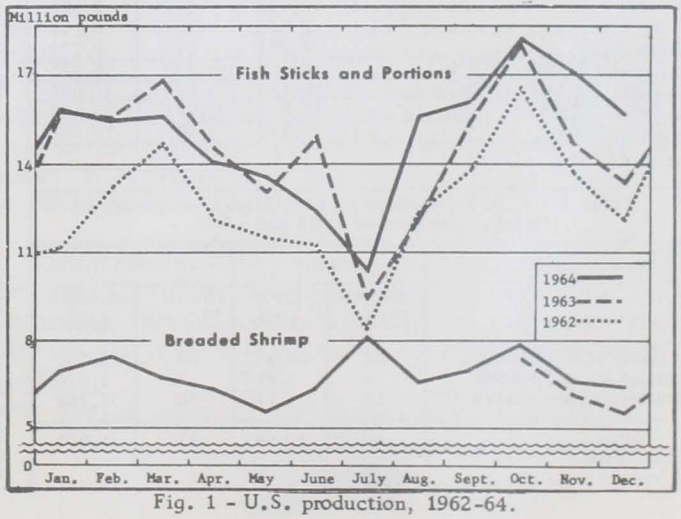



Fig. 1 - U.S. production, 1962-64.

Cooked fish sticks (18.7 million pounds) made up 93.5 percent of the October-December 1964 fish stick total. There were 30.1 million pounds of breaded fish portions produced, of which 24.5 million pounds were raw. Unbreaded fish portions amounted to 748,000 pounds.

Fig. 2 - Fish sticks (pieces of frozen fish fillets frozen in blocks) passing through batter prior to being coated with breading in a New England frozen fishery products plant.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 16.3 and 18.6 million pounds, respectively. The Inland and Gulf States ranked second with 1.8 million pounds of fish sticks, and 11.6 million pounds of fish portions.

Table 1 - U.S. Production of Fish Sticks by Months and Type, October-December 1964 1/

| Month | Cooked | Raw | Total |
|---|---|---|---|
| | (1,000 Lbs.) | | |
| October | 6,682 | 344 | 7,026 |
| November | 5,750 | 397 | 6,147 |
| December | 6,221 | 549 | 6,770 |
| Total 4th Qtr. 1964 1/ | 18,653 | 1,290 | 19,943 |
| Total 4th Qtr. 1963 | 18,755 | 1,846 | 20,601 |
| Total 1964 1/ | 67,810 | 5,722 | 73,532 |
| Total 1963 | 74,137 | 5,165 | 79,302 |

1/Preliminary.

Table 2 - U.S. Production of Fish Sticks by Areas, October-December 1964 and 1963

| Area | 1/1964 | | 2/1963 | |
|---|---|---|---|---|
| | No. of Firms | 1,000 Lbs. | No. of Firms | 1,000 Lbs. |
| Atlantic Coast States | 23 | 16,347 | 22 | 16,843 |
| Inland & Gulf States | 6 | 1,817 | 7 | 1,976 |
| Pacific Coast States | 11 | 1,779 | 12 | 1,782 |
| Total | 40 | 19,943 | 41 | 20,601 |

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Portions by Months and Type, October-December 1964 1/

| Month | Cooked | Breaded Raw | Total | Unbreaded | Tot |
|---|---|---|---|---|---|
| | | (1,000 Lbs.) | | | |
| October | 2,033 | 8,739 | 10,772 | 293 | 11, |
| November | 1,742 | 8,921 | 10,663 | 201 | 10, |
| December | 1,810 | 6,818 | 8,628 | 254 | 8, |
| Total 4th Qtr. 1964 1/ | 5,585 | 24,478 | 30,063 | 748 | 30, |
| Total 4th Qtr. 1963 | 4,571 | 20,064 | 24,635 | 826 | 25, |
| Total 1964 1/ | 20,898 | 82,134 | 103,032 | 2,541 | 105 |
| Total 1963 | 16,623 | 74,967 | 91,590 | 3,054 | 94 |

1/Preliminary.

Table 4 - U.S. Production of Fish Portions by Areas, October-December 1964 and 1963

| Area | 1/1964 | | 2/1963 | |
|---|---|---|---|---|
| | No. of Firms | 1,000 Lbs. | No. of Firms | 1,0 L |
| Atlantic Coast States | 24 | 18,575 | 24 | 14, |
| Inland & Gulf States | 8 | 11,586 | 10 | 10, |
| Pacific Coast States | 10 | 560 | 10 | |
| Total | 42 | 30,811 | 44 | 25, |

1/Preliminary.
2/Revised.

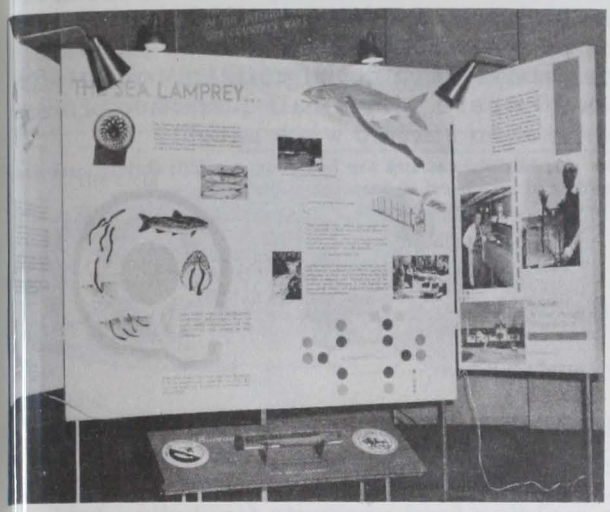
## Great Lakes

### 1965 LAKE TROUT RESTOCKING PROGRAM IN LAKE MICHIGAN:

Upper Lake Michigan will be planted wit 1.3 million yearling lake trout during sum- ser 1965, probably in June, under the lake trout restoration program of the Great Lak Fishery Commission.

With hatchery production exceeding Lak Superior's fish needs and sea lamprey con- trol work moving ahead on schedule in Lak Michigan streams, the decision to plant th yearlings was made this March by the Lak Trout Rehabilitation Committee of the Gre Lakes Fishery Commission at a meeting h in Milwaukee, Wis. The committee, repre- senting U. S. state and Federal, and Cana agencies in the Great Lakes area, made it decision after noting that chemical treatm should bring the sea lampreys under contr in northern Lake Michigan by 1967.

Providing the planted fish with the need leeway of safety until 1967 is the fact that lake trout are not usually attacked by sea lam preys until they are about 15 inches long. Thus, the 4- to 5-inch long fish scheduled f stocking this summer will not be in danger predation before the Lake's sea lamprey po




t showing sea lamprey research and control studies conducted
e Great Lakes Fishery Commission.

ons are substantially reduced two years
n now.

Lake Michigan's planting stock will come
m the Federal Jordan River Valley hatch-
in northern Michigan. Plans call for re-
ing one million of the young fish at three
rate locations between Seul Choix Point
Epoufette. Other releases will include
000 small lake trout in Grand Traverse
and 200,000 fish off Door Peninsula in
consin waters. Those planting sites were
led out for the first round of stocking be-
se they offer lake trout their best chances
rvival.

hemical control of sea lampreys is mak-
its earliest gains in those areas, which
rically have been good ones for support-
lake trout populations. Also of advantage
e fact that there is less small-mesh gill-
ng in those areas than in some other
s of Lake Michigan.

ll of the planted lake trout will be marked
at their growth, survival, natural repro-
on, and movements can be checked by
gists. Releases of the fish will be made
ep-water areas and carefully timed with
weather to prevent them from being
ashore. Personnel of the Michigan Con-
ation Department will plant fish in reef
ffshore areas from Seul Choix Point to
ette. (News Bulletin, Michigan Depart-
of Conservation, Lansing, March 18,
)

## Gulf Fisheries Explorations and Gear Development

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 57: To evaluate by comparative trawling, the ES-6(A) electric trawl was the objective of this cruise in the Gulf of Mexico by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers. The cruise ended on March 8, 1965, with the essel's return to Panama City.

Trawling tests during the cruise were conducted in depths of 20 to 30 fathoms on soft mud bottom east of Pass a Loutre, Miss. Methods used were similar to those of previous cruises--both nets were fished simultaneously, with identical scope ratio. To check both day and night fishing results, a minimum of 4 drags for each period were scheduled. Turbidity was checked by using a closed circuit TV camera with distance markers secured in front of the camera. The camera was lowered to various depths and the visible markers were counted on the TV monitor aboard the vessel. Winter storms persisted during most of the cruise and restricted operations.

Shrimp catches were light and ranged from 9 pounds to 6.5 pounds per hour during night drags with the nonelectric net. A total of 19 drags was completed, 11 of which yielded useful information. Results obtained from those 11 drags were: Day electric average 118 percent of the night nonelectric average; night electric average 83 percent of night nonelectric average; and day nonelectric average 110 percent of night nonelectric average.

Some typical indications of the turbidity in the area worked by the vessel were: Depth of water--5 fathoms: 2" definition at 4 fathoms; 0" definition at 5 fathoms. Depth of water--22 fathoms: 6" definition at 6 fathoms; 1" definition at 22 fathoms. Depth of water--30 fathoms: 2" definition at 8 fathoms; 1" definition at 30 fathoms.

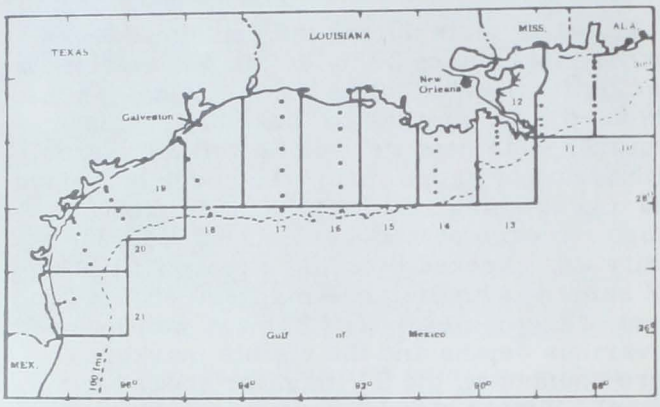
Since the shrimp were not burrowing during the daylight hours, due apparently to the severe turbidity, the comparative effectiveness of the electrical gear could not be thoroughly evaluated.

Note: See Commercial Fisheries Review, February 1965 p. 25.

## Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-26 (January 14-February 28, 1965): A 15-day shrimp-staining experiment designed to study shrimp mortality and growth comprised a portion of this cruise by the chartered research vessel Gus III. The cruise was another of a series in a continuing Gulf of Mexico shrimp distribution study conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex.




Station pattern for shrimp distribution studies by M/V Gus III, Cruise GUS-26.

The shrimp-staining experiment took place on the Tortugas fishing grounds near Key West, Fla., between eastern and western Gulf shrimp sampling areas. A total of 11,549 pink shrimp was stained and released within that area.

Regular trawling operations related to the shrimp distribution study were carried out in 7 statistical areas which yielded fair catches of white shrimp and only relatively small catches of brown shrimp. A total of 23 standard 3-hour tows with a 45-foot flat trawl was made in conjunction with both east and west trawling operations of the cruise. There were 52 plankton tows made during the cruise, and 36 bathythermograph (BT) and 102 water (Nansen bottle) casts. In crossing the southeastern part of the Gulf en route to Key West, 264 drift bottles were released and 22 (270-meter or 886-foot) BT casts were made.

Most of the areas worked yielded varying amounts of white shrimp. The largest white shrimp catches were 33 pounds (21-25 count) from the 10-20 fathom depth in area 13, and 26 pounds (51-67 count) in area 20.

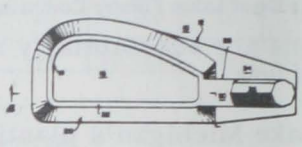
The best brown shrimp catch of the cruise was 36 pounds (31-40 count) from 10-20 fathoms in area 18. Catches of brown shrimp in other areas were not significant--mostly in area 20 where very small quantities of small and medium shrimp were caught.

Note: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, April 1965 p. 21.

## Inventions

PATENTED LOW-COST MANUAL DEVICE FOR MOLDING FOOD PRODUCTS:

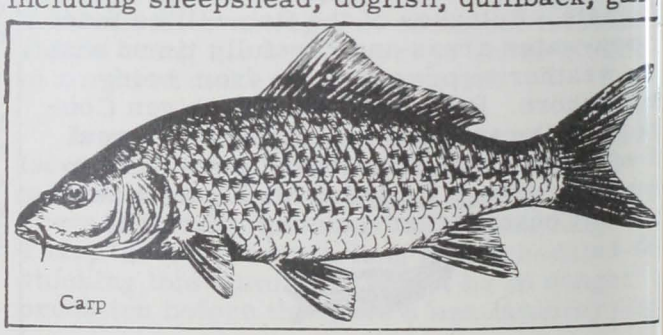
A patent was recently granted on a device for molding food products (including seafood) into patties of various shapes. The device is actually a simple mold (made of metal, wood, or plastic) which is operated by hand on a flat surface. The inventor emphasizes the novel designs that can be turned out at low cost with the device. (U. S. Patent No. 3,153,810 issued Jett E. Adams, 2318-B Jason Drive, Kirtland Air Force Base, New Mexico.)



## Iowa

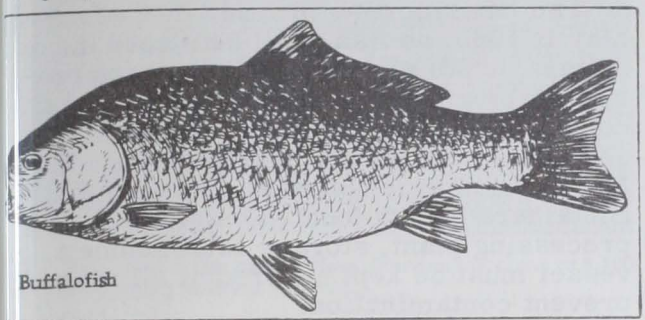
ROUGH FISH REMOVAL PROGRAM, 1964:

More than 900,000 pounds of rough fish were were removed from Iowa waters in 1964 by Iowa State Conservation Commission rough fish removal crews and chemical control projects. The 13 fisheries stations in Iowa reported the removal of 588,900 pounds of carp; 175,800 pounds of buffalofish; 90,300 pounds of shad; and 47,000 pounds of other species, including sheepshead, dogfish, quillback, gar,



Carp

nd suckers. About 160,000 pounds of carp, uffalofish, and sheepshead were sold on contract through the Spirit Lake Station. The emainder were either destroyed or carried way by the public.



Buffalofish

The largest chemical control project conucted by the Iowa State Conservation Commission in 1964 was the renovation work on ake Odessa in Louisa County. Over 500,000 ounds of rough fish were removed from that ake. (Iowa State Conservation Commission, ebruary 8, 1965.)

## aw of the Sea

NSTITUTE ESTABLISHED BY NIVERSITY OF RHODE ISLAND:

The Law of the Sea Institute has been esablished by the University of Rhode Island promote understanding and solution of the gal and international problems that can arise from attempts to exploit the ocean's resources, it was announced March 5, 1965.

"In many cases we appear to have at least e basic scientific and technological knowldge needed to mine the sea floors, underke shellfish farming, or other projects, t commercial interests are often discouged because of the lack of clear-cut laws ich would give them some protection for e heavy investments required," the Dean the University of Rhode Island Graduate chool of Oceanography said. "By means of s Institute we hope to bring together inrmation on the law of the sea, provide for e exchange of ideas and information, assist the education of students and the public, nd publish papers and symposia proceedings," e explained.

In addition, the Institute is planning to conuct an annual week-long summer conference the law of the sea to which scientific and gal experts would be invited, along with students and others interested in the topic. The Institute, which is believed to be the first of its kind in the nation, will also sponsor a series of prominent speakers throughout the academic year.

One of the scientists who helped establish The Law of the Sea Institute said, "The Institute would bring together individuals and groups of diverse interests and points of view and thus provide new insights into law of the sea problems. By making information available to professionals and nonprofessionals in this country and abroad the Institute could contribute to the peaceful solution to some of the pressing problems of national rights in the oceans and seas of the world."

For instance, one of the most tangled questions is how far from shore do a nation's territorial boundaries extend. The United States claims 3 miles, while other countries maintain they control out to 6, 12, or even 200 miles. There are also unsettled questions of how you measure these boundaries, particularly where coastal or large groups of islands are involved. Quarrels have also broken out between nations over "historic fishing rights," which have evolved over many years.

Interest in territorial limits and mining rights has been heightened by rapid scientific advances and new engineering skills which may soon open up vast undersea mineral resources.

Today, in the words of one scientist, the "sea is getting smaller" and all these topics require continuing research and analysis "in the light of both changing technology and resource use and of changing national and international interests." (Universtiy of Rhode Island, March 5, 1965.)

## Massachusetts

STATE LEGISLATURE PASSES RESOLUTION ON IMPORTS OF SOVIET COD BLOCKS:

In March 1965, the Massachusetts Legislature passed the following House resolution concerning United States imports of Soviet frozen cod blocks:

Whereas, The importation of Russian-caught codfish is a matter of deep concern to

Gloucester and to other New England fishing ports where an already high rate of unemployment exists; and

Whereas, The New England fishing industry is at a great disadvantage in competing with the Russian fishing fleet which is a completely subsidized government operation; and

Whereas, The Federal Bureau of Commercial Fisheries and the State Department have been asked to investigate the imports of Soviet cod blocks; therefore be it

Resolved, That the Massachusetts House of Representatives respectfully urges the Governor to instruct the Director of the Division of Marine Fisheries and the Commissioner of Commerce and Development to investigate the importing of Russian-caught codfish; and be it further

Resolved, That said director and said commissioner be further requested to cooperate fully with any Federal agency engaged in any similar investigation; and be it further

Resolved, That a copy of these resolutions be sent forthwith by the Secretary of the Commonwealth to His Excellency the Governor and to the Director of the Division of Marine Fisheries and the Commissioner of Commerce and Development.

* * * * *

MORE SANITARY METHODS FOR HANDLING FISH:

The use of forks for transferring fish from one receptacle to another, or from fishing vessel holds into unloading receptacles, will be prohibited in Massachusetts effective January 1, 1966. The announcement was made by the Division of Food and Drugs, Department of Health, Commonwealth of Massachusetts, in a letter dated March 16, 1965, to members of the fishing industry.

It was pointed out that forking has a detrimental effect on quality and that discontinuance of that method of handling fish is in the interest of the quality improvement program of fish received and marketed in Massachusetts.

The announcement urged the fishing industry to participate in the State's quality improvement program by cooperating with the Massachusetts Food and Drug Division, and asked that the Division be kept informed on the progress made in developing a substitute method for handling and transferring fish whenever such transfer is required.

The Division also ordered that effective May 1, 1965, no fish shall be placed in containers or boxes which have not been previously cleaned and sterilized, and that all containers of fish in transit shall be covered and kept under proper refrigeration. The Massachusetts industry was advised that all containers of fish located outside of a fish processing plant, storage establishment, or vessel must be kept covered at all times to prevent contamination.

## North Atlantic

FOREIGN FISHING ACTIVITIES OFF COAST, MARCH 1965:

Soviet fishing vessel activity in the North Atlantic during March 1965 was double that of the previous month. A total of 84 vessels were sighted and identified as 49 fish-factor stern trawlers, 19 refrigerated side trawlers 13 refrigerated and processing fish transports, 1 fuel and water carrier, and 2 salvage tugs. This compared with 42 vessels observed in February and with only 3 vessels seen on Georges Bank at the same time a year earlier, although 15 Soviet factory stern trawlers and several fish transports were operating along the mid-Atlantic Coast areas during that period.

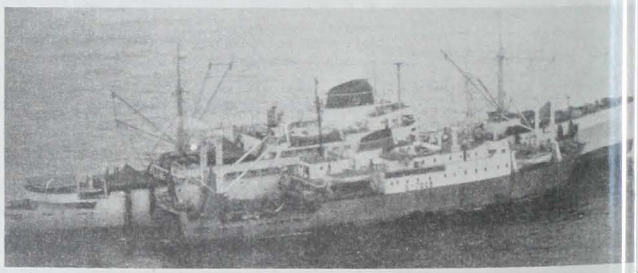
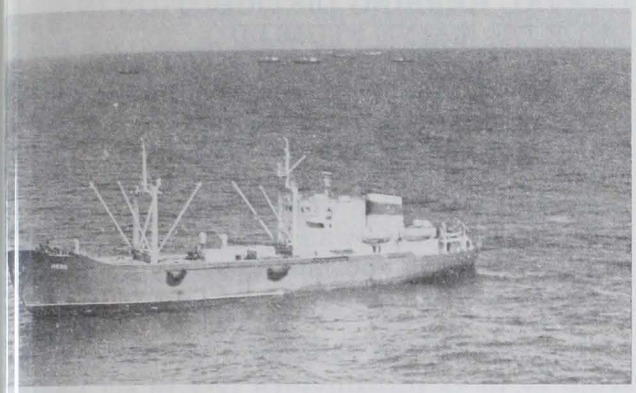


Fig. 1 - Soviet factory stern trawler (Tropik class) alongside fish transport vessel in North Atlantic.

Soviet fishing operations generally ranged from 70 miles south of Montauk Point, Long Island, eastward along the 100-fathom curve of the Continental Shelf 30 to 40 miles south and southeast of the Nantucket Lightship. Their activity was also confined to Nantucket Shoals adjacent to the lightship.



2 - Refrigerated fish carrier Neva (Pervomank class) of 3,100 ss tons operating in North Atlantic.

Each of the vessels sighted was actively gaged in fishing operations and had large ntities of red hake and whiting on deck. ern trawlers were seen hauling their trawls ch were estimated to have between 30,000 40,000 pounds of fish. Dehydration plants re continually working, which would indi- e that the excess portion of their catch was ng used for fish meal. The apparent suc- s s in fishing for those species was demon- ated by the continuous increase of their hing vessels and support ships.

During the month, the Soviet salvage tug vnyy towed the factory stern trawler Amet- into shelter of Cape Cod Bay in order to ke repairs to the fishing vessel's propel- . The vessels were visited by the Bureau's heries Management agents. The Soviet ssels had been vigorously exploiting the red e fishery for several months prior to March. hough their operations had been observed ring the weekly surveillance flights, there s some speculation concerning the quanti- nd use of their catch. While aboard the ssel, the Bureau officers learned that this rticular stern trawler had been engaged in hing operations for about one week. Their h cargo was estimated to be more than one lion pounds of predominantly red hake h smaller amounts of whiting. That would icate a catch of more than 100,000 pounds fish a day. It was learned that their catch r tow was about 30,000 pounds.

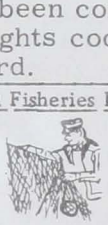
Both the red hake and whiting caught are ocessed and used for human consumption. e red hake are packed and frozen whole in rtons of about 40 pounds each. The whiting, wever, are headed and gutted before freez- . Fish waste and catches in excess of their ocessing facilities are used for fish meal. e gear used is heavy, bottom-tending trawls h fine mesh in the cod end and extensions.

Only red hake and whiting were being caught during March, and the vessel crew indicated there was no interest in other species--at least not until the herring season starts on Georges Bank. Some lobsters were being caught for consumption aboard the vessel.

Fig. 3 - Deck view of Soviet trawler fishing early this year in North Atlantic (40° W. between 69° and 70° W.). Fish catch consists mostly of red hake and whiting (silver hake).

In order to observe foreign fishing activities in the North Atlantic, the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Glouces- ter, Mass., has been conducting weekly re- connaissance flights cooperatively with the U. S. Coast Guard.

Note: See Commercial Fisheries Review, April 1965 p. 25.



## North Atlantic Fisheries Investigations

LATE WINTER DISTRIBTUION AND ABUNDANCE OF HERRING LARVAE STUDIED:

M/V "Phalarope" Research Cruise (March 9-12, 1965): To determine the late winter distribution and abundance of herring larvae was the purpose of this cruise by the char- tered research vessel Phalarope, operated by the U. S. Bureau of Commercial Fisher- ies Biological Laboratory, Boothbay Harbor, Me. The area of operations was in the Sheep- scot and Damariscotta estuaries and the Boothbay region off the coast of Maine.

BIOLOGICAL OBSERVATIONS: A total of 18 Boothbay Depressor trawl tows were made during this cruise at selected stations in the prescribed area. Except for one 15-minute bottom tow, all tows were oblique and lasted for one-half hour. In addition, at a single station off Tumbler Island, Boothbay Harbor,

an oblique 30-meter (98-foot) tow from 20 meters (66 feet) to the surface was made with a high speed Gulf III sampler, and Clarke-Bumpus closing nets were towed simultaneously at four levels--0, 6, 12, and 18 meters (or 20, 39, and 59 feet).

PRELIMINARY FINDINGS: Of the 683 herring larvae taken during the cruise, 414 were taken in one 15-minute bottom tow off Tumbler Island. The largest catches of herring larvae were made from the northern tip of Squirrel Island to Boothbay Harbor, and indicated a fairly heavy concentration of herring larvae.

Swarming barnacle larvae were the dominant zooplankters and constituted 97 percent of the zooplankton collected. Other zooplankters present were chaetognaths, the copepod Calanus finmarchicus, decapods, and harpactocoid copepods. Stomachs of 10 herring larvae ranging from 29 to 42 millimeters (1.1 to 1.7 inches) were examined for food content. Only one showed any evidence of intensive feeding on barnacle larvae. The remaining nine stomachs were fully compacted with small cyclopoid copepods.

Barnacle larvae began swarming in the Boothbay region during the first week in March 1963 and dominated the zooplankton until the third week of April. Surface water temperature during that period ranged from 37.5° F. to 43.0° F. The first large-scale barnacle swarming in 1964 occurred during the second week of March and continued to the second week of April. Surface water temperatures during the period ranged from 34.7° F. to 37.1° F. This year (1965), swarming first occurred in the Boothbay area during the second week of March. Surface water temperature was 37.5° F., suggesting that early spring surface temperatures of 34.7° F. influence the onset of barnacle swarming. Barnacle larvae were found throughout the water column. The greatest concentration was at 12 meters (39.4 feet), with decreasing numbers at 6 meters (19.7 feet) and the surface. Moderate numbers were found at the lower level of sampling at 18 meters (59 feet). With the colder temperatures found east of the Penobscot, past records indicate that swarming occurs later in that area than in the western region of the coast.

Note: See Commercial Fisheries Review, February 1965 p. 35.

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LARVAL HERRING DISTRIBUTION IN GULF OF MAINE STUDIED:

M/V "Rorqual" Cruise 1-65 (January 30-February 7, 1965): To determine the distribution of larval herring along the coast of the Gulf of Maine was the objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Rorqual. The area of operations was the coastal area between Cape Ann and Machias Bay within the 50-fathom line.

Herring larvae ranging in standard length from 20 to 42 millimeters (0.8 to 1.7 inches) occurred at 20 of the 21 stations covered on this cruise. The catch-per-tow ranged from 0 to 22 with the Gulf III and from 0 to 269 with the Boothbay Depressor No. 2 trawl. The total catch was 887 fish, with the largest catches in the western Gulf. No concentrations of fish were detected on the echo-sounder.

BIOLOGICAL OBSERVATIONS: Oblique hauls with the Boothbay Trawl 2 were made at 21 stations (from 20 meters or 66 feet to the surface at 15 stations, and from the bottom to surface at 6 stations). Oblique Gulf III tows were made from 20 meters to the surface at 12 coastal continuity stations.

HYDROGRAPHIC OBSERVATIONS: At each of the 12 continuity stations Nansen bottle casts, bathythermograph casts, photometer readings, and Secchi disc readings were made; 5 sea bed drifters and 5 surface drift bottles were also released.

Note: See Commercial Fisheries Review, February 1965 p. 35

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EFFECTS OF TOW SPEED AND DISTANCE TRAWLED ON SIZE AND VARIABILITY OF CATCHES:

M/V "Albatross IV" Cruise 65-1--Part (January 12-19, 1965) and Part 2 (January 19-25): To determine the effects of duration of tow, speed, and distance trawled on the size and variability of catches was the objective of this cruise in the southeast part of Georges Bank by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV. The cruise was in two parts because the vessel was forced to return to its base at Woods Hole, Mass., on January 16 to avoid storm, and resumed the cruise on the 19th.

A total of 64 tows was completed during the cruise consisting of a series of 16 tows

ch that lasted 15, 30, 60, and 120 minutes. each station worked, the catch (or aliquot mple) of each fish species was weighed and asured. Quantitative samples of inverte- ates were also obtained and 47 bathyther- graph (BT) casts were taken while steam- , and taken about every 6 hours while on tion. Stations were occupied according to --stage sample design in order to obtain ng with duration ot tow data) more infor- tion on efficiency of size of sampling unit rently used on survey cruises.

An odometer was attached to the foot rope he trawl and number of turns recorded r each tow. At the first station a buoy radar reflectors was anchored. Precise imates of speed and distance trawled were ained for 8 tows at station No. 1 by re- ling radar ranges and bearings of the buoy ing each tow. Rough seas during the re- inder of the cruise prevented further use he buoy.

Blood samples were collected for further orption studies on haddock blood, and yel- tail blood smears were taken for the ool of Medicine of the University of Vir- ia. A visiting scientist from the Massa- sett Institute of Technology collected in- tines from haddock and cod on Part I of cruise. Those samples were to be ana- d for the bacillus, Clostridium botulinum, he botulism investigation conducted by the artment of Food Science at M. I. T. The y is under a contract from the U. S. Bu- of Commercial Fisheries.

## rth Pacific Fisheries Explorations Gear Development

E POPULATION SURVEY CONTINUED: /V "John N. Cobb" Cruise 70 (February arch 12, 1965): Six weeks of hake ex- ations along the Pacific Coast were com- d March 12, 1965, by the U. S. Bureau of mercial Fisheries exploratory fishing el John N. Cobb. Purpose was to deter- e the late winter distribution and abun- e of that species along the Pacific Coast selected areas of Puget Sound.

Principal objective of the cruise was to te and capture Pacific hake (Merluccius ductus) off southern California during their spawning period (as determined previously by hake egg and larvae surveys conducted by the Bureau's research vessel Black Douglas).

Secondary objectives were to: (1) make echo-sounding surveys to determine if hake are present in more northern areas along the coasts of Washington, Oregon, and northern California during late winter months; and (2) collect biological and oceanographic data.

ECHO SOUNDING TRANSECTS: Alternate offshore and inshore echo-sounding transects were made during transit to and from southern California and Mexico. Distances offshore ranged from 1 to 50 miles encompassing water depths from 20 to 1,300 fathoms. No significant signs of hake were noted except in the southern California area. Occasional traces of small dense schools of fish, believed to be anchovy, were seen at points along the entire coast at depths ranging from surface to 125 fathoms. The southern limit of operations was near Geronimo Island, Mexico, about 250 miles south of San Diego, Calif.

With the exception of one echo-sounding transect from south of San Diego, Calif., to Geronimo Island, Mexico, all fishing effort in southern California was conducted in areas adjacent to stations at which the Black Douglas had reported an abundance of hake eggs and larvae. Most drags were made on one school of hake near a California Cooperative Fisheries Investigations (CALCOFI) station located about 35 miles west of San Diego. Relocation of the school each morning by echo-sounding search patterns tended to show a north-northwest movement of the main body of hake at about 5 miles per day. (On one occasion the Black Douglas returned to the center of a spawning school of hake as defined by the John N. Cobb's echo-sounding pattern and collected abnormally large quantities of hake eggs. Some plankton net tows reported by the Black Douglas produced over 5 cubic centimeters of hake eggs.)

PELAGIC TRAWLING: A total of 31 drags was made using the "Cobb" pelagic trawl in the following areas: Puget Sound 2, Washington coast 1, Oregon coast 5, and southern California 23.

With the exception of two hake taken in one tow near Stonewall Bank off central Oregon and a small amount taken in Puget Sound,

Wash., catches of hake were made only in the southern California area. Thirteen of the drags off southern California produced catches of hake ranging from a few pounds to 20,000 pounds per 1-hour tow. Ten other drags off southern California produced only small amounts of squid, jellyfish, myctophids, pelagic shrimp, and anchovy.

In comparison with echo-soundings and catch rates of nonspawning hake made in prior years off Washington and Oregon, the echo-soundings near CALCOFI station would be classed as excellent and should have produced larger hake catches than were taken. Most large catches were made either in early morning before 9:00 or in late afternoon after 3:00, which suggests that fish may be able to avoid the net during mid-day periods.

Usual depth of the spawning school of hake was about 125 fathoms at surface-to-bottom depths of 500 to 800 fathoms. When hake were taken, catches consisted entirely of that species.

Two drags were made during the hours of darkness in the vicinity of spawning schools of hake. One of the tows (made at 115 fathoms) produced 200 pounds of hake while the other tow (made at a depth of 22 fathoms) produced only Euphausids and jellyfish. Echo-soundings of schools of spawning hake in late evening and night hours failed to show a vertical migration towards the surface at approach of darkness as has been commonly observed on schools of nonspawning hake in more northerly waters.

Hake taken during drags through spawning schools usually ranged in length from 35 to 58 centimeters (13.8 to 22.8 inches) and consisted of from 80 to 97 percent males. One drag made on fish signs adjacent to the spawning school near the CALCOFI station and at a depth of 200 fathoms produced hake up to 63 centimeters (24.8 inches) in length and a higher percentage of females.

Severe gilling problems were encountered whenever large catches were made. That suggests that a smaller mesh size (less than 3 inches) should be used when fishing spawning schools of hake off southern California.

All female hake taken during the survey, including two fish taken in central Oregon, were either ripe, partially spent, or spent.

Stomach contents of fish were examined from each catch and were found empty.

GEAR USED: The principal gear used during the explorations was a Mark II "Cobb" pelagic trawl constructed of 3-inch webbing. A full-length cod end liner of $\frac{1}{2}$-inch mesh was used during some drags to retain small specimens, but was removed during drags on schools of spawning hake off southern California. The "Cobb" pelagic trawl was rigged with two aluminum hydrofoil-type otter boards on 60-fathom bridles. Fishing depth of the net was determined with a dual electrical depth-telemetry system having a depth-sensing unit mounted at each otter board.

Other gear used during the explorations included: (1) a 1-meter plankton net, (2) a gravity-type bottom-core sampler, and (3) reversing thermometer.

OTHER OBSERVATIONS: Twenty plankton tows with a 1-meter net were taken during the first 3 weeks of the cruise to determine if hake eggs and/or larvae were present. Tows lasted from 20 to 30 minutes and were made from near-surface waters to depths of 250 meters. Bottom depths over which the tows were made ranged from 30 to 1,000 fathoms and covered the area from Puget Sound, Wash., to San Diego, Calif.

Samples of bottom sediments were taken from the Columbia River to San Diego, Calif. with a gravity coring device for botulism studies being conducted by the Bureau's Seattle Technology Laboratory. A total of 21 samples was taken at predetermined stations at depths varying from 40 to 1,070 fathoms.

With the exception of a few days in the early part of the cruise, weather conditions were excellent. Wind velocities were mostly under 20 knots with many days ranging from calm to light airs.

M/V "John N. Cobb" Cruise 71: To continue the hake survey and other midwater trawl studies, the John N. Cobb was scheduled to depart Seattle, March 29, 1965, for 8 weeks of exploratory pelagic fishing from British Columbia to southern Oregon.

Waters to be investigated were Puget Sound, and the coastal area off Vancouver Island (British Columbia), Washington, and Oregon.

Major emphasis of Cruise 71 was to be on taining information relative to when and ere hake (Merluccius productus) schools st appear off Washington, Oregon, and Van- uver Island in the spring. Secondary objec- es will be to: (1) obtain additional data lative to catching efficiency of the "Cobb" agic trawl; and (2) obtain biological data Pacific hake, such as degree of maturity, sence or absence of hake larvae and/or s in the surface waters, size, age and sex mposition, and schooling behavior.

: See Commercial Fisheries Review, April 1965 p. 29, Feb. 65 p. 36.

## eanography

IVATE FIRM PLANS TO OPEN FISHING AR DEVELOPMENT BASE IN FLORIDA D "SEA LAB" IN MARYLAND:

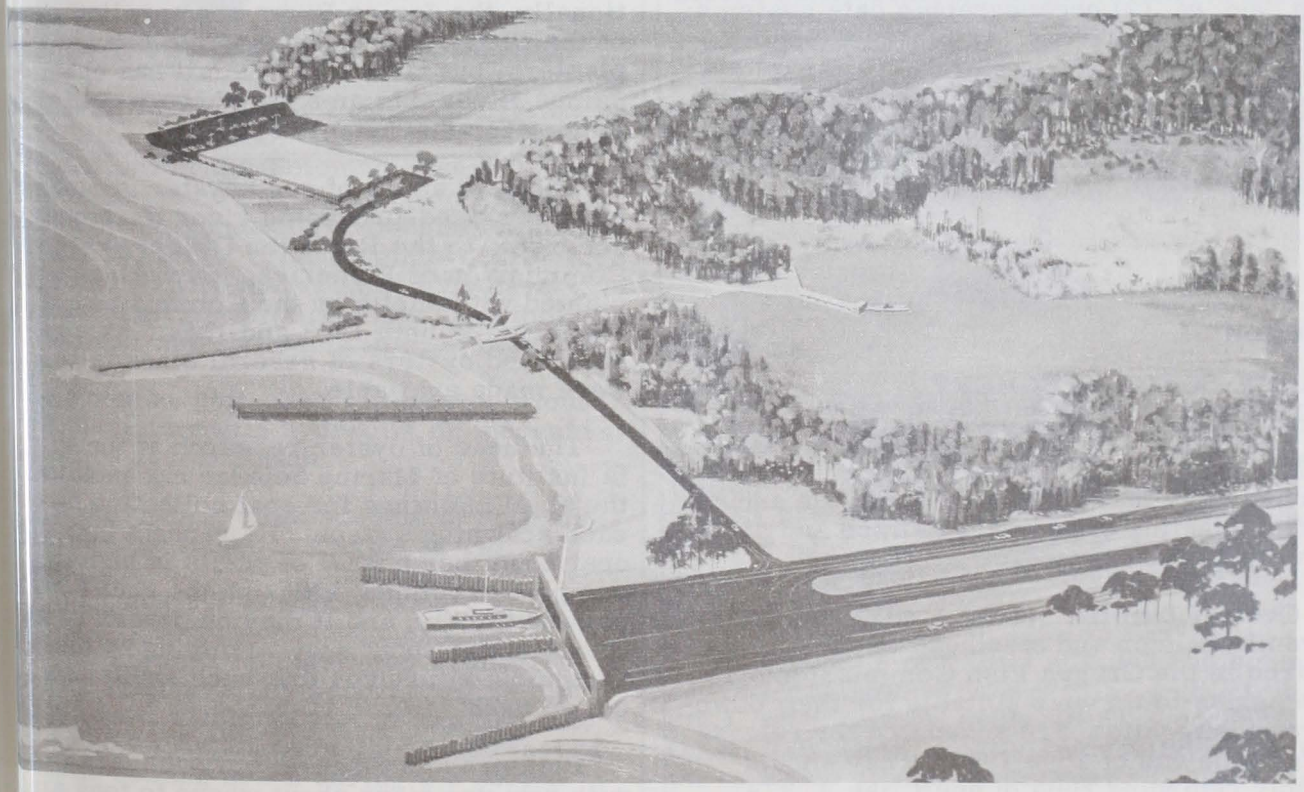
Fishing Gear Base in Florida: Plans to n a fishing gear development base in Sar- ota, Fla., were announced in February 1965 a large corporation (Westinghouse Elec- Corp.).

An official of the firm said the new depart- nt is the first serious effort by a major de- fense and space company to apply its tech- nological skills to better equipping the U. S. commercial fishing fleet.

"Sea Lab" in Maryland: The same corporation announced plans on March 2, 1965, to build a multimillion dollar ocean engineering and research facility on the western shore of Chesapeake Bay near Annapolis, Md. The firm's representative said the 2-story structure on Chesapeake Bay would have 120,000 square feet of space and would house offices and laboratories for the company's underseas division.

The 115-acre site near the Chesapeake Bay Bridge will include a 30-acre lake and facilities for docking vessels up to 300 feet long. About 350 persons, including more than 200 scientists and engineers, will be employed at the plant, designed to accommodate a working force of 500. The lake will be dredged to a depth of 25 to 90 feet and used for testing underwater devices.

Work at the new "sea lab" will involve underwater weapons systems, mines, oceanography, underwater acoustic methods, and missile handling and launching procedures.



Artist's drawing of the "sea lab" complex to be built by a private firm on a 115-acre site near Annapolis, Md.

* * * * *

ANNUAL OCEAN SCIENCE AND OCEAN ENGINEERING CONFERENCE TO BE HELD:

The 1965 "Ocean Science and Ocean Engineering Conference and Exhibit" will be held at the new Washington Hilton Hotel, Washington, D. C., June 14-17, 1965. The conference is sponsored by The Marine Technology Society and The American Society of Limnology and Oceanography.

Some 80 papers will be given by scientists and engineers from universities, oceanographic institutions, private industries, and government agencies, announced the chairman of the Conference Program Committee. In making the announcement the chairman said, "The papers submitted indicate the breadth and depth of interest of our scientific and technical communities in the marine environment and in man's role of exploring and exploiting it for knowledge and resources. We believe the papers, together with the special symposia that will be offered, assure that the conference will serve to define and evaluate major new developments and future programs concerning the world ocean."

The papers to be presented fall under eight main headings: (1) measurement techniques and devices; (2) oceanographic data systems; (3) ocean engineering; (4) undersea vehicles; (5) marine resource exploration and exploitation; (6) general marine science; (7) results of U. S. Biological Program of Indian Ocean Expedition; and (8) distribution of Columbia River Water in the North Pacific.

## Oregon

LARGE-SCALE HATCHERY SALMON PLANTINGS UNDER WAY:

The release of 330,000 yearling silver (coho) salmon in the Nehalem River system during early March 1965 heralded the annual spring planting of hatchery salmon and steelhead in Oregon rivers.

Over 40.8 million (over 1 million pounds) juvenile salmon and steelhead of all species, reared in the Oregon Fish Commission's 15 hatcheries to the size suitable for their downstream migration, are scheduled for release before the end of June 1965. They should supply returning runs of adult fish 2, 3, 4, and even 5 years from now. Hatchery rearing of juvenile salmon to the age they would reach in nature before starting their seawa journey greatly reduces early mortality. I fact, Oregon salmon hatcheries report successful rearing to young fish of 85 percent eggs collected. That is better than the nat al survival rate.

This season an additional 3.7 million ye ling salmon and steelhead were released prematurely from Oregon hatcheries as a sult of the Christmas and late January floo Another 24.4 million newly hatched salmo fingerlings were also to be released prem turely this spring from the surplus of egg that were taken last fall as "insurance." Those fingerlings are now in excess of th rearing capacity of the Oregon Fish Commission hatcheries. (Oregon Fish Commi sion, March 12, 1965.)

## Oysters

NEW SEED AREAS OPENED IN VIRGINIA

The opening on March 8, 1965, of new s oyster areas in the Piankatank and Great Wicomico Rivers marks a new era in the h tory of the Virginia oyster industry. Trad tionally, the James River has supplied mo of the seed oysters for Virginia private planters, but failure of spatfall has change James River into an area of clean culling tonging for marketable oysters.

About 70 acres of seed oyster grounds each new seed-producing river were open according to the Repletion Officer, Virgin Commission of Fisheries. Each river wa planted with shells by the Commission of Fisheries in both 1963 and 1964. As a re sult, seed oysters of several sizes (all sm were made available.

The head of oyster research at the Vir ia Institute of Marine Science has monito the shell plantings for spat collection afte each spawning season. He reports that th spat count per bushel of shells is high in samples examined, although the shells we planted thickly, and it may be possible to into shells without spat. Policing by the Commission insures that such shells are culled back.

Planters and tongers, however, are fac with new decisions about where to tong an what to buy. According to the director of

ginia Institute of Marine Science, MSX is
sent in a large portion of the Piankatank
d area, although the Great Wicomico has
n found almost free of MSX. He urges
ermen using the Piankatank seed to plant
ery low salinity waters (such as Moratti-
nd above in the Rappahannock River), or
repared for serious losses of oysters by
summer. He added that Great Wicomico
should be suitable for planting wherever
rs have thrived in recent years.

esearch work done by the Institute indi-
that the dry summers of 1963 and 1964
permitted MSX to penetrate farther up
ributaries of Chesapeake Bay than ever
e. Since the disease is permitted to
d by higher salinities, only a normally
spring would enable oysters in moderate
ty areas to cast out MSX, the scientists
They also report that rainfall experi-
d thus far has been inadequate to offset
ncroachment of higher salinities through-
e Bay system because of drought condi-
in 1963 and 1964. The scientists added
MSX does not affect the edibility of oys-
although such oysters are seldom fat.

## Potomac River Fisheries Commission

ULATIONS FOR SOFT-SHELL CLAMS
OTHER SPECIES:

egulations of the Potomac River Fisher-
ommission on the taking of soft shell
in the Potomac River became effective
uary 16, 1965. (The Virginia Legislature
e Maryland General Assembly have
d laws giving the Commission authority
ommercial clamming in the Potomac.)

e Potomac soft-shell clam regulations
n clamming with hydraulic or mechani-
edges and establish:

A daily limit of 40 bushels of soft-shell
for each licensed dredge or rig.

A license fee of $25.

Prohibitions on clamming within 100
of "commercially productive" oyster-
g areas; within 50 feet of any fish net,
, pier, or bulkhead; within 1,000 feet of
blic bathing beach during the period
May through September; within 100 yards
average low-water shoreline; within 500 yards of any occupied duck blind; and on Sunday or between sunset and sunrise on any other day.

The Potomac soft-shell clam regulations also govern the licensing of individuals and dredges, size of dredges, minimum size of clams, transfer of dredges, authority of enforcement officers, and penalties.

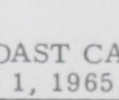
Acting under the Potomac River Compact of 1958 (between Maryland and Virginia), the Potomac River Fisheries Commission had previously issued commercial regulations governing the licensing and taking of finfish, crab, and oysters from the Potomac.

Note: Copies of the Potomac fishery regulations are available from the Potomac River Fisheries Commission, P.O. Box 128, Colonial Beach, Virginia 22443.

## Puerto Rico

JAPANESE FROZEN TUNA SHIPMENTS TO PUERTO RICO CANNERIES, 1964:

Japan shipped a total of nearly 50,000 short tons of frozen tuna (including loins) to four United States tuna canneries in Puerto Rico during 1964. Albacore (round) accounted for some 28,000 tons, followed by yellowfin with about 16,000 tons (mostly gilled and gutted), skipjack (round) 4,000 tons, and a small quantity of big-eyed tuna. The remainder of about 1,400 tons was made up of albacore and yellowfin tuna loins. (Suisan Tsushin, March 4, 1965.)

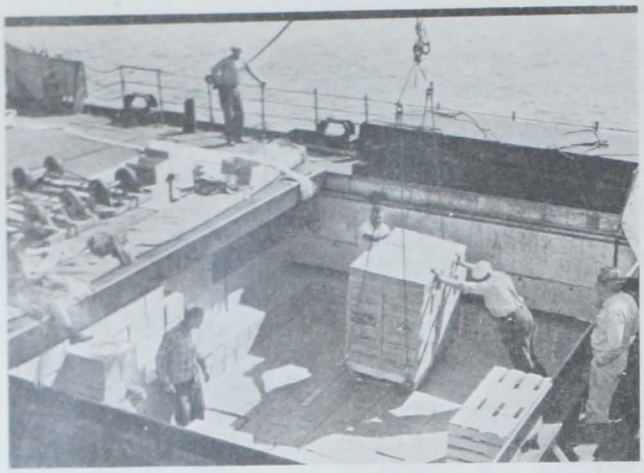


## Salmon

U. S. PACIFIC COAST CANNED STOCKS, MARCH 1, 1965:

On March 1, 1965, canners' stocks in the United States of Pacific canned salmon totaled 1,966,187 standard cases (48 1-lb. cans), 511,774 cases less than on February 1, 1965, when stocks were 371,893 cases less than on January 1, 1965.

On the basis of a total of 2,342,254 actual cases (consisting of cans of $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., 1-lb., etc.), pink salmon made up 51.3 percent (1,201,716 cases, mostly 1-lb. talls) of the total canners' stocks on February 1, 1965. Next came chum (536,529 cases, mostly 1-lb. talls), followed by red (411,505 cases). The remain-



A shipment of Alaska canned salmon being unloaded at a Port of Seattle Pier.

der of about 8.2 percent was coho (silver) and king salmon. A little more than 80 percent of the pink salmon stocks on hand was packed in 48 1-lb. cans, and the balance mostly in 48 $\frac{1}{2}$-lb. cans.

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, March 1, 1965

| Species | Mar.1, 1965 | Feb. 1, 1965 | Jan. 1, 1965 |
|---|---|---|---|
| | (No. of Actual Cases) | | |
| King | 63,915 | 79,834 | 91,675 |
| Red | 411,505 | 511,299 | 607,913 |
| Coho | 128,589 | 146,885 | 176,504 |
| Pink | 1,201,716 | 1,550,541 | 1,795,619 |
| Chum | 536,529 | 648,041 | 726,063 |
| Total | 2,342,254 | 2,936,600 | 3,397,774 |

From February 1 to March 1, 1965, pink salmon stocks were lower by 348,825 actual cases (1-lb. talls lower by 273,519 cases), reds were down 99,794 cases, and chums were down 111,512 cases.

Carryover stocks at the canners' level t taled 1,175,588 standard cases on July 1, 1 the approximate opening date of the Pacific salmon packing season. Adding the new se son pack of 3,922,356 standard cases brou the total available supply for the 1964/65 s son to 5,097,944 standard cases.

Shipments at the canners' level from Jul 1, 1964, to March 1, 1965, totaled 4,016,62 actual cases (equal to 3,131,757 standard cases).

Data on canned salmon stocks are bas on reports from U. S. Pacific Coast canne who packed over 98 percent of the 1964 sa on pack. (Division of Statistics and Econo ics, National Canners Association, March 1965.)

* * * * *

## NEW FISH SCREEN DEVICE MAY HELP GUIDE MIGRANT FISH:

A new device with the name of "Velocit Matching Traveling Fish Screen" is being to protect young salmon in critical river are The screen moves in a downstream direct as fast as the current and guides migrant into a collection area.

The idea was conceived by a biologist the Fish-Passage Research Program, U. Bureau of Commercial Fisheries, Seattle, Wash., who visited Mount Hood to examine the tramway taking skiers up the mountain see if a similar design could be used for ing or protecting fish.

Table 2 - Total Canners' Stocks on Hand March 1, 1965 (Sold and Unsold), By Species and Can Size

| Case & Can Size | King | Red | Coho | Pink | Chum | To |
|---|---|---|---|---|---|---|
| | (Actual Cases) | | | | | |
| 48 $\frac{1}{4}$-lb. | 5,286 | 87,050 | 39,405 | 6,115 | 1,201 | 13 |
| 48 $\frac{1}{2}$-lb. | 52,285 | 202,179 | 22,143 | 202,007 | 64,935 | 54 |
| 48 1-lb. | 6,242 | 122,139 | 62,170 | 977,515 | 455,507 | 1,62 |
| 12 4-lb. | 102 | 137 | 4,871 | 16,079 | 14,886 | 3 |
| Total | 63,915 | 411,505 | 128,589 | 1,201,716 | 536,529 | 2,34 |

Table 3 - Canners' Shipments from July 1, 1964 to March 1, 1965, By Species and Can Size

| Case & Can Size | King | Red | Coho | Pink | Chum | To |
|---|---|---|---|---|---|---|
| | (Actual Cases) | | | | | |
| 48 $\frac{1}{4}$-lb. | 18,961 | 340,882 | 83,287 | 5,566 | 243 | 44 |
| 48 $\frac{1}{2}$-lb. | 84,557 | 484,915 | 32,232 | 401,461 | 93,156 | 1,09 |
| 48 1-lb. | 15,879 | 375,915 | 106,339 | 1,420,409 | 423,100 | 2,34 |
| 12 4-lb. | 314 | 4,813 | 16,619 | 83,318 | 24,656 | 12 |
| Total | 119,711 | 1,206,525 | 238,477 | 1,910,754 | 541,155 | 4,01 |

The Velocity-Matching Traveling Fish
een has been used experimentally at Troy,
g., Carson, Wash., and Tracy, Calif., and
ears very promising for future use. Large-
le testing of the screen is planned for the
ke River, but first many complicated en-
eering problems have to be worked out.
choice of location and preliminary testing
begin with low-water levels during the
mer or fall of 1965. Prototype testing is
eduled for 1966.

he greatest problem encountered has been
ting fingerling fall chinook salmon from
of debris. They are the smallest and
kest swimmers because they have had the
t time in the river. The fingerling fish
to be picked out at the time of spring
s and fast water velocities. The debris
e water ranges in size from houses dis-
d by floods to log rafts and dead animals.
r such conditions it is exceedingly diffi-
o try and pick out tiny salmon and steel-
from the debris without injuring them.
e are many problems to be resolved and
e are now all in the probing stage. The
ntific studies in connection with the proj-
re being conducted by the Bureau's Fish-
sage Research Program at Seattle.

Many years of research have been devoted
e problem of protecting young salmon
steelhead from destruction in rivers,
ms, and canals, subject to hydroelectric
rrigation developments. This has included
ies on the practicability of using such
ng devices as electricity, light, odors,
d, traveling cables, air bubbles, and louv-
"None of these, however, has been able
pe successfully with the high flow and
s of a major river in flood without ex-
ve cost," said the Bureau's supervisory
gist in charge of the project. "In an at-
t to eliminate the need for expensive
tures capable of withstanding high flow
ities, this method of guiding fish was
ived. The velocity-matching aspect of
stem would actually permit the guiding
h in stream velocities greater than the
num swimming speed of the fish."

e task of safeguarding the various spe-
of Pacific salmon as well as steelhead
ot been simplified because each year the
lex of dams and irrigation projects be-
s even more intricate. Only time will
hether the Velocity-Matching Traveling
Screen will be the answer to guiding
on and steelhead fingerlings at dam sites.

The device on an experimental basis so far appears to be very promising.

* * * * *

## USE OF PIPES TO MOVE SALMON TO SPAWNING GROUNDS STUDIED:

Getting salmon upstream through pipes in order to help them reach their spawning grounds is becoming a reality. The pipes can be made of ordinary metal or of plastic, and may conceivably be used for salmon on part of their journey home to the Columbia and Snake Rivers to spawn.

Scientists of the Fish-Passage Research Program, U. S. Bureau of Commercial Fisheries, Seattle, Wash., have been working on a so-called "Pipes for Fish" project as part of the problem of safely passing adult fish en route to the spawning gravel. Up to now, research on the use of pipes is said to show great promise. Large 40-pound salmon have been successfully passed through pipes only one foot wide. But to provide a margin of safety, scientists are using pipes 2 and 3 feet wide in their studies. Pipe-like, darkened fish-passage channels are already in use in Washington, Oregon, and California.

How will the pipes be used as an aid in passing fish? "Pipes are potentially useful as transportation channels for migrating adult salmonids," say biologists of the Fish-Passage Research Program of the Bureau's Seattle Biological Laboratory. "Fish passage through difficult areas at dams might be less costly if pipe passageways were substituted for conventional concrete structures. Another potential application includes the use of pipes to extend fishway exits beyond the immediate influence of spillway gates," it was explained.

Pipes are not being proposed as a substitute for fish ladders. No prototype research has been done in the use of pipes for the vertical ascent of salmon at dam sites. But they may prove very valuable in moving fish from one point to another. At a dam site, for example, there may be several collecting points and only one fish ladder. So the salmon may conceivably be transported from one side of the dam to the fishway on the other side by means of pipes. (A very substantial savings in funds would result if only one fish ladder needed to be built instead of two.)

Fishway exits may be extended further upstream by the use of pipes. Biologists have noted and have been concerned over the fact that when the fish ladder exit is close to the spillway of the dam, a number of salmon wash back over the spill and have to reclimb the long ladder. By extending the exit a greater distance away from the spillway, this fallback problem could be alleviated.

Short lengths of pipes have been used to pass fish under small roads and highways. But with the advent of superhighways, the greater lengths of pipes that will be required, and the possibility of darkened passageways, a number of questions have arisen. Because of such developments scientists are seeking to expand their knowledge on the use of pipes.

The Bureau's Fish-Passage Research Program at Seattle has received inquiries from highway departments from Alaska to Maine requesting information on methods to pass fish in pipes under highway systems. Under certain circumstances pipes may be used to replace large transportation channels, thus considerably reducing construction costs by thousands of dollars.

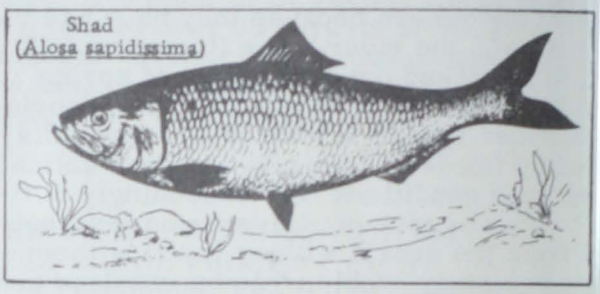
Research on the use of pipes in passing salmon and steelhead has been accomplished in a two-year study at the Fisheries-Engineering Research Laboratory located on the Washington shore of Bonneville Dam. Sections of pipes up to 270 feet long were used, two 180-degree turns were tried, and pipes of 1, 2, and 3 feet in diameter were tested. Various water velocities, light conditions, and entrance conditions were tested to establish the preferences of salmon and steelhead in traveling through pipes. Hydroscopes, used for visual observations, were placed at the entrances and exits of the pipes. Electronic detectors were used to record fish behavior and passage within the pipe.

Exploratory tests indicated that salmon passage was usually more rapid when the pipes were partially filled with water instead of completely filled. Salmon prefer it that way, scientific tests have shown. Salmon also were reluctant to enter such a small passageway as a 12-inch pipe, and stayed outside the entrance for long periods of time. To make the small entrances more enticing for the salmon, scientists developed funnel-type entrances that finally led the fish into the narrow pipe opening. Once they entered the pipe, they quickly swam through it.

## Shad

### SUSQUEHANNA SHAD RESTORATION STUDY ENCOURAGING:

It may be possible to restore the once great shad runs of the Susquehanna River. Shad have been barred from the Susquehanna for more than 50 years by dams and pollution. But now a study has shown that shad can spawn in the upper Susquehanna and successfully migrate to sea. The next objective of the study is to find out if adult shad will migrate upstream through the still waters behind dams.


Shad
(Alosa sapidissima)

The study on shad restoration in the Susquehanna was launched after the Pennsylvania Fish Commission in 1962 asked the U. S. Interior Department to request that the Federal Power Commission require fishways around four dams on the lower Susquehanna. Since the fishways could cost as much as $10 million, a comprehensive study was planned to determine if the river would support restored runs of American shad.

The Susquehanna shad study is a cooperative endeavor by fishery agencies of New York, Pennsylvania, and Maryland, four electric power companies that have dams along the river, and the U. S. Fish and Wildlife Service.

The results so far have been gratifying. In June 1964, about 16 million shad eggs from the Columbia River in the Pacific Northwest were flown to the Susquehanna. Biologists placed the eggs in hatching boxes in Susquehanna within 24 hours after they had been taken from the Columbia. An additional 3.5 million shad eggs were taken from the Susquehanna Flats area of Chesapeake Bay for use in the study.

Many of the young fish that hatched from those transplanted eggs have now successfully migrated to sea past four dams on the Susquehanna. The growth rate for those yearling shad averaged nearly 1 inch per m

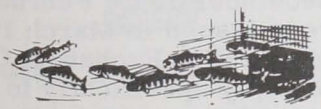
Shad eggs from the Columbia and from the squehanna Flats were also used in bio-as- y studies of water from the Susquehanna ver. The bio-assays have helped substan- te field observations that waters of the squehanna River, except possibly one area luted by mine drainage, are suitable for ching of shad eggs and the rearing of young d. Shad hatched in the upper waters of the er in the spring of 1964 were able to move n through the polluted area with little if noticeable effect on the fish.

he study will now focus on whether adult d will migrate upstream through the still ers behind dams. To do this, a fish-trap- g facility is to be built at Conowingo Dam the mouth of the Susquehanna River. trap, which will catch adult shad for trans- ting upstream, will be in operation when shad runs come up from Chesapeake Bay e spring of 1965.

dult shad trapped at Conowingo will be ed and released in the forebay above owingo Dam and near Harrisburg, Pa. types of tags will be used--regular num- ed tags and a newer type that includes a r device. The sonar tags give off signals can be picked up by biologists using hy- phones. Eavesdropping on the fish will cate how well they orient themselves to inue the upstream migration. Sportsmen be asked to help supply information with which they recover.

ther research activities to be continued e spring of 1965 include further hatching and bio-assay studies to define the toler- of shad eggs and young to polluted water, water chemistry analysis of the river in s that are polluted by acid drainage from mines.

See Commercial Fisheries Review, May 1963 p. 41, Aug. p. 48.



## fish

CULTURE PROGRAMS CONDUCTED TLANTIC COASTAL STATES:

mparing techniques for artificially prop- g oysters and clams was the main ob- e of the first Shellfish Seed Culture Con- ce held at New York State University, Brook, N. Y., earlier this year. The scientist of oyster research at the Vir- ginia Institute of Marine Science, Gloucester Point, Va., presented available information on the Institute's successful efforts in artificially breeding and culturing oysters. A program of oyster breeding at that Institute is being conducted to obtain MSX-resistant brood stock. Hatchery and pond culture has been necessary in northern states because natural setting is inadequate.

It was disclosed during the Conference meetings that 5 Federal or state agencies and 9 private groups or companies, ranging in location from Cape Cod to Florida, have started hatchery or pond-culture programs to breed shellfish. Informal reports and discussions by oyster farmers and biologists revealed that nursery areas for newly-set spat are the most pressing problem.

The Institute scientist said, "We are moving ahead very well in our program to provide MSX-resistant brood oysters. When we have suitable brood stock, oystermen must be prepared to breed in hatcheries or secluded ponds away from the natural spatfall. With present facilities the Institute can only provide brood stock, and it cannot attempt to breed resistant oysters in quantities. Therefore, oystermen must be thinking ahead about their own controlled breeding sanctuaries." He reported that Virginia oystermen are interested in pilot hatcheries, and indicated that the Institute is encouraging such efforts to provide experience. The ultimate step in repopulating MSX-infested waters in Virginia depends upon breeding commercial quantities of resistant oysters in hatcheries, ponds and natural bodies of water with restricted flow to retain larvae.

Commercial hatcheries are not feasible in Virginia at existing prices of oysters, the Institute scientist believed, although improved techniques learned through pilot operations may reduce production costs considerably. In the Long Island area, prices of $15 or more per bushel encourage controlled culture methods. Long Island oysters are sold as raw oysters on the half-shell at fancy hotels and restaurants, whereas Chesapeake Bay oysters are generally sold freshly shucked for nationwide distribution and home eating.

The conference at Stony Brook was attended by 60 persons representing every coastal state from Virginia to Maine. The conference was jointly sponsored by the Oyster Institute of North America, the Bureau of Marine Fisher-

ies of the New York Conservation Department, and the Biology Department of New York State University. (Virginia Institute of Marine Science, Gloucester Point, March 4, 1965.)

## Shrimp

BREADED PRODUCTION, 1964:

United States production of breaded shrimp during 1964 amounted to about 90.7 million pounds--an increase of 19 percent as compared with 1963.

The Gulf States ranked first in the production of breaded shrimp in 1964 with 55.0 million pounds, followed by the Atlantic States with 28.4 million pounds, and the Pacific State with 7.3 million pounds.

Table 1-U.S. Production of Breaded Shrimp by Months, 1963-64

| Month | 1/1964 | 1963 |
|---|---|---|
| | (1,000 Lbs.) | |
| January | 7,347 | 2/ |
| February | 8,045 | 2/ |
| March | 7,249 | 2/ |
| April | 7,027 | 2/ |
| May | 6,171 | 2/ |
| June | 6,588 | 2/ |
| July | 8,641 | 2/ |
| August | 7,299 | 2/ |
| September | 7,830 | 2/ |
| October | 9,169 | 7,390 |
| November | 7,852 | 6,129 |
| December | 7,460 | 5,513 |
| Total | 90,678 | 76,216 |

1/Preliminary.
2/Not available.

Table 2-U.S. Production of Breaded Shrimp by Areas, 1963-64

| Area | 1/1964 | | | 1963 | | |
|---|---|---|---|---|---|---|
| | Plants | Quantity | Value | Plants | Quantity | Value |
| | No. | 1,000 Lbs. | $1,000 | No. | 1,000 Lbs. | $1,000 |
| Atlantic | 19 | 28,449 | 19,263 | 24 | 23,545 | 15,752 |
| Gulf | 23 | 54,942 | 38,683 | 27 | 47,054 | 33,551 |
| Pacific | 8 | 7,287 | 5,095 | 10 | 5,617 | 4,224 |
| Total | 50 | 90,678 | 63,041 | 61 | 76,216 | 53,527 |

1/Preliminary.

Table 3 - U. S. Production of Breaded Shrimp, 1954-64

| Year | Quantity | Value |
|---|---|---|
| | 1,000 Lbs. | $1,000 |
| 1/1964 | 90,678 | 63,041 |
| 1963 | 76,216 | 53,527 |
| 1962 | 76,803 | 62,230 |
| 1961 | 73,795 | 55,089 |
| 1960 | 70,348 | 47,015 |
| 1959 | 69,764 | 45,314 |
| 1958 | 60,865 | 43,622 |
| 1957 | 51,085 | 37,764 |
| 1956 | 50,888 | 37,301 |
| 1955 | 38,991 | 26,907 |
| 1954 | 24,802 | 17,579 |

1/Preliminary.

* * * * *

BREADED PRODUCTION, OCTOBER-DECEMBER 1964:

United States production of breaded shrimp amounted to about 21.1 million pounds during the fourth quarter of 1964, according to preliminary data.

The Atlantic and Gulf States ranked first in the production of breaded shrimp with 19 million pounds.

Table 1 - U. S. Production of Breaded Shrimp by Months, October-December 1964

| Month | Total |
|---|---|
| | 1,000 Lbs. |
| October | 7,950 |
| November | 6,662 |
| December | 6,442 |
| Total 4th Qtr. 1964 1/ | 21,054 |
| Total 4th Qtr. 1963 | 19,032 |

1/Preliminary.

Table 2 - U. S. Production of Breaded Shrimp by Areas, October-December 1964

| Area | 1964 | | 1963 | |
|---|---|---|---|---|
| | No. of Plants | 1,000 Lbs. | No. of Plants | 1,0 Lb |
| Atlantic and Gulf States | 34 | 19,503 | 35 | 17,5 |
| Pacific States | 8 | 1,551 | 8 | 1,4 |
| Total | 42 | 21,054 | 43 | 19,0 |

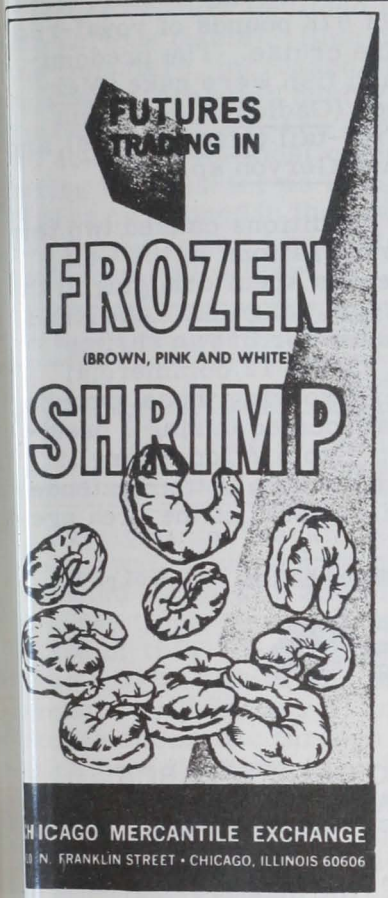
* * * * *

REVISED RULES AND SPECIFICATIONS ON FUTURES TRADING IN FROZEN SHRIMP:

New rules and specifications applicable to futures trading in frozen shrimp for delivery in October, December 1965, February and April 1966, were issued in March 1965, by the Chicago Mercantile Exchange, Chicago, Ill. The rules apply specifically to raw, frozen, headless shrimp which have been caught and processed in the Western Hemisphere--brown, white, or pink in color.

Trading under the new rules and specifications opened April 1, 1965, on the Chicago Mercantile Exchange, at which time buyers and sellers negotiated contracts for delivery in October 1965.

The new rules and specifications as published follow:




e rules in this chapter shall apply specifically to raw, , headless shrimp, brown, white or pink color. Method ding, clearing, settlement and delivery of contracts as s any other matters not specifically covered by this shall be governed by the rules of the Exchange.

ICATION AND GRADE—All futures contracts for Frozen shall be U.S. Grade A raw, frozen, headless shrimp count of 15/20 to the pound, *which have been caught cessed in the Western Hemisphere.* All shrimp must e requirements of standards as promulgated by the States Department of Interior, Fish and Wildlife

FUTURES CALL—Futures contracts shall be scheduled for trading and for delivery in such months as may be determined by the Board of Governors.

TRADING UNIT ON FUTURES CALL—All transactions cleared through the Clearing House shall be in units of 5,000 pounds.

PRICE FLUCTUATIONS ON FUTURES CALL—Minimum price fluctuations on the futures call shall be 1/10 cents per pound.

DELIVERIES AND SUBSTITUTIONS ON THE FUTURES CALL—To qualify for delivery Frozen Shrimp shall be tendered for delivery in accordance with requirements of the Exchange rules and with specifications announced by the Board of Governors prior to the opening of the contract. The weight of a delivery unit shall be 5,000 pounds and the grade thereof shall comply with the contract of sale subject to such substitutions as are allowed.

A delivery unit of 5,000 pounds shall consist of 100 master cartons, each master carton containing ten 5-pound packages. The unit shall consist of not more than 3 lots or sub-lots with no lot or sub-lot weighing less than 1,000 pounds. The entire unit must be processed by one packer and must be stored during any one calendar month. Each delivery unit must be uniform as to color.

Frozen Shrimp which have been in storage more than eight months are not deliverable except that a delivery unit delivered in accordance with the rules during a delivery month is eligible for re-delivery through that month.

Allowable variations in quantity of a delivery unit are as follows: Minimum delivery unit: 4,750 pounds—95 master cartons of 50 pounds each. Maximum delivery unit: 5,250 pounds—105 master cartons of 50 pounds each. A weight tolerance of 3% shall be permitted. Payment shall be made on the basis of the exact quantity delivered.

All shrimp delivered on Exchange contracts shall be of good pack, glazed and packed in paperboard cartons which must meet all Federal regulations governing labeling and packing.

All shrimp shall conform in every respect to the provision of the Federal Food, Drug and Cosmetic Act together with all regulations promulgated thereunder.

Inspection certificates must be in good standing up to 5:00 P. M. on the business day following day of tender.

*Par delivery shall be frozen shrimp in approved warehouses in Chicago. Delivery in approved warehouses west of the eastern borders of the states of Montana, Wyoming, Colorado and New Mexico may be made at 3¢ per pound allowance. Delivery may be made in approved warehouses outside of Chicago and east of the eastern borders of Montana, Wyoming, Colorado and New Mexico at an allowance of 2¢ a lb.*

Permissible substitutions shall be:

(1) Frozen shrimp with a count of less than 15 to the pound and meeting all other requirements of these rules shall be deliverable at par.

(2) Frozen shrimp with a count of 21/25 to the pound and meeting all other requirements of these rules shall be deliverable at 8¢ a pound allowance.

(3) *Grade B shrimp meeting all other requirements of these rules and grading 85 to 89 points shall be deliverable with an allowance of 1¢ a pound. Grade B shrimp grading 80 to 84 points shall be deliverable with an allowance of 3¢ a pound.*

Each delivery unit must be uniform as to count per pound.

INSPECTION CERTIFICATES—Inspections will be made for members only and in the order of applications filed except precedence shall be given to inspections relating to transactions made on Exchange.

An official inspection certificate shall be final. No re-inspection upon the same application shall be permitted.

No member shall order an official inspection on another member's goods without the written order of such member.

An official inspection certificate on Frozen Shrimp issued by the Exchange shall state the location and the grade established. It shall bear the signature of the President or Assistant to the President and the seal of the Exchange. It shall state the date of inspection and the time when the certificate expires. This certificate shall be based upon an inspection certificate of the United States government and such government certificate (or a copy thereof) shall in all cases accompany the Exchange certificate.

The removal of the commodity from the place or location designated on the inspection certificate invalidates the certificate.

The charge for inspection shall be the cost plus 50¢ per lot for Exchange certificate.

LIFE OF INSPECTION CERTIFICATE—An Exchange inspection certificate for quality or weights of frozen shrimp in cold storage shall expire on the first business day of the sixth month following date of inspection provided the shrimp have remained in the same warehouse and have been kept under proper refrigeration in the meantime.

STORAGE CHARGES ON FUTURES CALL TO BE ON A PRO RATA BASIS—On all deliveries made on the futures call the seller must assume storage up to 5:00 P. M. on the second business day after the date of delivery. The proration shall be on the basis of 1/30th of the prevailing monthly storage rate at the particular warehouse raised to the nearest 5¢ and multiplied by the number of days remaining to the next storage expiration date (all months figured on the basis of 30 days). In no case shall handling charges be included in such proration. The storage charges shall be paid in advance by the person holding shrimp on the storage expiration date and pro rata charges prepaid by such holder shall be added to and shown on the tender notice.

SPECULATIVE POSITION LIMITS—No member for himself or for a customer, and no firm for its own account or for the account of a customer, may carry, control, or have a proprietary interest in more than a total of 200 frozen shrimp contracts, with a maximum of 200 in any one contract month, nor shall any individual, customer, or firm exceed the above limits in any single day's trading.

See Commercial Fisheries Review, April 1964 p. 30, De- er 1963 p. 42.

## h Atlantic Fisheries Explorations
## Gear Development

CTRIC SHRIMP TRAWL STUDIES:
/V "Oregon" Cruise 98 (February 1965):

est and evaluate an electric shrimp trawl e royal-red shrimp grounds off St. Au- ine, Fla., was one objective of this two- e cruise by the U. S. Bureau of Commer- Fisheries exploratory fishing vessel on. Another objective, carried out dur- he second phase of the cruise, was to obtain photographic data on the royal-red shrimp grounds.

Five days were spent testing and evaluating the electric shrimp trawl on the royal-red shrimp grounds off St. Augustine, during phase I completed February 13, 1965. The trawl was equipped with a specially designed, battery powered, deep-water pulse generator capable of withstanding pressures in the 200-fathom depth range.

It was not possible to follow the normal procedure of dragging both an electric and a nonelectric trawl simultaneously because of physical and mechanical conditions. Therefore, consecutive drags duplicated as closely as possible, were made. A total of 23 drags

Housing of underwater movie camera attached to its frame in the mouth of a shrimp trawl. Used by the M/V Oregon for motion picture photography of both trawl performance and shrimp reaction behavior.

was completed during that trial. The electrical components functioned normally, and the gear did not present any handling problems. The results from the relatively small number of drags were generally inconclusive, although the largest individual catch of 94 pounds (for a 2-hour drag) was made in the electric net. The total catches from both types of trawls were nearly identical. One noteworthy preliminary result was that whereas the catches of the nonelectric trawl were equally divided by weight between shrimp and fish, the catches of the electric trawl had half the weight of fish. From the results obtained during this cruise, procedures were developed which will allow a continuing program to fully evaluate the effectiveness of the electric gear in this fishery.

Twelve days were spent in the second phase of the cruise (completed February 25, 1965) with the objective of obtaining photographic data on the royal-red shrimp grounds. Due to extreme surface weather conditions and the strong current of the Gulf Stream (estimated at 4 knots), the CA-8 still camera sled was unable to reach bottom. Because of the high current speed during the period, the shrimp trawls were not reaching their maximum configuration. This caused the movie camera system to become improperly positioned to record the bottom.

A total of 47 drags was made with a 40-foot flat trawl in depths ranging from 150 to 300 fathoms. The best depth was found to be 220-225 fathoms and 42 of the 47 tows made were completed there. Shrimp catches were light, with a total of 676 pounds of royal-red caught for the entire cruise. The predominant species of trash fish were hake (Merluccius albidus), cod (Gadidae), sea robin (Peristedion sp.), rat-tail (Macrouridae), and crab (Cancer sp. and Geryon sp.).

Severe weather conditions caused two temporary halts to the operations in the Gulf Stream. That time was spent dragging in the 30- to 40-fathom depth range off Cape Kennedy and Bethel Shoals for brown shrimp (Penaeus aztecus). Some 12 commercial shrimp vessels were working those grounds which had been first located during a previous Oregon cruise. Exploration during 19 drags showed that trawlable bottom extended at least several miles south of the area previously delineated.

Note: See Commercial Fisheries Review, April 1965 p. 36, March 1965 p. 49.

## South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1965:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for January-March 1965 follows:

Shrimp Studies: Regular station trawling throughout coastal waters during January-March 1965 showed the presence of a fairly good wintering-over population of white shrimp. This was not the case during the same periods in 1963 and 1964, both of which were poor years for white shrimp. Milder water temperatures throughout the State during the past quarter may be responsible for the increased abundance of white shrimp this year.

The average catch per unit of effort for white shrimp in experimental trawling was about 15 times as great during January-March 1965 as it was for the same period in 1964, and about 5 times that of the same period in 1963 (table). While not as plentiful as in January-March 1962, white shrimp during the present quarter are sufficiently abundant to produce a fair crop of "roe" shrimp this spring, if conditions remain favorable.

The numbers of spot in coastal waters increased considerably during this quarter as compared with that period of 1964,

Whereas croaker declined in abundance for the two periods (table). Blue crabs, both mature and immature, increased significantly in experimental trawling during the January-March quarter this year. The general increase in the abundance of most commercial species during this quarter as compared with that of 1964 as mentioned in the case of white shrimp, may be due to mild water temperatures experienced this winter.

North Carolina Average Catch Per Unit of Effort for Various Species at Regular Shrimp Survey Stations, January-March, 1962-65

| Year | Spot | Croaker | White Shrimp | Blue Crabs | |
|---|---|---|---|---|---|
| | | | | Mature | Immature |
| 1965 | 7.2 | 5.7 | 15.7 | 6.2 | 12.0 |
| 1964 | 0.7 | 9.5 | 0.1 | 3.2 | 9.4 |
| 1963 | 7.9 | 10.2 | 3.2 | 8.1 | 8.6 |
| 1962 | 22.1 | 18.6 | 26.3 | 14.1 | 23.9 |

Experimental plankton tows throughout coastal waters during January-March 1965 indicated that brown shrimp postlarvae were over two times as abundant as during the same period of 1964. Those postlarvae began to enter coastal sounds and inlets in significant numbers by February 8, and continued to recruit in abundance through February 28, at which time their numbers began to decline. The recruitment of brown shrimp postlarvae was about one month earlier this year than last, and this is quite possibly a result of warmer water temperatures during the past fall and winter.

The abundance of postlarval brown shrimp during the first quarter of the year for the last five years shows a distinct relationship between these numbers and the commercial catch in June, July, and early August. If this same pattern continues in 1965, then the catch of brown shrimp in those months should be slightly above average. This, of course, provided no excessive mortalities of young shrimp occur in the nursery areas up to June, as was the case in 1960 when a cold snap in March apparently caused considerable mortality of postlarvae. Although no cold snaps have occurred which have caused sudden lowering of water temperatures to date, excessive rainfall in February and March may possibly have considerable effect on the young shrimp. The outlook is at this time, nonetheless, considerably better than in 1964, and if the second postlarval peak occurs in early April as has been the case in most years, it will be improved even more.

Pond Cultivation: Experimental shrimp ponds at Bears Bluff Laboratories were drained, repaired, and refilled during this quarter. Stocking with postlarval brown shrimp has begun and will continue through April.

Several small-scale pond cultivation experiments were carried out in a temperature-controlled 3,000-gallon concrete tank during this quarter. The tank was stocked with postlarval shrimp less than $\frac{1}{2}$ inch in total length in late February, and by mid-March the young shrimp were already over one inch long. The water in the tank was kept at 70°-75° F. and the shrimp were fed heavily on chopped fish and green algae.

In another small-scale experiment using a heated (70°-75° F.) concrete tank, juvenile channel bass were stocked on January 6, 1965. These fish ranged in total length from $2\frac{1}{2}$-5 inches, averaging $3\frac{1}{2}$-4 inches, when stocked. Under natural conditions, young channel bass grow very little if at all during cold weather, but in the heated tank with heavy feeding of shrimp, they showed considerable growth. By March 18 the fish ranged from $3\frac{1}{2}$ to $7\frac{1}{2}$ inches in total length, averaging about 6 inches. This rate of growth is probably comparable to that under natural conditions during the summer months.

Note: See Commercial Fisheries Review, Mar. 1965 p. 51.

## States Legislation

ACTIONS AFFECTING FISHERIES:

Following is a supplemental list of proposed State Legislative actions affecting fisheries. The bills listed are those introduced during the current session of the various State Legislatures. (Information Letter, National Canners Association, March 20, 1965.)

Alaska: SCR 11 relates to fisheries research projects in the northwest portion of the States.

S. 112 relates to the stabilization, maintenance, quality control, and development of the shellfish industry of the State; would create an Alaska Shellfish Marketing and Quality Control Advisory Board. It also would provide for an assessment on shellfish processors in the State to finance the Act.

S. J. R. 48 requests full support through appropriations for the Commercial Fisheries Research and Development Act of 1964.

S. J. R. 46 calls for a national department of Fisheries.

Maine: H. 849 relates to the use of sardine tax revenues for advertising.

H. 938 would place a tax on lobsters shipped beyond the State.

Maryland: S. 464 would change laws on issuing and suspending licenses of canneries and frozen food processing plants.

H. 1116 would exclude canned and sterilized shellfish from State limitations on the importation of shellfish.

H. 1108 would give the State Health Department jurisdiction over equipment used in making or preparing food including cannery equipment.

H. 1159 defines the sanitation of equipment in connection with making and preparing food, including cannery equipment.

Note: See Commercial Fisheries Review, April 1965 p. 37.

## Transportation

SPECIAL "VANSHIPS" AND "TRAILERSHIPS" FACILITATE HANDLING OF FISH AND OTHER CARGO IN STEAMSHIP TRADE BETWEEN ALASKA AND WASHINGTON STATE:

The "vanships" Nadina and Tonsina, coastal freighters of a west coast steamship company, are making regular trips between Seattle, Wash., and the railhead port of Whittier in central Alaska. The vessels carry much of their cargo in special vans on deck. The vans are held firmly in place by a framework of steel posts with fixed metal heads resembling "lollipops." Loading and unloading is done by a dock crane. The vans are 24 feet long, 8 feet wide, and 8 feet high. One van makes a load for a truck trailer; a railway flatcar will hold two. Some of the vans have temperature-control facilities, which can be plugged into the ship's electrical system to maintain perishable freight at regulated temperatures. The Nadina and the Tonsina can each carry 175 vans, in addition to automobiles and other freight. (The Seattle Times, January 31, 1965.)

The vanship vessel Nadina being loaded at Seattle, Wash., with special vans for shipment to Whittier, Alaska.

Another shipping company is operating the "trailerships" Seattle and Anchorage directly between Seattle, Wash., and the Alaska ports of Anchorage and Kodiak. Each of the trailerships is capable of carrying 166 35-foot truck trailers and also has 425,000 cubic feet of space for break bulk cargo. The Seattle and the Anchorage each carry an electric crane to load and discharge the trailers. The trailers are 35 feet long, 8 feet wide, and 8 feet high. Some of the trailers have temperature-control facilities. These units operate on either electric current or liquid propane gas. The trailers are designed for land hauling by any highway tractor having a minimum pin-to-cab clearance of 64 inches. They can also be hauled by rail.

Strengthened for navigation in ice, the Seattle and the Anchorage are providing year-round service to the port of Anchorage and central Alaska. They are reported to be the first deep-draft commercial freighters to navigate ice-bound Cook Inlet in winter. (Anchorage Daily Times, December 17, 19[illegible] and other sources.)

The vanships and the trailerships with their containerized freight can be loaded and unloaded much faster than ordinary freighters. This cuts terminal handling charges which are an important part of ocean shipping costs.

Frozen halibut, salmon, sablefish, king crab meat and sections, and other fishery products are some of the products shipped from Alaska in the vans and trailers.

## Tuna

BEHAVIOR STUDIES AID UNITED STATES FISHING INDUSTRY:

Research on the behavior of tuna, whether in the open sea or in captivity, is conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Kewalo Basin, Honolulu, Hawaii, and at the Tuna Resources Laboratory in La Jolla, Calif. The purpose is to find out what tuna can see, hear, and smell, what bait will entice them, and what net or line will best catch and hold them. In this way, scientists hope to learn how to predict tuna response to both natural and artificial stimuli in the ocean. Information from the results of the research will be passed on to the United States tuna fishing industry.

Fig. 1 - Skipjack tuna swimming in shoreside tank at the U. S. Bureau of Commercial Fisheries Kewalo Basin Biological Laboratory, Honolulu, Hawaii.

At La Jolla, where there are no facilities for holding captive tuna, research is being done from the Bureau's research vessels. Research on the vessels is focused on the response of the fish to fishing gear, its behavior during the entire fishing operation, and its attempts to escape a net.

After the tuna are caught by the Bureau's research vessel, they are inspected for damage and if found to be all right are lowered into a portable tank aboard the vessel. The net holding each fish is slackened, allowing the tuna to "throw off" the hook.

When the tank has its quota, the vessel heads for its home port of Honolulu. At Honolulu, the portable tank is moved by crane from vessel to shoreside tanks of the Bureau's Kewalo Basin Biolobical Laboratory where they are trained and studied. The portable tank is lowered into the larger tank and the tuna allowed to swim out of the smaller one.

While in the tank, tuna that may naturally swim counterclockwise can be trained to alter that pattern at the sound of a buzzer and make sharp turns through an opening in a barrier net. They can also be trained to respond to vertical and horizontal patterns of light. When one pattern is shown to the tuna and it makes a correct move, it is rewarded with food; when the tuna makes a wrong move, it receives an electric shock.

Fishing for Tuna: Practical information of much value to the United States tuna fishing fleet has already come out of the Bureau's research. The information helps answer two important questions. (1) Where in the vast ocean is one most likely to find tuna? and (2) How far down should one drop his nets? Tuna live in the warm upper layers of the ocean, and they are sensitive to temperature changes. Their distribution and movements vary from month to month because features in their environment change as they follow their food sources.

In the eastern Pacific, the upper 500 feet of the ocean is not as uniform in temperature as the atmosphere above the sea. The ocean contains a layer or zone of water called the thermocline, where there is a rapid change

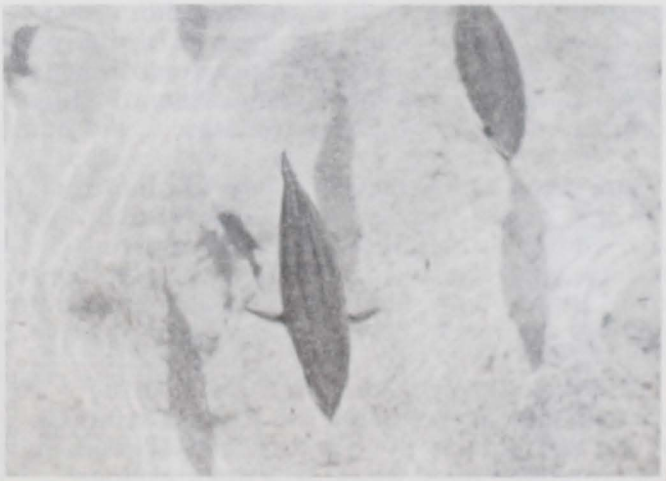


Fig. 2 - Two-pound skipjack tuna in shoreside tank.

in temperature with depth. Bureau scientists have learned that where these sandwiched cold-water layers occur less than 50 feet from the surface, and where the temperature change is very rapid, the chances of catching tuna with a purse seine are improved by 65 percent. The depth of the thermocline is located with a bathythermograph (BT), a device that also records temperature. Based on Bureau's success with that instrument, more and more commercial tuna vessels are being equipped with it.

The Bureau already has achieved what it calls "fair reliability" in predicting the whereabouts and abundance of skipjack tuna in the waters off Hawaii, and of albacore and bluefin tuna along the West Coast. The scientists base their predictions on the time in early spring when the ocean begins to warm and on changes in the movement of the different types of water. They then can predict when the fish are likely to show up, in what abundance, and whether they will be early or late in reaching the area. As the researchers learn more about the interrelations between tuna and the ocean, their predictions will become more precise.

Tuna Research in the Ocean: Tuna research work in the Pacific Ocean is being carried on by the Bureau's research vessels Charles H. Gilbert and Townsend Cromwell, which are equipped with observation chambers below the waterline.

To the fishery scientists, the tuna's world is made up of schools, each composed of several tons of fish, usually of the same species and size. If a school is not feeding, it may swim along at 6 to 8 knots for hours, with bursts of speed up to 20 knots for short periods. Most of the time, tuna swim with their mouths open. This allows water containing oxygen to flush over their gills. Should a tuna stop swimming, it would suffocate.

Scientists study the response of tuna to different types of bait and the behavior of the bait. Bait that is silvery and fast moving, such as sardines and anchovies, is good. Live bait is better than dead bait, and the research vessel is equipped with tanks to keep bait alive.

Although skipjack tuna are a schooling species, they break ranks when food stimuli appear and pursue the prey as individuals. Superimposed over the 4 or 5 dark stripes running from tail to head of the skipjack are alternating, vertical, dark and light bars. These bars fade slowly when the stimuli disappear and reappear when new food stimuli appear. The excitement of skipjack going after their food is described as a "feeding frenzy." Scientists also are interested in the reaction of tuna to specific sounds, particularly those associated with fishing operations. The sounds are transmitted to schools of tuna and their reactions are carefully observed.

Tuna Research in Holding Tanks: Doing research on tuna at sea has certain limitations. Tuna are fast and do not stay long enough in one spot to satisfy the scientists' need for close and continual study. The big problem, however, was how to keep tuna alive in tanks so that experiments could be conducted. This was achieved by the U. S. Bureau of Commercial Fisheries in 1960 when it found a way to eliminate manual handling of skipjack from the time of capture until they were placed in shoreside experimental tanks. With this technique the fish now live up to 6 months in captivity.

Research at the Bureau's Biological Laboratory at Honolulu emphasizes studies regarding tuna hearing and sight. When this knowledge is gained it may be useful in designing fishing gear less visible to fish. Although the Bureau believes some of its findings are tentative and cannot be applied over too broad a base, researchers are confident they have gathered much information that will pay off in greater fishing success for United States fishermen.

## U. S. Fishing Vessels

U. S. FISHERMEN ADVISED BY COAST GUARD TO STUDY NEW INTERNATIONAL RULES OF THE ROAD: United States fishermen operating in international waters were advised by the U. S. Coast Guard, March 8, 1965, to take a long look at the revised 1960 International Rules of the Road before they go into effect September 1, 1965. The new rules make substantial changes in light requirements, fog-signal procedures, and other important aspects of Rule of the Road for fishing vessels on the high seas.

One of the most important changes in the revised rules, the Coast Guard said, is in

Rule 9 which prescribes the navigation lights and shapes to be shown by fishing vessels in international waters. Under the new Rule 9 fishermen will be required to show either a red or a green light carried vertically in line over a white light. The red-over-white combination of lights will apply to a vessel fishing with lines or nets, except trolling lines, and the green-over-white arrangement will indicate a vessel trawling. This is in sharp contrast to the present rule which requires use of a single all round white light, a vertical triangular pattern of white lights, or a tricolored lantern. Under the new rule most fishermen operating on the high seas will have to mount new lights, the Coast Guard said.

Instead of the basket used under existing rules as a day shape to show a vessel engaged in fishing, fishermen under the new Rule 9 will have to use a black shape, consisting of two cones with their points together, vertically aligned one over the other.

The Coast Guard also called attention to important changes in fog-signal procedures under the revised International Rules of the Road. They will require that vessels engaged in fishing, under way, or at anchor in restricted visibility sound ". . . . at intervals of not more than 1 minute, three blasts in succession, namely one prolonged blast followed by 2 short blasts."

The foregoing changes, however, are only a small sampling of the many important modifications in the revised rules. To be on the safe side the Coast Guard urged that fishermen familiarize themselves with the 1960 International Rules of the Road under which many will have to operate after September 1, 1965.

The revised rules will not apply to waters governed by the Inland, Great Lakes, and Western Rivers Rules of the Road, the Coast Guard said. (U. S. Coast Guard, March 8, 1965.)

Advance copies of the revised 1960 International Rules of the Road may be obtained from local Coast Guard Marine Inspection Offices or by writing to the Commandant (MVI-4), 400 E Street NW., Washington, D.C. 20226. Coast Guard Marine Inspection Offices located in most of the major United States ports will be able to answer questions on the new regulations.

* * * * *

## FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, JANUARY 1-MARCH 31, 1965:

From the beginning of the program in 1956 through March 31, 1965, a total of 1,614 applications for $42,125,872 was received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. By that date, 849 applications ($18,982,544) had been approved, 535 ($12,764,477) had been declined or found ineligible, 199 ($7,768,392) had been withdrawn by the applicants before being processed, and 31 ($596,685) were pending. Of the applications approved, 318 were approved for amounts less than applied for--the total reduction was $2,013,474.

The following loans were approved from January 1 through March 31, 1965:

New England Area: Waldo D. Preston, Cape Elizabeth, Me., $2,500; George A. Beal, Friendship, Me., $1,000; Freeman C. Robinson, Vinalhaven, Me., $5,242; and Mac Jac Corp., Atlantic City, N. J., $9,900.

California: Joe Lewis Queen, Costa Mesa, $7,770; James N. Blum, Eureka, $40,000; Donald A. Koski, Fort Bragg, $22,000; Fred A. Cefalu, Morro Bay, $5,500; James N. Quesenberry, Rosemead, $10,584; Everingham Bros. Bait Co., San Diego, $75,000; George M. Gibney, Sausalito, $10,362; and Stanley Haskin, Watsonville, $29,257.

Pacific Northwest Area: Henry Kreitzberg, Portland, Oreg., $15,000; Henry F. Eaton, Seattle, Wash., $19,499; Ray Lunde, Seattle, Wash., $14,800; and Ole Westby, Seattle, Wash., $14,442.

Alaska: Turi Kivisto, Cordova, $2,150; Barney J. Corgatelli, Jr., Kodiak, $11,046; Lawrence Finlay, Kodiak, $6,400; and Elwood E. Mathews, Sitka, $8,502.

Great Lakes Area: Lewis O. Brooks and Harry F. Day, Cheboygan, Mich., $15,000.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the first quarter of 1965, a total of 8 applications for $872,835 was received. Since the program began (July 5, 1960), 72 applications were received for $7,242,748. Of the total, 56 applications were approved for $3,926,663 and 10 applications for $2,637,835 were pending as of March 31, 1965. Since the mortgage program began, applications received and approved by area are:

New England Area: Received 13 ($1,464,500), approved 9 ($1,034,928).

California: Received 2 ($1,262,000), approved 1 ($557,000).

South Atlantic and Gulf Area: Received 44 ($2,579,402), approved 38 ($1,753,665).

Pacific Northwest Area: Received 8 ($1,861,250), approved 5 ($526,296).

Alaska: Received 5 ($75,596), approved 3 ($54,774).

The first applications for a Fishing Vessel Construction Differential Subsidy under the Bureau's expanded program were received December 1964. Through March 31, 1965, a total of 25 applications for $3,600,000 had been received. Public hearings were held on 13 applications during that period, and one invitation to bid on a vessel has been released.

Note: See Commercial Fisheries Review, March 1965 p. 55.

* * * * *

## DOCUMENTATIONS ISSUED AND CANCELLED:

December 1964: During December 1964, a total of 29 vessels of 5 net tons and over was issued first documents as fishing craft, as compared with 33 in December 1963. There were 34 documents cancelled for fishing vessels in December 1964, as compared with 2 in December 1963.

* * * * *

November 1964: During November 1964, a total of 32 vessels of 5 net tons and over was issued first documents as fishing craft, as compared with 37 in November 1963. There

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, December 1964 with Comparisons

| Area (Home Port) | December 1964 | December 1963 | Total 1964 | Total 1963 |
|---|---|---|---|---|
| | (Number) | | | |
| Issued first documents 2/: | | | | |
| New England | 1 | 2 | 33 | 23 |
| Middle Atlantic | 1 | 1 | 11 | 18 |
| Chesapeake | - | 6 | 39 | 66 |
| South Atlantic | 4 | 6 | 50 | 77 |
| Gulf | 16 | 10 | 221 | 239 |
| Pacific | 6 | 8 | 141 | 160 |
| Great Lakes | 1 | - | 4 | 5 |
| Hawaii | - | - | 2 | - |
| Puerto Rico | - | - | 2 | 2 |
| Total | 29 | 33 | 503 | 590 |
| Removed from documentation 3/: | | | | |
| New England | 2 | 5 | 53 | 48 |
| Middle Atlantic | 1 | 3 | 27 | 47 |
| Chesapeake | - | 2 | 29 | 25 |
| South Atlantic | 8 | 4 | 62 | 53 |
| Gulf | 11 | 7 | 106 | 118 |
| Pacific | 11 | 5 | 151 | 87 |
| Great Lakes | 1 | 1 | 14 | 15 |
| Hawaii | - | - | - | 3 |
| Total | 34 | 27 | 442 | 396 |

Note: For explanation of footnotes, see table 4.

Table 2 - U. S. Fishing Vessels--Documents Issued by Tonnage and Area, December 1964 2/

| Gross Tonnage | New England | Middle Atlantic | South Atlantic | Gulf | Pacific | Great Lakes | Total |
|---|---|---|---|---|---|---|---|
| | (Number) | | | | | | |
| 5-9 | - | - | - | 2 | - | - | 2 |
| 10-19 | - | - | - | 3 | 3 | 1 | 7 |
| 20-29 | - | 1 | - | 1 | - | - | 2 |
| 40-49 | - | - | - | - | 1 | - | 1 |
| 50-59 | - | - | - | - | 1 | - | 1 |
| 60-69 | - | - | - | 2 | - | - | 2 |
| 70-79 | - | - | 1 | 1 | - | - | 2 |
| 80-89 | - | - | 1 | 7 | - | - | 8 |
| 90-99 | - | - | 2 | - | - | - | 2 |
| 110-119 | 1 | - | - | - | - | - | 1 |
| 160-169 | - | - | - | - | 1 | - | 1 |
| Total | 1 | 1 | 4 | 16 | 6 | 1 | 29 |

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, December 1964 2/

| Length in feet | New England | Middle Atlantic | South Atlantic | Gulf | Pacific | Great Lakes | Total |
|---|---|---|---|---|---|---|---|
| | (Number) | | | | | | |
| 27 | - | - | - | 1 | - | - | 1 |
| 31 | - | - | - | - | 2 | 1 | 3 |
| 33 | - | - | - | 1 | - | - | 1 |
| 34 | - | - | - | 1 | - | - | 1 |
| 38 | - | - | - | 2 | - | - | 2 |
| 39 | - | - | - | - | 1 | - | 1 |
| 45 | - | - | - | 1 | - | - | 1 |
| 46 | - | - | - | - | 1 | - | 1 |
| 49 | - | - | - | - | 1 | - | 1 |
| 50 | - | 1 | - | - | - | - | 1 |
| 62 | - | - | - | 2 | - | - | 2 |
| 63 | - | - | - | 1 | - | - | 1 |
| 64 | - | - | - | 1 | - | - | 1 |
| 66 | - | - | 2 | 5 | - | - | 7 |
| 67 | - | - | 2 | 1 | - | - | 3 |
| 73 | 1 | - | - | - | - | - | 1 |
| 82 | - | - | - | - | 1 | - | 1 |
| Total | 1 | 1 | 4 | 16 | 6 | 1 | 29 |

Note: For explanation of footnote, see table 4.

Table 4 - U.S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, December 1964 2/

| Horsepower | New England | Middle Atlantic | South Atlantic | Gulf | Pacific | Great Lakes | Total |
|---|---|---|---|---|---|---|---|
| 25 | - | - | - | 1 | - | 1 | 2 |
| 86 | - | - | - | 1 | - | - | 1 |
| 100-109 | - | - | - | 1 | 1 | - | 2 |
| 115 | - | - | - | 1 | - | - | 1 |
| 120 | - | - | - | - | 1 | - | 1 |
| 130 | - | - | - | 1 | - | - | 1 |
| 150 | - | - | - | 1 | - | - | 1 |
| 170 | - | - | - | 1 | 1 | - | 2 |
| 205 | - | - | - | 1 | - | - | 1 |
| 215 | - | - | - | - | 1 | - | 1 |
| 220-229 | - | - | - | 2 | 1 | - | 3 |
| 275 | - | 1 | - | - | - | - | 1 |
| 300 | - | - | 3 | 5 | 1 | - | 9 |
| 320 | - | - | - | 1 | - | - | 1 |
| 345 | - | - | 1 | - | - | - | 1 |
| 457 | 1 | - | - | - | - | - | 1 |
| Total | 1 | 1 | 4 | 16 | 6 | 1 | 29 |

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/There were 2 redocumented vessels in December 1964 previously removed from the records. Vessels issued first documents as fishing craft were built: 24 in 1964; 1 in 1962; 1 in 1959; and 3 prior to 1947.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

ere 44 documents cancelled for fishing ves-
els in November 1964, as compared with 29
n November 1963.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, November 1964 with Comparisons

| Area (Home Port) | November | | Jan.-Nov. | | Total |
|---|---|---|---|---|---|
| | 1964 | 1963 | 1964 | 1963 | 1963 |
| | (Number) | | | | |
| Issued first documents 2/: | | | | | |
| New England | 3 | 1 | 32 | 21 | 23 |
| Middle Atlantic | 1 | 1 | 10 | 17 | 18 |
| Chesapeake | 3 | 6 | 39 | 60 | 66 |
| South Atlantic | 7 | 6 | 46 | 71 | 77 |
| Gulf | 11 | 20 | 205 | 229 | 239 |
| Pacific | 5 | 2 | 135 | 152 | 160 |
| Great Lakes | 1 | 1 | 3 | 5 | 5 |
| Hawaii | 1 | - | 2 | - | - |
| Puerto Rico | - | - | 2 | 2 | 2 |
| Total | 32 | 37 | 474 | 557 | 590 |
| Removed from documentation 3/: | | | | | |
| New England | 9 | 2 | 45 | 43 | 48 |
| Middle Atlantic | 2 | 2 | 21 | 44 | 47 |
| Chesapeake | 1 | 4 | 20 | 23 | 25 |
| South Atlantic | 5 | 2 | 44 | 49 | 53 |
| Gulf | 13 | 11 | 75 | 111 | 118 |
| Pacific | 13 | 7 | 125 | 82 | 87 |
| Great Lakes | 1 | 1 | 10 | 14 | 15 |
| Hawaii | - | - | - | 3 | 3 |
| Total | 44 | 29 | 340 | 369 | 396 |

Note: For explanation of footnotes, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, November 1964 2/

| Length in feet | New England | Middle Atlantic | Chesapeake | South Atlantic | Gulf | Pacific | Great Lakes | Hawaii | Total |
|---|---|---|---|---|---|---|---|---|---|
| | (Number) | | | | | | | | |
| 28 | 1 | - | - | - | - | - | - | - | 1 |
| 29 | 1 | - | - | - | 1 | 1 | - | - | 3 |
| 30 | - | - | - | - | - | 1 | - | - | 1 |
| 31 | - | - | - | - | - | 1 | - | - | 1 |
| 34 | - | - | - | 1 | 1 | - | 1 | - | 3 |
| 35 | - | - | - | - | 2 | - | - | 1 | 3 |
| 36 | - | - | 1 | - | - | - | - | - | 1 |
| 37 | - | - | - | - | - | 1 | - | - | 1 |
| 38 | - | - | 1 | - | - | - | - | - | 1 |
| 40 | - | - | 1 | - | 1 | - | - | - | 2 |
| 44 | - | 1 | - | - | - | - | - | - | 1 |
| 49 | - | - | - | 1 | - | - | - | - | 1 |
| 51 | - | - | - | - | 1 | - | - | - | 1 |
| 52 | - | - | - | - | 1 | - | - | - | 1 |
| 54 | - | - | - | - | 1 | - | - | - | 1 |
| 56 | - | - | - | 3 | 3 | - | - | - | 6 |
| 57 | - | - | - | 2 | - | - | - | - | 2 |
| 104 | 1 | - | - | - | - | - | - | - | 1 |
| 138 | - | - | - | - | - | 1 | - | - | 1 |
| Total | 3 | 1 | 3 | 7 | 11 | 5 | 1 | 1 | 32 |

For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, November 1964 2/

| Gross tonnage | New England | Middle Atlantic | Chesapeake | South Atlantic | Gulf | Pacific | Great Lakes | Hawaii | Total |
|---|---|---|---|---|---|---|---|---|---|
| | (Number) | | | | | | | | |
| 1-9 | 2 | - | 1 | 2 | 1 | 1 | - | - | 7 |
| 10-19 | - | 1 | 2 | - | 3 | 3 | 1 | 1 | 11 |
| 20-29 | - | - | - | - | 1 | - | - | - | 1 |
| 30-49 | - | - | - | 1 | 1 | - | - | - | 2 |
| 50-69 | - | - | - | - | 1 | - | - | - | 1 |
| 70-79 | - | - | - | - | 1 | - | - | - | 1 |
| 80-89 | - | - | - | - | 3 | - | - | - | 3 |
| 90-99 | - | - | - | 4 | - | - | - | - | 4 |
| 100-139 | 1 | - | - | - | - | - | - | - | 1 |
| 140-439 | - | - | - | - | - | 1 | - | - | 1 |
| Total | 3 | 1 | 3 | 7 | 11 | 5 | 1 | 1 | 32 |

For explanation of footnotes, see table 4.

Table 4 - U.S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, November 1964 2/

| Horsepower | New England | Middle Atlantic | Chesapeake | South Atlantic | Gulf | Pacific | Great Lakes | Hawaii | Total |
|---|---|---|---|---|---|---|---|---|---|
| | (Number) | | | | | | | | |
| 25 | - | - | - | - | - | 1 | - | - | 1 |
| 60 | - | - | - | 1 | - | - | - | - | 1 |
| 100-119 | 1 | - | - | - | 2 | 1 | - | - | 4 |
| 120-129 | - | - | - | - | - | 2 | 1 | - | 3 |
| 130 | - | - | - | - | 1 | - | - | - | 1 |
| 150 | - | - | 1 | - | 1 | - | - | - | 2 |
| 160-169 | 1 | 1 | 1 | 1 | 1 | - | - | - | 5 |
| 170 | - | - | - | - | 1 | - | - | - | 1 |
| 180 | - | - | - | - | 1 | - | - | - | 1 |
| 220-229 | - | - | - | - | 1 | - | - | 1 | 2 |
| 250 | 1 | - | - | - | - | - | - | - | 1 |
| 300 | - | - | - | 5 | 3 | - | - | - | 8 |
| 420 | - | - | 1 | - | - | - | - | - | 1 |
| 1050 | - | - | - | - | - | 1 | - | - | 1 |
| Total | 3 | 1 | 3 | 7 | 11 | 5 | 1 | 1 | 32 |

1/ Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/ There were 4 redocumented vessels in November 1964 previously removed from the records. Vessels issued first documents as fishing craft were built: 22 in 1964; 1 in 1959; 3 in 1947, and 5 prior to 1947.
3/ Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U.S. Treasury Department.

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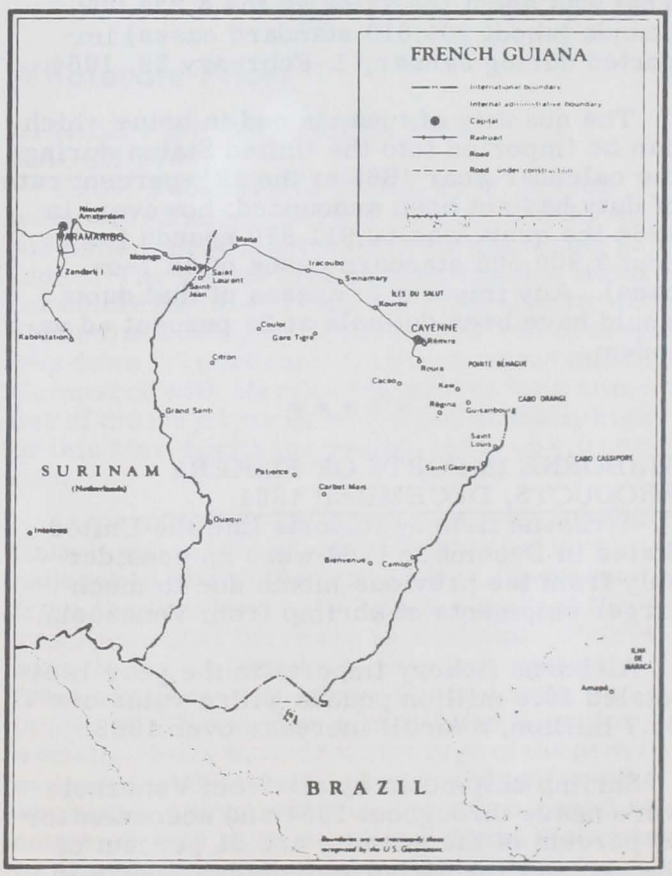
## THREE NEW U. S.-BUILT SHRIMP TRAWLERS OPERATING OFF SOUTH AMERICA:

Three new United States-built shrimp trawlers are now operating on shrimp grounds off South America. They were the first vessels of a fleet costing $1 million being built at a shipyard in Rockport, Tex., for a group of Florida firms. The vessels operate out of



Cayenne, French Guiana, where one of the owning companies has a new shrimp-processing plant.

The fleet has been specially designed by the Texas shipyard's general manager. The vessels are 72 feet in length, with steel hulls, and powered by diesel engines.

Like other United States shrimp vessels that are fishing South American shrimp grounds, the three new trawlers are manned by skeleton American crews, with deckhands to be recruited from the Guianas or West Indies. (Fishing News, London, February 26, 1965.)

## U. S. Foreign Trade

### IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-February 27, 1965, amounted to 4,175,915 pounds (about 198,853 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was about the same as the 4,234,009 pounds (about 201,619 standard cases) imported during January 1-February 29, 1964.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty has not been announced; however, in 1964 the quota was 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.

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### AIRBORNE IMPORTS OF FISHERY PRODUCTS, DECEMBER 1964:

Airborne fishery imports into the United States in December 1964 were up considerably from the previous month due to much larger shipments of shrimp from Venezuela.

Airborne fishery imports in the year 1964 totaled 10.6 million pounds with a value of $5.7 million, a small increase over 1963.

Shrimp shipments by air from Venezuela were heavy throughout 1964 and accounted for 67 percent of the quantity and 61 percent of the value of the airborne fishery imports in 1964. Airborne shrimp shipments from other Caribbean countries declined in 1964 in line with a trend that started in 1963. (It is thought that some of the Caribbean shrimp producers have shifted to other means of transport.) The bulk of the 1964 airborne shrimp imports entered through the Customs District of Florida and consisted of fresh and frozen raw headless shrimp.

The main shellfish items other than shrimp imported by air in 1964 were northern lobsters from Canada and spiny lobster products from Central and South American countries. Brutish Honduras is the leading supplier of airborne imports of spiny lobsters.

U. S. 1/Airborne Imports of Fishery Products, December 1964 and Years 1963-1964

| Product and Origin 2/ | December 1964 | | Year 1964 | | Year 1963 | |
|---|---|---|---|---|---|---|
| | Qty. 3/ | Value 4/ | Qty. 3/ | Value 4/ | Qty. 3/ | Value 4/ |
| | 1,000 Lbs. | US$ 1,000 | 1,000 Lbs. | US$ 1,000 | 1,000 Lbs. | US$ 1,000 |
| Fish: | | | | | | |
| Mexico | - | - | 320.5 | 64.7 | 264.8 | 70.1 |
| Canada | - | - | 14.8 | 4.8 | 2.2 | 0.1 |
| Other countries | 20.1 | 7.9 | 102.8 | 68.8 | 109.5 | 122.4 |
| Total fish | 20.1 | 7.9 | 438.1 | 138.3 | 376.5 | 193.1 |
| Shrimp: | | | | | | |
| Guatemala | - | - | - | - | 141.6 | 74.1 |
| El Salvador | - | - | 170.2 | 102.8 | 338.0 | 219.1 |
| Honduras | - | - | 10.3 | 3.8 | 99.8 | 52.2 |
| Nicaragua | - | - | 97.5 | 55.8 | 517.3 | 181.2 |
| Costa Rica | 40.2 | 20.5 | 350.4 | 187.3 | 644.8 | 308.1 |
| Panama | 192.5 | 124.0 | 1,262.9 | 789.4 | 1,633.0 | 890.2 |
| Venezuela | 1,314.7 | 687.4 | 7,120.4 | 3,486.9 | 5,048.2 | 2,297.1 |
| Ecuador | - | - | - | - | 111.6 | 39.4 |
| France | - | - | - | - | 2.6 | 0.2 |
| British Guiana | - | - | 10.5 | 5.2 | - | - |
| Mexico | - | - | 2.1 | 1.4 | 13.2 | 6.2 |
| Other countries | - | - | 13.1 | 6.9 | 19.1 | 11.2 |
| Total shrimp | 1,547.4 | 831.9 | 9,037.4 | 4,639.5 | 8,569.2 | 4,081.6 |
| Shellfish other than shrimp: | | | | | | |
| Canada | 0.9 | 0.5 | 316.6 | 175.2 | 213.3 | 101.8 |
| Mexico | - | - | 14.4 | 9.9 | 101.1 | 69.0 |
| British Honduras | 65.9 | 79.2 | 368.5 | 337.3 | 378.6 | 312.1 |
| Honduras | - | - | 80.3 | 82.6 | 17.0 | 17.1 |
| Nicaragua | 20.2 | 29.1 | 70.7 | 69.1 | 183.2 | 111.8 |
| Costa Rica | 43.0 | 40.0 | 62.1 | 54.7 | 73.8 | 63.2 |
| Jamaica | 12.3 | 20.2 | 75.6 | 83.4 | 86.6 | 97.6 |
| Other countries | 19.7 | 22.4 | 128.3 | 104.6 | 131.8 | 111.0 |
| Total | 162.0 | 191.4 | 1,116.5 | 916.8 | 1,185.4 | 883.6 |
| Grand total | 1,729.5 | 1,031.2 | 10,592.0 | 5,694.6 | 10,131.1 | 5,158.3 |

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U.S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, December 1964, U.S. Bureau of the Census.

Fish fillets from Mexico were the leading finfish product (from a volume standpoint) imported by air in 1964 and 1963.

The airborne imports in both years included several high-value shipments of caviar.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

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PROCESSED EDIBLE FISHERY PRODUCTS, DECEMBER 1964:

United States imports of processed edible fishery products in December 1964 were up 1 percent in quantity and 4 percent in value from those in the previous month due mainly to larger imports of canned tuna, canned sardines, and canned oysters. The gain was partly offset by smaller imports of cod fillets, sea catfish fillets, and canned crab meat.

Compared with the same month in 1963, imports in December 1964 were up 25 percent in quantity and 26 percent in value. The increase extended to most fishery items, particularly groundfish fillets and blocks, flounder fillets, canned albacore tuna, canned sardines, and canned oysters. There was some decline in imports of canned tuna other than albacore.

U.S. Imports and Exports of Processed Edible Fishery Products, December 1964 with Comparisons

| Item | QUANTITY | | | | VALUE | | | |
|---|---|---|---|---|---|---|---|---|
| | Dec. | | Jan.-Dec. | | Dec. | | Jan.-Dec. | |
| | 1964 | 1963 | 1964 | 1963 | 1964 | 1963 | 1964 | 1963 |
| | . . (Millions of Lbs.) . | | | | . . (Millions of $) . . | | | |
| Fish & Shellfish: | | | | | | | | |
| Imports1/ | 53.6 | 42.9 | 551.3 | 536.3 | 17.3 | 13.7 | 169.1 | 157.4 |
| Exports2/ | 5.9 | 4.3 | 50.9 | 34.5 | 3.0 | 2.1 | 26.6 | 16.6 |

1/ Includes only those fishery products classified by the U.S. Bureau of Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i.e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/ Includes fresh and frozen.

In January-December 1964, imports were 3 percent in quantity and 7 percent in value from those in January-December 1963. During January-December 1964, there were larger imports of groundfish blocks (increase mainly from Canada and Iceland), flounder fillets, yellow pike fillets, and sea catfish fillets. Imports were also up for canned albacore tuna and canned sardines not in oil. But there was a decline in imports of most other canned fish import items (tuna other than albacore, crab meat, oysters, salmon, and sardines in oil).

Exports of processed edible fish and shellfish from the United States in December 1964 were down 12 percent in quantity and 9 percent in value from the previous month due mainly to lower shipments of canned salmon, sardines, and canned shrimp. In December 1964, shipments of canned salmon to the United Kingdom increased 6 percent but those to other countries were down 48 percent.

Compared with the same month of 1963, the exports in December 1964 were up 37 percent in quantity and 43 percent in value. The increase was due mainly to larger shipments of canned salmon and canned squid. Shipments of canned squid to Greece were down sharply compared with December 1963 but those to the Philippines were up about 800 percent.

Processed fish and shellfish exports for the 12 months of 1964 were up 48 percent in quantity and 60 percent in value from those in the same period of 1963. In 1964 there were much larger shipments of canned mackerel and canned salmon. Exports of canned shrimp and canned sardines in oil were also higher, but exports of canned sardines not in oil and canned squid (to Greece and the Philippines) were down.

## Wholesale Prices

EDIBLE FISH AND SHELLFISH, MARCH 1965:

From February to March 1965, prices were seasonally lower for nearly all of the major fishery products listed in the wholesale price index. The March 1965 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) at 108.3 percent of the 1957-59 average was down 1.3 percent from the previous month. Compared with March 1964, prices for a number of the major items were substantially higher this March with the overall index up 4.0 percent.

In the subgroup for drawn, dressed, or whole finfish, ex-vessel prices at Boston for large haddock in March 1965 dropped 11.8 percent from the previous month as a result of the usual seasonal increase in landings. Prices were lower at New York City for western frozen king salmon (down 2.9 percent), and prices at Chicago for Fresh Lake Superior whitefish were down from the high of the previous month. But Great Lakes round yellow pike wholesale prices were up 5 cents a pound because of very light supplies. From February to March 1965 the subgroup index was down 3.7 percent, but was 9.8 percent higher than

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1965 with Comparisons

| Group, Subgroup, and Item Specification | Point of Pricing | Unit | Avg. Prices 1/ ($) | | Indexes (1957-59=100) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Mar. 1965 | Feb. 1965 | Mar. 1965 | Feb. 1965 | Jan. 1965 | Mar. 1964 |
| ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) | | | | | 108.3 | 109.7 | 112.1 | 104.1 |
| Fresh & Frozen Fishery Products: | | | | | 112.5 | 114.5 | 118.3 | 105.5 |
| Drawn, Dressed, or Whole Finfish: | | | | | 110.8 | 115.1 | 121.8 | 100.9 |
| Haddock, lge., offshore, drawn, fresh | Boston | lb. | .11 | .13 | 87.4 | 99.2 | 133.3 | 61.8 |
| Halibut, West., 20/80 lbs., drsd., fresh or froz. | New York | lb. | .40 | .40 | 117.3 | 117.3 | 118.3 | 89.2 |
| Salmon, king, lge. & med., drsd., fresh or froz. | New York | lb. | .83 | .85 | 115.3 | 118.8 | 119.1 | 114.2 |
| Whitefish, L. Superior, drawn, fresh | Chicago | lb. | .63 | .65 | 93.3 | 96.3 | 90.3 | 108.2 |
| Yellow pike, L. Michigan & Huron, rnd., fresh | New York | lb. | .85 | .80 | 139.2 | 131.0 | 122.8 | 114.7 |
| Processed, Fresh (Fish & Shellfish): | | | | | 112.3 | 115.1 | 116.0 | 116.1 |
| Fillets, haddock, sml., skins on, 20-lb. tins | Boston | lb. | .40 | .44 | 97.1 | 105.6 | 134.8 | 77.7 |
| Shrimp, lge. (26-30 count), headless, fresh | New York | lb. | .95 | .97 | 111.3 | 113.7 | 109.6 | 113.1 |
| Oysters, shucked, standards | Norfolk | gal. | 6.88 | 7.00 | 115.9 | 118.0 | 120.1 | 126.5 |
| Processed, Frozen (Fish & Shellfish): | | | | | 109.3 | 108.6 | 111.8 | 96.2 |
| Fillets: Flounder, skinless, 1-lb. pkg. | Boston | lb. | .38 | .35 | 95.0 | 88.7 | 92.5 | 98.9 |
| Haddock, sml., skins on, 1-lb. pkg. | Boston | lb. | .39 | .39 | 112.9 | 114.3 | 115.8 | 108.5 |
| Ocean perch, lge., skins on 1-lb. pkg. | Boston | lb. | .31 | .31 | 108.7 | 108.7 | 106.9 | 114.0 |
| Shrimp, lge. (26-30 count), brown, 5-lb. pkg. | Chicago | lb. | .92 | .91 | 108.5 | 107.9 | 112.1 | 87.2 |
| Canned Fishery Products: | | | | | 101.3 | 101.8 | 101.8 | 102.2 |
| Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. | Seattle | cs. | 20.50 | 21.00 | 89.3 | 91.5 | 91.5 | 94.8 |
| Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. | Los Angeles | cs. | 11.44 | 11.56 | 101.6 | 102.6 | 102.6 | 103.3 |
| Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs. | Los Angeles | cs. | 7.13 | 6.25 | 120.9 | 105.9 | 105.9 | 103.9 |
| Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs. | New York | cs. | 10.00 | 10.00 | 128.3 | 128.3 | 128.3 | 118.2 |

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.

in March 1964 due to sharply higher prices this March for ex-vessel haddock and frozen halibut.

Prices for all items in the processed fresh fish and shellfish subgroup dropped from February to March 1965, with the subgroup index down 2.4 percent. The more significant price declines were for fresh small haddock fillets at Boston (down 8.0 percent), followed by lower prices at New York City for fresh South Atlantic shrimp (down 2.1 percent), and a slight drop in prices for shucked standard oysters. As compared with the same month a year earlier, the subgroup index this March was lower by 3.3 percent because of lower prices for fresh shrimp and oysters which were partially offset by much higher prices this March for fresh haddock fillets (up 25 percent from March 1964).

The March 1965 subgroup index for processed frozen fish and shellfish rose only 0.6 percent from the previous month. But prices for frozen flounder fillets were up 7.1 percent in that period and for frozen shrimp at Chicago up 0.6 percent. The subgroup index this March was 13.6 percent higher than in Mar 1964 chiefly because of substantially higher prices for frozen shrimp (up 24.4 percent) and frozen haddock fillets (up 4.1 percent).

Lower prices for canned pink salmon a canned tuna in March 1965 were responsib for a 0.5-percent drop from the previous month in the subgroup index for canned fis ery products. Lower prices for canned pi salmon were established as a spur to increased sales and to continue the good mo ment of canners' stocks. Canned tuna pri for advertised brands were unchanged fro the previous month, but slightly lower pri for "other packers' labels" caused a 1-pe cent drop in the average canned tuna price California canneries paid more for ex-ves jack mackerel in March and prices for the canned product rose 14.2 percent above the previous month. As compared with the sa month a year earlier, prices in March 196 were higher for canned Maine sardines an jack mackerel. But those higher prices w offset by lower prices for canned pink sal and canned tuna, and this March the subgr index was down 0.9 percent from March 1