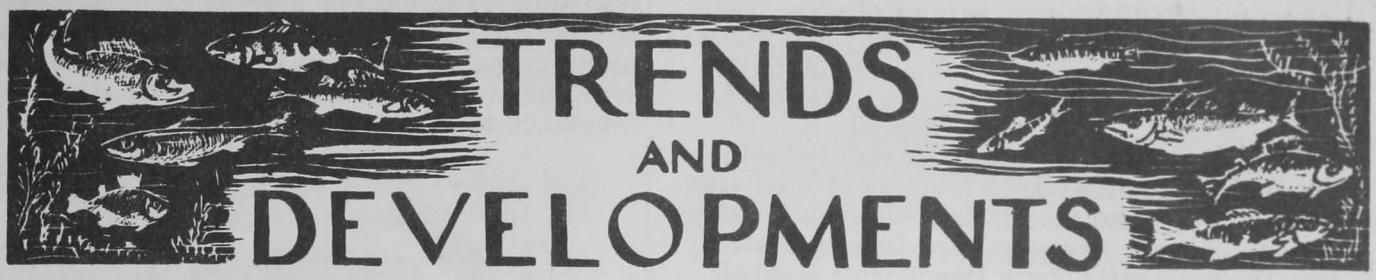

California

PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 61A9-Pelagic Fish: The coastal waters of California from Point Reyes to Santa Cruz Island were studied November 27-December 14, 1961, by the California Department of Fish and Game research vessel Alaska (1) to determine the amount of sardine recruitment from the 1961 spawning and to measure the population density of older sardines; (2) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies; and (3) to collect live sardines from Monterey Bay, and elsewhere north of Point Conception for blood genetic studies.

A total of 62 stations were occupied. Anchovies, 44 to 119 mm. long, were taken at five stations. No sardines, jack mackerel, or Pacific mackerel were taken or observed.

The Alaska scouted 479 miles between stations. Fish schools were very scarce throughout the area; only 8 anchovy schools were observed near Purisima Point. "Pinhead" anchovies were scattered at the surface between stations in the northeast end of Monterey Bay.

Generally poor weather hampered operations during most of the cruise. High winds and rough seas kept the Alaska in port for 4 nights and curtailed operations on 2 other nights. In addition, marginal weather conditions on most of the remaining nights limited the areas which could be worked. Sea-surface temperatures ranged from 51.31° F. at Point Buchon to 56.48° F. at El Capitan.

This cruise, together with cruises 61A5 through 61A8, formed the 1961 pelagic fish survey in California and Baja California. These cruises indicated that adult (age 1 and over) sardines were much less abundant than in 1959 and 1960. The percentage of stations where adult sardines were taken dropped to about one-fifth of the percentage recorded in 1959 and 1960. The abundance and distribution of sardines of the 1961 year-class was about the same as that of the relatively weak 1960 year-class last year. Fish-of-the-year have been virtually absent from California waters during the last two years.

Anchovies and Pacific mackerel had about the same abundance in all areas as in 1960, while jack mackerel were less abundant.

Airplane Spotting Flight 61-14-Pelagic Fish: The inshore area from the United States-Mexican Border to Monterey Bay, Calif., was surveyed from the air (November 13-16, 1961) by the Department's Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools.

No coverage was possible north of Monterey Bay because of a persistent low cloud cover. Conditions were generally favorable south of Monterey Bay.

Only 25 schools, all anchovy, were seen during the flight. Eleven were close to the beach near Scripps pier, La Jolla; 5 were near the Oceanside pier; and 9 were scattered between Avila and Pismo Beach.

Airplane Spotting Flight 61-15-Pelagic Fish: The area from the United States-Mexican Border to Point Piedras Blancas, Calif., was further studied from the air (December 1-4, 1961) by the Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools. The weather was good throughout the area covered.

Only three small schools of anchovies (off the Coronado Strand) were seen south of Port Hueneme and no fish were spotted north of Ventura. A fairly large school group of anchovies was between Ventura and Port Hueneme. Despite very dirty water, resulting from the recent rains, 189 schools were

counted, all within one mile of shore. Good commercial catches of sardines were made in the same area two days before the flight, but no sardine schools were identified.

Airplane Spotting Flight 61-16-Pelagic Fish: The inshore area from Port Hueneme to San Diego and the offshore islands of southern California was surveyed from the air by the Department's Twin Beechcraft N5614D on December 13, 1961, to determine the distribution and abundance of pelagic fish schools.

Fair flying weather prevailed over most of the area; however, low coastal clouds prevented inshore spotting between Point San Mateo and San Diego. The sea was generally calm but there was considerable surface glitter.

Anchovies were abundant from Port Hueneme to Point Dume. Fifty-nine schools, including an unusually long one, were in this area. Several large schools were observed splitting up into small schools and then reuniting. The long anchovy school, off Point Dume, was approximately $1\frac{1}{4}$ miles long by 20 to 30 feet wide.

Only one sardine school, a large one, was observed. It was between Redondo Canyon and Malaga Cove in the southern end of Santa Monica Bay.

Off San Mateo Point about 100 porpoises, specific identity unknown, were observed in a closely-knit group.

About 150 Pacific pilot whales (Globicephala scammoni) were seen $1\frac{1}{2}$ to 2 miles offshore between Catalina Harbor and the east end of Santa Catalina Island. They were in pods of 15 to 20 animals. Sixteen pilot whales were noted between Santa Catalina Island and Palos Verdes Point. They were widely separated and apparently feeding. Only one gray whale was seen; it was in Kuyler's Cove, San Miguel Island.

Note: See Commercial Fisheries Review, Feb. 1962 pp. 14-15.

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DUNGENESS CRAB STUDIES CONTINUED:

M/V "Nautilus" Cruise 61N19a-d-Crab: The coastal waters off central California from Bodega Bay to San Francisco were surveyed (Aug. 15-20, Sept. 12-17, Oct. 17-22, Nov. 14-19, 1961) by the California Department of Fish and Game research vessel Nautilus (1) to collect market or dungeness crabs (Cancer magister) for growth studies using traps and a beam trawl; and (2) to determine time of occurrence and relative abundance of crabs in areas of operations.

Market or Dungeness Crab
(Cancer magister)

Collections were made at selected stations from Bodega Head to San Francisco using a 10-foot beam trawl with a 1-inch mesh net and seven 30-inch diameter crab traps of 1-inch mesh. The crab traps were baited with rockfish carcasses and squid and allowed to fish overnight. Beam trawling was done at each trap site. Each drag was usually for 20 minutes and covered $\frac{3}{4}$ mile. Exploratory beam trawling also was done at stations where traps were not set.

Excellent samples of juvenile market crabs were obtained from Bodega Bay using the 10-foot beam trawl.

In the Bodega Bay area, the crabs grew 16.6 mm. between August and November; males and females grew at approximately the same rate. In the San Francisco area, crabs grew 13.2 mm. during the same period with males growing slightly faster than females. Sex ratios were approximately equal.

Estimates were made of the number of juvenile crabs in the nursery area at Bodega Bay. In August there were approximately 6.5 million crabs in an area 1 by 3.5 miles. September estimates were much higher, indicating 27.2 million crabs in the area. An extreme concentration of crabs in one part of the bay caused the estimate to be high; in a single 20-minute trawl-haul 56,000 juvenile crabs were taken. No sampling was done in October, and in November only 0.8 million juvenile crabs were in the area. It is felt this reduction in the population was due to movements out of the nursery area.

Adult crabs were also taken in both the trawl and the traps; however, no increase in

the average size of the adult group was noted during the period. The extreme range in size of any age group has made it impossible to identify succeeding year-classes; however, with the abundance of juveniles it is hoped that their growth into the next year of life and possibly into the harvest will be followed.

Note: See Commercial Fisheries Review, Feb. 1962 p. 12-13.

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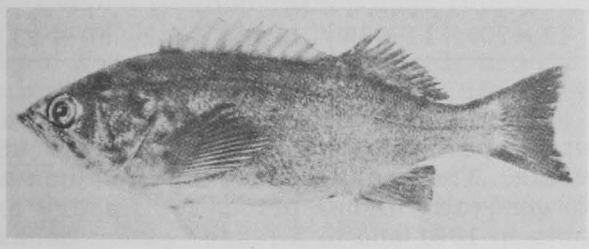
ROCKFISH TAGGING STUDIES CONTINUED:

M/V "N. B. Scofield" Cruise 61S8-Rockfish: The California Department of Fish and Game research vessel N. B. Scofield cruised (Nov. 24-Dec. 4, 1961) in the area of Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara Islands to (1) capture blue rockfish, Sebastodes mystinus, by hook and line for tagging and for food and age studies; and (2) collect other species of rockfish for taxonomic studies.



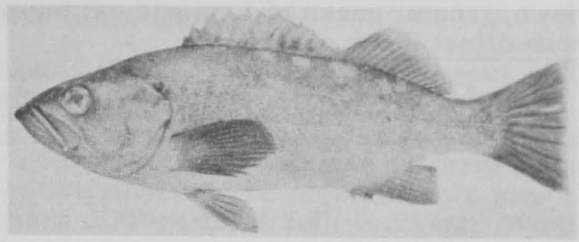
Blue Rockfish (Sebastodes mystinus)

In all, 507 blue rockfish were tagged; most required deflation of the air bladder and a few had to have their stomachs pushed back into normal position after they were everted by the expanded air bladder. All fish were anesthetized in a 1:15,000 solution of MS 222.

Blue rockfish were caught in depths ranging from a few feet below the surface to almost 150 feet. The largest concentrations were around San Miguel Island where olive, vermilion, and copper rockfish were also quite abundant.

Thirty-four stomach and scale samples were obtained from the blue rockfish and 5 stomach samples were collected from lingcod, Ophiodon elongatus. In addition, several otoliths and partially digested small fish taken from the stomachs of the various rockfish were preserved for identification.

Copper rockfish, S. caurinus, vermilion rockfish, S. miniatus, black-and-yellow rockfish, S. chrysomelas, and juvenile olive rockfish, S. serranoides, were saved for taxonomic studies.



Olive Rockfish (Sebastodes serranoides)

Eight rockfish--rosy, S. rosaceus (2), speckled, S. ovalis (2), widow, S. entomelus (1), vermilion (1), copper (1), and black-and-yellow (1)--were successfully decompressed; these along with a sculpin, Scorpaena guttata, two sarcastic fringeheads, Neoclinus blanchardi, and one petrale sole, Eopsetta jordani, were kept in a live tank and delivered to Marineland of the Pacific.

Other species caught on hook and line included cabezon (Scorpaenichthys marmoratus), ocean whitefish (Caulolatilus princeps), kelp bass (Paralabrax clathratus), California sheepshead (Pimelometopon pulchrum), Pacific sanddab (Citharichthys sordidus), gopher rockfish (Sebastodes carnatus), flag rockfish (S. rubrivinctus), kelp rockfish (S. atrovirens), yellowtail rockfish (S. flavidus), honeycomb rockfish (S. umbrosus), starry rockfish (S. constellatus), bocaccio (S. paucispinis), and squarespot rockfish (S. hopkinsi).

Note: See Commercial Fisheries Review, Jan. 1962 p. 15.

Cans

SHIPMENTS FOR FISHERY PRODUCTS, JANUARY-NOVEMBER 1961:

Total shipments of metal cans during January-November 1961 amounted to 116,567 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 115,108 tons in the same period of 1960. Canning of fishery products in January-November 1961 was confined largely to tuna, jack mackerel, Pacific salmon, and Maine sardines. Although the packs of Maine and California sardines, and shrimp were

down, greater packs of tuna and salmon more than offset those declines.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

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ALUMINUM-ALLOY CANS:

A new method of producing thin, high-strength, lacquered aluminum-alloy sheets is said to make the material economically competitive with tinplate. It offers a considerable advantage over pure aluminum, which would be used more extensively for the manufacture of cans and boxes if its tensile strength were higher.

The process, developed by an aluminum company of Singen, Germany, consists of annealing and quenching hot-rolled coils of an aluminum alloy which contains about $1\frac{1}{2}$ percent of both magnesium and silicon. The heat-treated strip is then allowed to age for 3 or 4 days at room temperature, so that its tensile strength is increased, before being cold rolled. A covering of epoxy resin is then applied which renders the material more suitable for deep drawing into cans, as well as offering protection against subsequent chemical attack. Drying and baking of this lacquer coating is carried out for 30 seconds at a temperature of 240°C. (464° F.) and it is reported that this procedure also helps to increase the tensile strength of the material. Source: New Scientist, vol. 9, no. 219 (1961), p. 215.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, 1961:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, more fresh and frozen fishery products were purchased by the Military Subsistence Supply Agency in December 1961 than in the same month of 1960. The increase was 10 percent in quantity and 33.3 percent in value. As compared with the previous month, purchases in December 1961 were lower by 20.4 percent in quantity and 14.0 percent in value (table 1).

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, December 1961 with Comparisons

QUANTITY				VALUE			
December		Jan.-Dec.		December		Jan.-Dec.	
1961	1960	1961	1960	1961	1960	1961	1960
(1,000 Lbs.)				($1,000)			
1,876	1,706	23,450	22,917	1,109	832	12,470	11,839

Table 2 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, 1957-61

QUANTITY					VALUE				
1961	1960	1959	1958	1957	1961	1960	1959	1958	1957
(1,000 Lbs.)					($1,000)				
23,450	22,917	22,651	22,511	23,452	12,470	11,839	11,624	12,850	12,080

Total purchases for the year 1961 were up 2.3 percent in quantity and 5.3 percent in value. The greater increase in value was due to generally higher prices for fishery products in 1961 and to a lesser extent because the purchases consisted of higher-priced products. Fresh and frozen fishery products purchases from 1957 through 1961 have stabilized at around 22.5 million to 23.5 million pounds annually and the value of those purchases from $11.6 million to $12.9 million annually (table 2). However, in 1956, purchases went as high as 26.6 million pounds valued at $13.4 million.

The average price paid for fresh and frozen fishery products in 1961 of 53.2 cents a pound was significantly higher than the 51.7 cents per pound paid in 1960 and the 51.3 cents a pound paid in 1959.

Canned: As occurred in December 1960, the only product purchased in December 1961 was canned tuna but the amount purchased was almost twice as much as in the same month a year earlier (table 3).

Table 3 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, December 1961 with Comparisons

Product	QUANTITY				VALUE			
	December		Jan.-Dec.		December		Jan.-Dec.	
	1961	1960	1961	1960	1961	1960	1961	1960
	(1,000 Lbs.)				($1,000)			
Tuna	423	47	7,081	3,610	235	24	3,315	1,613
Salmon	-	-	1,403	3,593	-	-	893	2,436
Sardine	-	21	131	147	-	9	63	61

Total purchases of canned fishery products in the year 1961 were 17.2 percent greater in quantity but only 2.6 percent higher in value than in 1960 (table 4). The smaller increase in value in 1961 was due to a 61-percent drop in canned salmon purchases. The quantity of tuna purchased in 1961 was 96.1 percent greater than the previous year, but canned sardine purchases were down 10.9 percent because the 1961 pack of canned Maine sardines was substantially less than in 1960.

Table 4 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, 1957-61

Product	QUANTITY					VALUE 1/		
	1961	1960	1959	1958	1957	1961	1960	1959
	(1,000 Lbs.)					($1,000)		
Tuna	7,081	3,610	3,698	5,884	2,711	3,315	1,613	1,672
Salmon	1,403	3,593	1,085	3,336	3,111	893	2,436	737
Sardine	131	147	1,051	253	215	63	61	177
Total	8,615	7,350	5,834	9,473	6,037	4,271	4,110	2,586

1/Value prior to 1959 not available.

Canned fish purchases have fluctuated rather widely during the past five years from a low of 5.8 million pounds in 1959 to a high of 8.6 million pounds in 1961. The purchases in 1961 have been the highest for the six-year period of 1956-1961.

Note: (1) Armed Forces installations generally make some local purchases not included in the data given; the actual total purchases are higher than reported above.

(2) See Commercial Fisheries Review, April 1961 p. 18.

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VETERANS ADMINISTRATION REQUIREMENTS FOR CANNED FISH FROM NEW PACKS:

Early this year the Veterans Administration announced its estimated requirements of various canned food products, including fishery products.

Veterans Administration Requirements for Canned Fish from New Packs

Canned Product	Can Size	Quantity (Dozen Cans)
Salmon, medium red or coho, skin and backbone on or removed	4 lb.	3,000
Salmon, red or sockeye	1 lb.	22,000
Salmon, red or sockeye, dietetic	No. $\frac{1}{2}$	9,000
Sardines	No. 1	5,000
Tuna, light meat, chunk, in veg. oil	4 lb.	6,500
Tuna, dietetic	No. $\frac{1}{2}$	9,100

Items listed are purchased by the Marketing Division for Subsistence, Veterans Administration Supply Depot, P. O. Box 27, Hines, Ill.

Fish Bone Detection

AUTOMATIC BONE DETECTION AND REJECTION SYSTEM FEASIBLE:

It is now possible to design and fabricate a commercial unit capable of detecting potentially harmful or objectionable bones in one-half-inch-thick fish portions. This has been made possible by research supervised and financed by the U. S. Bureau of Commercial Fisheries. The same research also indicates that additional equipment can be fabricated which will be sensitive only to the bone signal as it appears on the oscilloscope. Such sensitized equipment could then be coupled to an automatic reject system, thus resulting in an automatic bone detection and rejection system.

Methods for automatically detecting bones in fishery products under normal production conditions have been under study by the Bureau's Technological Laboratory at Gloucester, Mass., since 1954. The most recent work in the field was conducted at the Barkley & Dexter Laboratories, Inc., of Fitchburg, Mass., under a contract from the Bureau. At that laboratory a model X-ray unit was fabricated to detect bones in fish meat under simulated production conditions. The unit was made from commercially-available electronic components and included an X-ray source, a fluoroscope screen, a revolving plastic turntable-sample holder to simulate fish plant production belt speeds of 12.5 and 25 feet per minute, and an electronic detection unit comprised of photoelectric cells wired to an oscilloscope. In operation, X-ray energy passing through the sample results in an image on the fluoroscopic screen. Changes in energy levels resulting from the presence of bone are relayed from the screen to the oscilloscope by the photo cells and result in distortion of the normal line trace.

The unit satisfactorily detected bones in frozen fish portions passing under the detector at belt speeds of 12.5 to 25 feet per minute. All bones greater than 0.012 inch in diameter, or about as thick as three sheets of typewriter paper, were detected in portions one-half-inch thick. However, the sensitivity of the unit decreased with increasing product thickness. Results in detecting bones in unfrozen fish fillets were not entirely satisfactory because of the smaller density contrast between the meat and bone.

Tests at the Bureau's Gloucester Laboratory have shown that bones less than 0.012

inch in diameter are harmless and not objectionable because they become soft upon cooking. Bones greater than 0.012 inch in diameter are either objectionable or potentially harmful.

Note: See Commercial Fisheries Review, October 1961 p. 14.

Fish Oils

EFFECT OF DIETARY FISH OILS ON BLOOD CHOLESTEROL:

A number of fish oils have been shown to have a cholesterol-depressant effect on hypercholesteremic rats. These include oils from menhaden, tuna, herring, dogfish liver, mullet, perch, and salmon. These and others such as cod-liver oil, sardine oil, and seal oil have been reported to be effective in patients and in experimental animals.

Experiments are being conducted to determine which components of fish oils are active as cholesterol depressants. Comparative analyses are being made on the effects of total unsaturation and of specific types of unsaturation in the tissue lipids of rats. The effects of feeding highly unsaturated products in the distribution of fatty acids in the tissues of both normal and hypercholesteremic rats are also being investigated. Lipids from cardiovascular tissues from rats fed marine oil esters are being fractionated and analyzed for their total fatty acid spectrum. This work is being done under a U. S. Bureau of Commercial Fisheries contract awarded in 1961 to the Hormel Institute, University of Minnesota.

Information on the effects of whole fish products is also important. Consequently, menhaden, silver salmon, ocean perch, and mullet were freeze-dried. The dried products, lipids from the dried products, and dried products with lipids extracted were fed to hypercholesteremic rats.

A paper ("Effect of Dietary Fats and Marine Oil Fractions on Cardiovascular Tissues," by James J. Peifer and W. O. Lundberg) presented at the Federated Societies for Experimental Biology in Atlantic City on April 14, 1961, reveals that previous studies by Peifer et al. established that linolenate, menhaden, and tuna oils are very effective cholesterol-depressant agents. Further studies were made of the effects of feeding butter, margarine, corn oil, and marine oil fractions on tissue lipids of hypercholesteremic rats. Results show that cholesterol-depressant activities of tuna, menhaden, and dogfish-liver oils were due to their fatty acid components while their nonsaponifiables tend to aggravate the hypercholesteremic condition. All supplemental lipids promoted significant changes in higher polyene components of the myocardium and of the phospholipids from plasma and liver. Test lipids had less effect on cholesteryl ester polyenes. Studies suggest each tissue has its own specific polyenoic acid requirements. Polyene concentrates from menhaden oil were most effective in reducing blood cholesterol, the TC-TP ratio in plasma, and liver lipids. Lipid analyses by silicic acid microchromatoplates and GLC will be reported later.

Note: This contract research is supervised by the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

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INVESTIGATION OF CHEMICAL COMPOUNDS CAUSING FISHY FLAVORS AND ODORS:

Attempts are being made to determine causes for and precursors 1/ of fishy odors and flavors in marine oils. Low-molecular-weight aldehydes, ketones, acids, and amines are probably among the offenders. Methods have been developed to determine small amounts of these compounds. Derivatives of aldehydes, methyl ketones, and fatty acids containing 1 through 8 carbons were prepared, separated, and identified. This research is being done under a U. S. Bureau of Commercial Fisheries contract awarded in 1961 to the Hormel Institute, University of Minnesota, Austin, Minn.

Compounds containing nitrogen, phosphorus, or sulfur often have potent and obnoxious odors. Elemental analyses were made on odoriferous fractions of fish oil obtained from molecular distillation.

Potential precursors of odoriferous materials are being studied. Classes of compounds include long-chain amines, amides, nitriles, cyanates, thicocyanates, sulfates, sulfonates, phosphates, and phosphonates. Any compounds that were not commercially available were synthesized. Each was mixed with methyl esters of fish oil fatty acids and stored at room temperature. Any that develop fishy flavors and odors during storage will

1/ A precursor is a compound from which another compound is formed.

be analyzed to determine the classes of compounds formed in an attempt to detect chemical changes that have occurred.

Attempts are being made to learn why oxidation of fish oil fatty acids is different from oxidation of those in other oils and results in "fishy" odors.

Studies during the latter part of 1961 were done on the volatile components found in fish oils. Derivatives of carbonyl compounds often cannot be separated by ordinary methods, including paper chromatography. Separations of these were accomplished by gas chromatography. Derivatives were prepared and chromatographed on paper.

Since nitrogen compounds may contribute to odors of fish oils, fractions obtained from molecular distillations of commercial oils were tested for the presence of primary, secondary, and tertiary amines.

Column chromatography was used to fractionate fish oil. This was an attempt to segregate odors characteristic of the total oil and to determine whether the odors would be associated with some particular classes of lipids. A total of 24 fractions were separated, the odors described, and the classes of lipids present in the fractions are being characterized.

Note: This contract research is supervised by the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

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APPLIED RESEARCH ON EFFECT OF COMPONENTS ON HEALING OF SKIN LESIONS:

For years many people have believed that fish oils promoted healing of skin lesions and had a benefical effect on the skin. Fish oils are added to a number of pharmaceutical and cosmetic products on the market, including creams, ointments, and sprays for burns. But information is not available in the scientific literature about the nature of or the use of fish oils in this field. Questions have been raised about the effects of tryglycerides, α-glyceryl ethers, vitamins A and D, hydrocarbons, and other compounds present in the unsaponifiable fractions of fish oils.

In order to clarify the effects of fish oils, a contract was awarded by the U. S. Bureau of Commercial Fisheries to the Mayo Association and the Mayo Clinic in 1961 to study the action of certain fish oil compounds on the healing of skin lesions. The research involves producing second-degree ultraviolet burns on the skin of hairless mice and guinea pigs. An experimental oil and a control oil will be used. The experimental consists of bleached distilled tryglycerides from menhaden oil. The control oil consists of mineral oil with color and viscosity similar to those of the fish oils. The oils will be applied directly and as a cream. Clinical observations will be made, and if differences are observed in rate of healing or manner of healing, histological studies will be made.

Other components of fish oils such as unsaponifiable fractions and glyceryl ethers will be investigated.

Note: This contract research is supervised by the Technological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

Frozen Fish

MICROWAVE THAWING:

A study of the microwave thawing of frozen fish has been developed by Canadian and U. S. Bureau of Commercial Fisheries Gloucester Technological Laboratory scientists. The Canadians will catch inshore cod and brine-freeze them in pre-rigor and post-rigor conditions. The fish will be shipped to the Gloucester Laboratory where they will be thawed by a microwave unit.

The quality of the thawed fish will be evaluated by the Gloucester Laboratory's taste panel at bimonthly intervals. Aliquots of the bimonthly samples will be returned to the Canadians who will determine free fatty acids and protein dispersibility.

In addition to determining the feasibility of rapid thawing with microwaves, the results of the tests may settle the long-standing dispute between proponents of post-rigor plate freezing and the proponents of pre-rigor brine-freezing.

Gear

LOCATION OF DETACHABLE COD ENDS:

During rough weather, floating fishing gear or detachable cod ends with or without

radar reflectors cannot be seen on the radar screen. Undue delay in locating drifting cod ends deteriorates the quality of the fish.

A small transmitter fixed to the drifting cod end was found very satisfactory in quickly locating the cod ends. In spite of very bad weather during experiments off Greenland, it was possible to detect without any difficulty the drifting transmitter-fitted cod end up to 8 nautical miles away.

Small transmitters are manufactured in suitable designs to locate lifeboats or shipwrecked sailors. Similar transmitters are used for detecting floating whales. Source: Hansa, vol. 97, no. 8-9 (1960), p. 479.

Great Lakes Fishery Investigations

WHITEFISH SPAWNING SURVEY IN APOSTLE ISLANDS AREA OF LAKE SUPERIOR CONTINUED:

M/V "Siscowet" Cruise 10: Activities of the U. S. Bureau of Commercial Fisheries research vessel Siscowet (November 27-December 13, 1961) were in the Apostle Islands region, at localities east of Stockton Island, east of Madeline Island, north of Sand Island, east of Outer Island, east of Basswood Island, and in Presque Isle Bay. The studies dealt primarily with the spawning activities of pygmy whitefish, round whitefish, lake herring, and various forms of chubs. Although rough weather curtailed many of the scheduled activities, substantial amounts of life-history data and materials were collected.

Pygmy whitefish spawned in about 20 fathoms during the last week of November and round whitefish spawned in about 3 fathoms during the first week in December. Fertilized eggs were collected from both species for studies of embryonic and larval development but all of the pygmy whitefish eggs died soon after collection. Fertilized eggs were collected also from lake herring, chubs (Coregonus hoyi and C. kiyi). In addition, eggs of lake herring and chubs (C. hoyi) were cross-fertilized with milt from chubs (C. hoyi) and lake herring, respectively. The eggs will be incubated and the fry reared at the Northville Hatchery, in an attempt to discover characteristics which may aid in field identification of the various forms.

Scanning with the Siscowet's fish magnifier (a modified echo-sounder) confirmed earlier suggestions that lake herring may be pelagic spawners. Night scanning on November 28, 1961, during the peak of the spawning season revealed a heavy concentration of fish (presumably lake herring) at depths of 5 to 15 fathoms, in water 35 fathoms deep. A midwater trawl (converted from a 43-foot semi-balloon bottom trawl) towed 10 fathoms below the surface caught small numbers of lake herring and smelt. A 5-foot, 1/16-inch-mesh net (usually used for the collection of larval fish) which was towed at 20 fathoms, below the concentration of lake herring, caught small numbers of lake herring eggs, and opossum shrimp (Mysis). The eggs undoubtedly were drifting towards the bottom after being released in midwater. Stomachs from the lake herring and smelt caught in the midwater trawl were examined; all of the lake herring stomachs were empty and the smelt contained only mysids.

The concentration of fish, as observed by the fish magnifier, descended to slightly deeper levels during the night and by 10:00 p. m. most fish were at the 10- to 20-fathom depth. Heavy seas prevented further observations but commercial gill nets lifted from the bottom in the same area during the following morning yielded several tons of lake herring. The fish apparently migrated to the bottom sometime during the night, possibly to spawn. Some spawning, however, occurred at midwater levels.

Standard gill-net gangs (1- to 5-inch mesh) were set in three locations among the Apostle Islands. Chubs (Coregonus hoyi) and lake herring were the predominant catches in the East Stockton Island area at 63 fathoms and in the East Outer Island area at 85 fathoms. In the Presque Isle Bay area, catches consisted primarily of smelt at 25 fathoms. Two trawl tows in 20 fathoms east of Basswood Island yielded 27 juvenile lake trout, all of which were fin-clipped.

During the 1961 season the Siscowet captured 536 small (less than 17 inches long) lake trout in the Apostle Islands region. Of the 183 fish which were 2 years old or older, 159 (87 percent) were fin-clipped. Of 353 yearlings, 347 (98 percent) were hatchery-reared fish.

Surface water temperatures during cruise 10 ranged from 42.1° F. east of Stockton Island to 37.0° F. east of Outer Island.

The Siscowet was brought to her winter berth at Bayfield, Wis., immediately after the completion of the cruise.

Note: See Commercial Fisheries Review, Feb. 1962 p. 24.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-16 and "Miss Angela" Cruise MA-10: Concentrations of brown shrimp were located by the research vessels Belle of Texas and Miss Angela during cruises made during January 19-30, 1962. The concentrations were located by the Miss Angela in the offshore area from Freeport to Port Aransas, Tex., particularly in the 35-60 fathom depth range; and by the Belle of Texas in the offshore areas along the Louisiana coast particularly in the Trinity and Ship Shoal areas. This is the first promising concentrations of shrimp found by the research vessels operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory in Galveston, Tex., since the shrimp distribution studies were expanded in the Gulf of Mexico in September 1961.

The two vessels made a total of 27 tows and covered 9 statistical areas (FWS fishing grid zones 13 through 21). In each area one tow was made in each of three depth ranges--0-20 fathoms, 20-40 fathoms, and 40-60 fathoms. A 45-foot shrimp trawl was used.

The biggest catch occurred in area 19 where 73 pounds of heads-on brown shrimp per three hour tow was caught in the 40-60 fathom range and 19 pounds of shrimp was caught in the 20-40 fathom range. Only a negligible amount was caught in the 0-20 fathom range. The shrimp was all 15-20 count size in the 40-60 fathom range and 21-25 count in the 20-40 fathom range.

Hawaii

SKIPJACK TUNA LANDINGS, JANUARY-DECEMBER 1961:

Landings of skipjack tuna in Hawaii during December 1961 were about 290,000 pounds, or about 55,000 pounds more than in November and 60,000 pounds more than the 1948-60 average landings for the month.

The catch per successful trip of 5,234 pounds in December was twice that of November. There were 36 successful trips by Oahu boats in December as compared with 37 in November.

The landings during December were composed of 32.8 percent small (less than 8 lbs.), 24.8 percent medium (8-15 lbs.), and 42.4 percent large (more than 15 lbs. each) skipjack. This shows an increase in the proportion of large fish and a decrease in medium fish as compared to November.

Total estimated landings for January-December 1961 were 11.4 million pounds, about 1.6 million pounds above the 1948-60 average.

Industrial Products

MAJOR INDICATORS FOR FISH MEAL, SOLUBLES, AND OIL, DECEMBER 31, 1961:

Fish Meal Production and Imports				
Item and Period	1961	1960	1959	1958
	(Short Tons)			
Production:				
December	12,300	9,185	14,381	14,636
November	10,058	8,725	10,797	9,749
January 2/	2,713	2,433	3,095	2,075
Jan.-Dec. preliminary 3/	287,900	257,969	275,396	226,299
Jan.-Dec. totals 4/	1/	290,137	306,551	248,140
Imports:				
December	1/	15,564	5,538	8,490
November	25,649	6,149	3,673	6,082
January	9,531	8,571	19,700	7,696
January-November	194,214	115,997	127,416	91,862
January-December	1/	131,561	132,955	100,352

Fish Solubles Production and Imports				
Item and Period	1961	1960	1959	1958
	(Short Tons)			
Production 5/:				
December	4,600	2,897	5,430	6,305
November	5,153	3,542	4,628	8,888
January	1,129	1,392	1,828	825
Jan.-Dec. totals	109,774	98,929	165,359	130,177
Imports:				
December	1/	60	420	5,180
November	3,649	282	3,089	867
January	219	214	954	473
January-November	6,267	3,114	26,210	9,396
Jan.-Dec. totals	1/	3,174	26,630	14,567

(Table continued on following page)

Fish Oil Production and Exports				
Item and Period	1961	1960	1959	1958
	.....(1,000 Gallons).....			
Production:				
December.....	1,500	1,038	1,865	1,839
November.....	1,360	1,202	1,147	1,028
January.....	55	46	64	46
Jan.-Dec. preliminary 6/	33,400	26,690	24,418	21,957
Jan.-Dec. totals 7/...	1/	27,886	24,978	22,028
Exports:				
December.....	1/	2,108	2,611	383
November.....	190	1,952	813	2,037
January.....	1,793	276	898	825
Jan.-November	14,934	17,047	16,653	12,156
Jan.-Dec. totals	1/	19,155	19,264	12,539

1/Not available.
2/Does not include crab, shrimp, and misc. meals.
3/Preliminary data computed from monthly data.
4/Final annual data.
5/Includes homogenized fish.
6/Represents over 95 percent of total production. Data computed from preliminary monthly data.
7/Final annual data.
Note: Data for 1961 are preliminary.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-November 1961: Based on domestic production and imports, the United States supply of fish meal for the first 11 months of 1961 amounted to 470,100 tons--84,100 tons or 22 percent more than in the same period of 1960. Domestic production was 5,500 tons and imports 78,600 tons greater than in the same period of 1960. Peru continued to lead other countries as the principal source of imports with shipments of 132,300 tons during the first 11-months of 1961.

The United States supply of fish solubles, including homogenized fish, during January-November 1961 totaled 111,400 tons--12,300 tons more than in the same period of 1960. Solubles and homogenized fish manufactured from domestically-caught fish made up 94 percent of the supply, while 6 percent of the supply was imported during the first 11 months of 1961.

Fig. 1 - Menhaden purse-seiner vessel at the dock of a reduction plant in Empire, La.

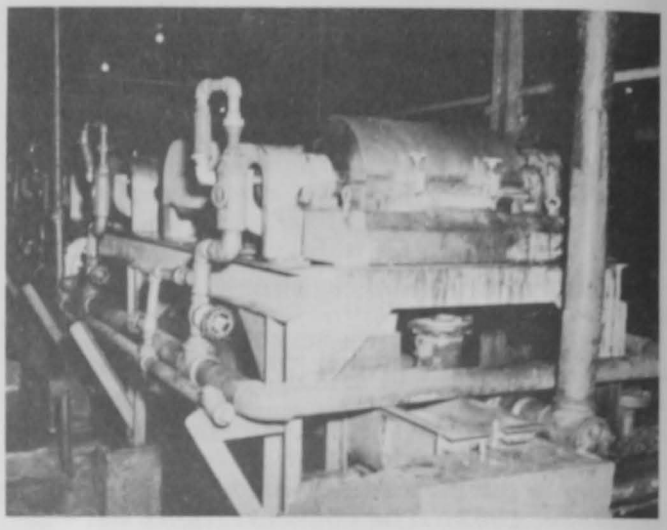


Fig. 2 - At a menhaden plant at Empire, La., a screw press is used to produce press liquor and press cake. From the press cake comes menhaden scrap and meal and from the liquor the oil is extracted as well as the fine solids.

U.S. Supply of Fish Meal and Solubles, January-November 1961 and Comparative Data			
Item	January-November 1961	January-November 1960	Total 1960
	..... (Short Tons)		
Fish Meal and Scrap:			
Domestic Production:			
Menhaden.....	237,286	212,541	218,423
Tuna and mackerel...	19,189	23,963	26,499
Herring, Alaska.....	3,576	6,103	6,103
Other.....	15,504	27,399	39,112
Total production ...	1/275,555	1/270,006	290,137
Imports:			
Canada.....	35,861	29,588	30,982
Peru.....	132,321	58,152	68,156
Chile.....	10,738	17,990	21,183
Angola.....	1,543	360	888
So. Africa Republic...	12,626	6,672	7,073
Other countries.....	1,488	3,235	3,279
Total imports	194,577	115,997	131,561
Available fish meal supply	470,132	386,003	421,698
Fish Solubles:			
Domestic production 2/	105,174	96,032	98,929
Imports:			
Canada.....	935	809	869
Denmark.....	28	1,858	1,858
Other countries.....	5,304	447	447
Total imports	6,267	3,114	3,174
Available fish solubles supply.....	111,441	99,146	102,103

1/Preliminary. Based on reports from firms which accounted for 96 percent of the 1960 total production.
2/50 percent solids. Includes production of homogenized condensed fish.

Maine Sardines

CANNED STOCKS, JANUARY 1, 1962:

Distributors' stocks of Maine sardines totaled only 193,000 actual cases on January 1, 1962, a drop of 40,000 cases or 17 percent from the 233,000 cases on hand on the same date in 1961. Stocks held by distributors on November 1, 1961, amounted to 202,000 cases, and on July 1, 1961, amounted to 208,000 cases, according to estimates made by the U. S. Bureau of Census.

Canners' stocks on January 1, 1962, totaled only 144,000 standard cases (100 $3\frac{3}{4}$-oz. cans), a drop of 885,000 cases (86 percent) as compared with the same date in 1961. Stocks held by canners on November 1, 1961, totaled 221,000 cases and on July 1, 1961, totaled 201,000 cases.

The low level of current stocks reflects one of the shortest packs of Maine sardines in recent years. The total 1961 pack was 679,169 standard cases as compared with 1,970,000 cases in 1960. The Maine Legislator authorized a 1962 season of 13 months--December 2, 1961-January 1, 1963. The 1960 and 1961 seasons ran from April 15 to December 1, the usual legal season for packing canned sardines in Maine.

The pack of canned Maine sardines for the 1962 season which started on December 2, 1961, totaled 6,927 cases as of February 9, 1962.

The carryover of canned Maine sardines at the canners' level on April 15, 1961, was 457,000 standard cases. Adding the 1961 season (April 15-December 1, 1961) pack of 679,000 cases to the carryover, gives a total supply of 1,132,000 cases as of January 1, 1962. This was slightly less than half the available supply on January 1, 1961, of 2,300,000 cases. Shipments April 15, 1961, to January 1, 1962, amounted to 988,000 cases as compared to 1,271,000 cases for the same period a year earlier. The drop in shipments was due to the smaller amount packed in 1961.

Note: See Commercial Fisheries Review, Jan. 1962 p. 22.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1962, with Comparisons 1/

Type	Unit	1961/62 Season		1960/61 Season					1959/60 Season			
		1/1/62	11/1/61	7/1/61	6/1/61	4/1/61	1/1/61	11/1/60	7/1/60	6/1/60	4/1/60	1/1/60
Distributors	1,000 actual cases	193	202	208	215	267	233	277	172	197	252	235
Canners	1,000 std. cases 2/	144	221	201	294	506	1,029	1,258	359	235	397	843

1/Table represents marketing season from November 1-October 31.
2/100 $3\frac{3}{4}$-oz. cans equal one standard case.

Table 2 - Stocks of Canned Maine Sardines in Warehouses of Retail Multiunit Organizations, January 1, 1960-January 1, 1962

Item	1/1/62	11/1/61	7/1/61	6/1/61	4/1/61	1/1/61	1/1/60
Amount (1,000 actual cases)	56	53	53	56	71	53	52
Percent of total distributors' stocks (%)	29.0	26.2	25.5	26.0	26.6	22.7	22.1

North Carolina

"SEA BED DRIFTERS" RELEASED ALONG NORTH CAROLINA SHORE:

Several hundred "sea bed drifters" were released in mid-January 1962 in the area between Cape Hatteras and Cape Fear, N. C., by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Beaufort, N. C. This was done in cooperation with the Woods Hole Oceanographic Institution, Woods Hole, Mass., and the U. S. Coast Guard Cutter Chiluia, stationed at Morehead City.

Recoveries of the drifters will provide scientists with information on the ocean current pattern along the North Carolina coast. This information will be particularly valuable in studies of the distribution of menhaden eggs and larvae being conducted by the Menhaden Program at the Bureau's Pivers Island Laboratory. Waters along the North Carolina coast are known to be an important spawning ground for menhaden, but the means by which the larvae move, or are carried, from the ocean spawning grounds to the estuarine nursery grounds are not clearly understood. Information obtained from recoveries of the drifters will enable the scientists to follow the dispersal pattern of the young fish in relation to the current pattern.

All persons are urged to be on the lookout for sea bed drifters along the shore. The drifter consists of a 7-inch bright yellow plastic disc attached to a pink plastic stem. A 50-cent reward will be paid by the Woods Hole Oceanographic Institution for the return

of each drifter. A mailing tag attached to the top of the disc should be filled in, placed in an envelope, and mailed to the address shown on the tag.

Oregon

CHINOOK SALMON EGGS PLANTED IN COOS RIVER:

Planting of eggs from late fall-spawning chinook salmon into the South Fork of the Coos River was done by biologists and hatcherymen of the Oregon Fish Commission in January 1962.

There remains in the Coos system a remnant chinook population, but at the time when their spawning activities are conducted, water conditions are usually poor. Establishment of a later-spawning chinook run would take advantage of better water flows and more advantageous temperatures.

Nearly one-million eyed eggs were obtained from the California Department of Fish and Game's Nimbus Hatchery on the Sacramento system. The eggs are from late fall-spawning Sacramento system stock. They were buried in gravel in quantities of 5,000 per man-made redd. This closely approximates the number deposited by a single chinook.

Surplus silver salmon eggs from one of the Fish Commission's hatcheries were sent to California in exchange for the chinook eggs.

Studies have shown the stream flow and spawning gravel on the South Fork are sufficient to maintain runs if they can be established. The egg plants were made to conform as nearly as possible to natural conditions, with hatching estimated to start in about five weeks.

The success of this venture cannot be fully determined until the mature fish originating from the plants return to spawn.

Oysters

SHELLFISH MORTALITY CONFERENCE:

The Fourth Annual Shellfish Mortality Conference was held at Solomons, Md., the week of January 22, 1962. Over 40 biologists and research administrators from marine laboratories along the Atlantic, Pacific, and Gulf coasts considered problems associated with the recognition, study, and control of oyster diseases. A large part of the time was devoted to reports on the epidemic caused by MSX.

A biologist from the Virginia Institute of Marine Service, Gloucester Point, Va., reported to the group that in Virginia the distribution of MSX had changed very little since 1960. No new areas were invaded, but there is no evidence that MSX has disappeared from any area once infested. Early summer infections produce late summer kills (about 40 percent in 1961). Late summer infections result in losses the following June and July.

Another scientific paper described and named the agent which causes a mortality of oysters on Seaside, Va. Previously known as SSO, it has been named Haplosporidium costale. Studied carefully by Virginia scientists during the past three years, this protozoan first appears in live oysters about February. Oysters die from it in May and June and then it disappears until the following early spring.

United States Commercial Fishery Landings, 1961

Of the total United States near-record commercial fishery landings of 5.1 billion pounds, 21 percent (1.1 billion pounds) was taken from the coastal waters between Pascagoula, Miss., and Port Arthur, Tex.--only 300 miles apart as the crow flies.

This confirms conclusively the importance of conserving the environment of the Nation's inshore areas for the control, cultivation, and concentration of fisheries, according to the Fish and Wildlife Service's Bureau of Commercial Fisheries. The effects of altering coastlines, for industrial growth and urban development, must be assessed carefully for the protection of bays, inlets, and estuaries needed for fishery resource development. The items taken from the waters between Pascagoula and Port Arthur consisted largely of menhaden, unclassified fish for animal food, crabs, oysters, and shrimp.

Statistics compiled by the Bureau for 1961 reveal that the United States landings of fish, shellfish, and other aquatic products had an ex-vessel value of about $364 million--about 200 million pounds and $10 million more than in 1960 and only two percent under the record 5.3 billion pounds taken in 1956.

Increased landings of menhaden, tuna, jack mackerel, salmon, and king crabs accounted primarily for the increase in 1961. The record catch of menhaden was 45 percent of the total United States fishery landings; packers of

United States Commercial Fishery Landings of Certain Species, 1961 and 1960

Species	1961 1/	1960
	.....(1,000 Lbs.).....	
Anchovies, California	7,400	5,059
Cod, Atlantic:		
Maine	2,100	2,897
Massachusetts	36,200	31,266
Other	5,400	6,218
Total cod	43,700	40,381
Crabs, all species	220,500	221,681
Haddock:		
Maine	2,600	3,834
Massachusetts	130,600	114,643
Other	100	220
Total haddock	133,300	118,697
Halibut 2/:		
Alaska	25,100	21,351
Washington	14,900	16,802
Total halibut	40,000	38,153
Herring:		
Alaska	48,600	77,913
Maine	51,500	152,327
Industrial fish, Me. & Mass. 3/	41,900	43,798
Mackerel:		
Jack	98,300	74,945
Pacific	40,200	36,810
Menhaden	2,295,900	2,018,263
Ocean perch, Atlantic	134,200	141,433
Oysters, all species	57,800	60,010
Salmon:		
Alaska	263,700	207,100
Washington	29,400	16,528
Other	15,500	11,819
Total salmon	308,600	235,447
Sardines, Pacific	40,100	57,533
Scallops, sea (meats)	27,400	26,599
Shrimp (heads-on):		
South Atlantic & Gulf	155,000	236,939
Alaska	12,600	7,436
Washington	1,500	1,805
California	2,000	2,028
Other	700	1,244
Total shrimp	171,800	249,452
Squid, California	4,200	2,562
Tuna	333,600	298,203
Whiting:		
Maine	14,100	11,123
Massachusetts	67,700	87,348
Other	16,000	13,131
Total whiting	97,800	111,602
Total all above items	4,196,800	4,010,868
Other 4/	943,200	931,361
Grand total	5,140,000	4,942,229

1/Preliminary.
2/Dressed weight.
3/Excludes menhaden.
4/Includes landings for species not listed.
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

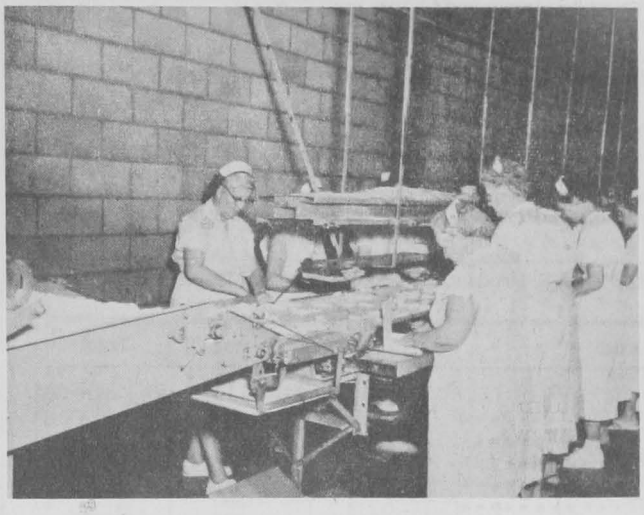


Fig. 1 - Breaded shrimp are hand-packed in cartons prior to freezing in a processing plant in Brunswick, Ga.

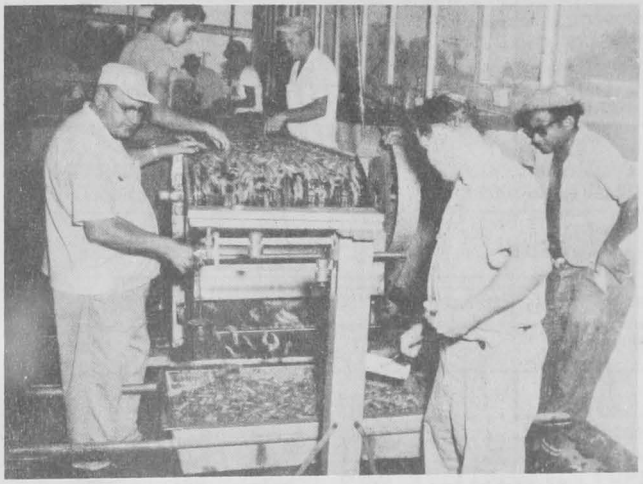


Fig. 2 - Weighing shrimp in a canning plant in Westwego, La. On the scale is a tared weighing bucket. Unsuitable shrimp and marine debris are removed as shrimp travels along the conveyor belt.

canned tuna put up the largest tuna pack in history. The catch of king crabs, sea scallops, and striped bass also hit new highs. Cod, haddock, anchovies, and Pacific mackerel also were taken in considerably greater volume, while large declines occurred in catches of herring (in both Maine and Alaska), sardines, shrimp, and whiting.

Prices for most items advanced during the year and, according to the "Wholesale Prices and Indexes for Edible Fishery Products," prices were 7.8 percent higher in December 1961 than in December 1960.

During 1961, the domestic catch for human consumption continued static, 17 percent below the 1948-1953 average. It was exceeded in quantity by that taken for industrial products, bait, and animal food. Imports of edible fishery products increased over 100 percent.

Note: See Commercial Fisheries Review, January 1962 p. 32.

U. S. Production of Fish Sticks and Portions, 1961

The United States production of fish portions in 1961 amounted to 60.1 million pounds valued at $21.1 million and the production of fish sticks totaled 69.9 million pounds with a value of $29.6 million. Compared with 1960, fish portions were 10.7 million pounds (22 percent) greater in quantity and $3.5 million (20 percent) greater in value. Fish-stick production was up 4.8 million pounds (7 percent) in quantity and $906,000 (3 percent) in value.

During 1961, 11.2 million pounds of breaded cooked and 46.9 million pounds of breaded raw portions were processed--97 percent of the 1961 total. Unbreaded portions accounted for the remaining 1.9 million pounds or 3 percent.

Table 1 - U.S. Production of Fish Sticks by Months and Type, 1961 1/

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January	5,734	357	6,091
February	6,721	371	7,092
March	6,678	555	7,233
April	5,229	377	5,606
May	4,771	365	5,136
June	4,613	325	4,938
July	3,272	313	3,585
August	6,344	593	6,937
September	4,862	354	5,216
October	5,752	391	6,143
November	5,848	450	6,298
December	5,261	367	5,628
Total quantity 1961	65,085	4,818	69,903
	($1,000)		
Total value 1961	27,844	1,733	29,577
Total value 1960 2/	26,792	1,879	28,671

1/Preliminary.
2/Revised.

Table 2 - U.S. Production of Fish Sticks by Months, 1958-1961

Month	1961 1/	1960 2/	1959	1958
	(1,000 Lbs.)			
January	6,091	5,511	6,277	5,471
February	7,092	6,542	6,352	5,925
March	7,233	7,844	5,604	5,526
April	5,606	4,871	4,717	4,855
May	5,136	3,707	4,407	4,229
June	4,938	4,369	4,583	4,702
July	3,585	3,691	3,790	4,574
August	6,937	5,013	3,879	4,358
September	5,216	5,424	5,353	5,328
October	6,143	6,560	5,842	5,485
November	6,298	6,281	4,831	5,091
December	5,628	5,329	4,743	5,467
Total	69,903	65,142	60,378	61,011

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Sticks by Areas, 1961 and 1960

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	57,269	23	53,259
Inland and Gulf States	7	6,772	8	6,161
Pacific Coast States	10	5,862	8	5,722
Total	40	69,903	39	65,142

1/Preliminary.
2/Revised.

Table 4 - U.S. Production of Fish Portions by Months, 1961 1/

Month	Breaded		Total	Unbreaded	Total
	Cooked	Uncooked			
	(1,000 Lbs.)				
January	694	3,472	4,166	137	4,303
February	756	3,940	4,696	206	4,902
March	1,322	4,339	5,661	170	5,831
April	798	3,565	4,363	144	4,507
May	848	2,944	3,792	110	3,902
June	552	3,352	3,904	159	4,063
July	730	3,146	3,876	110	3,986
August	609	4,252	4,861	126	4,987
September	1,342	4,262	5,604	165	5,769
October	1,591	4,959	6,550	233	6,783
November	1,000	4,580	5,580	233	5,813
December	1,011	4,052	5,063	152	5,215
Total quantity 1961	11,253	46,863	58,116	1,945	60,061
	($1,000)				
Total value 1961	4,563	15,771	20,334	718	21,052
Total value 1960 2/	3,663	12,949	16,612	905	17,517

1/Preliminary.
2/Revised.

Table 5 - U.S. Production of Fish Portions by Areas, 1961 and 1960

Area	1961 1/		1960 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	26	34,567	24	29,028
Inland and Gulf States	12	24,016	11	19,184
Pacific Coast States	6	1,478	5	1,169
Total	44	60,061	40	49,381

1/Preliminary.
2/Revised.

Table 6 - U.S. Production of Fish Portions by Months, 1958-1961

Month	1961 1/	1960 2/	1959	1958
	(1,000 Lbs.)			
January	4,303	3,632	2,692	1,973
February	4,902	3,502	3,025	1,254
March	5,831	4,706	3,225	1,471
April	4,507	3,492	2,634	2,268
May	3,902	3,253	2,684	1,478
June	4,063	3,995	3,247	1,504
July	3,986	4,088	2,227	2,161
August	4,987	3,558	2,796	1,516
September	5,769	4,631	3,558	1,566
October	6,783	5,275	4,314	2,560
November	5,813	4,790	3,483	1,979
December	5,215	4,459	3,262	2,060
Total	60,061	49,381	37,147	21,790

1/Preliminary.
2/Revised.

The 1961 fish-stick production consisted of 65.1 million pounds cooked fish sticks (93 percent) and 4.8 million pounds (7 percent) raw fish sticks.

The Atlantic Coast States led all areas in the production of both fish portions and fish sticks with 34.6 and 57.2 million pounds, respectively. The inland and Gulf States were next with 24 million pounds of fish portions and 6.8 million pounds of fish sticks. The Pacific Coast States made up the remaining 1.5 million pounds of fish portions and 5.9 million pounds of fish sticks.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, DECEMBER 1961:

During December 1961, a total of 20 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 16 in December 1960. The number issued first documents in 1961 was 3 less than in 1960. Also, there were 49 more documents cancelled for fishing vessels in 1961 than in 1960. This means that in 1961 there was a decline in the number of vessels documented for fishing.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, December 1961 with Comparisons

Area (Home Port)	Dec. 1961	Dec. 1960	Total 1961	Total 1960
	(Number)			
Issued first documents 2/:				
New England	1	2	33	35
Middle Atlantic	1	-	12	18
Chesapeake	6	2	74	78
South Atlantic	4	1	44	47
Gulf	6	5	103	90
Pacific	2	5	149	146
reat Lakes	-	1	12	18
Puerto Rico	-	-	2	-
Total	20	16	429	432
Removed from documentation 3/:				
New England	2	-	20	22
Middle Atlantic	3	3	32	18
Chesapeake	-	3	27	21
South Atlantic	2	2	29	38
Gulf	7	6	103	90
Pacific	7	7	111	87
Great Lakes	-	1	17	13
Puerto Rico	-	-	-	1
Total	21	22	339	290

1/For explanation of footnotes, see table 3.

Table 2 - U. S. Fishing Vessels 1/--Documents Issued and Cancelled, by Tonnage Groups, December 1961

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	7	6
10-19	5	7
20-29	1	2
30-39	2	1
40-49	-	1
50-59	1	3
60-69	1	-
70-79	2	-
230-239	-	1
810-819	1	-
Total	20	21

1/For explanation of footnotes, see table 3.

Table 3 - Fishing Vessels--Documents Issued, 1938-1961

Year	First Documentation	Redocumentation	Total
	(Number)		
1961	409	20	429
1960	408	24	432
1959	479	34	513
1958	684	29	713
1957	601	18	619
1956	521	17	538
1955	418	23	441
1954	717	28	745
1953	729	25	754
1952	675	20	699
1951	780	28	808
1950	812	29	841
1949	1,002	42	1,044
1948	1,184	38	1,222
1947	1,300	48	1,348
1946	1,085	117	1,202
1945	741	4/	4/
1944	635	4/	4/
1943	358	4/	4/
1942	358	4/	4/
1941	354	4/	4/
1940	320	4/	4/
1939	357	4/	4/
1938	376	4/	4/

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 14 in 1961, 2 in 1960, and 4 prior to 1951. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
4/Data not available.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1962 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Jan. 1962	Dec. 1961	Jan. 1962	Dec. 1961	Nov. 1961	Jan. 1961
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					143.0	143.6	141.1	130.9
Fresh & Frozen Fishery Products:					157.6	158.9	154.6	146.2
Drawn, Dressed, or Whole Finfish:					156.1	163.8	153.0	162.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.14	101.3	141.8	98.5	125.2
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.37	.36	115.5	109.8	108.3	92.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.86	.86	193.8	193.8	191.0	202.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.74	.63	183.5	156.2	204.6	179.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.57	.64	132.5	148.9	111.4	152.4
Processed, Fresh (Fish & Shellfish):					164.8	161.5	158.8	145.9
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.36	.32	122.5	107.2	115.7	132.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.94	.92	148.5	144.6	138.3	118.5
Oysters, shucked, standards	Norfolk	gal.	7.88	7.88	194.9	194.9	194.9	185.6
Processed, Frozen (Fish & Shellfish):					134.4	133.7	133.9	116.0
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.39	103.4	100.8	100.8	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.33	103.6	103.6	109.9	109.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.33	.31	132.9	124.9	120.8	118.8
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.92	.92	141.2	141.2	138.1	107.2
Canned Fishery Products:					122.1	121.9	121.8	109.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	143.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.15	12.15	87.6	87.6	87.6	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	5.15	5.00	120.2	116.7	114.4	91.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	12.31	12.31	131.0	131.0	131.0	90.5

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.

Wholesale prices of the fresh processed products rose 2.0 percent from December to January. Shucked oyster prices at Norfolk held steady at the same level since November 1961, but prices for fresh haddock fillets were up 14.3 percent and for fresh shrimp were up 2.7 percent during that period. Fresh processed prices were 13.0 percent higher in January 1962 than in the same month a year earlier. During that period, because of substantially light production in the South Atlantic States, fresh shrimp prices at New York City were up 25.3 percent. In that period, oyster prices rose 5 percent because the oyster industry continued to experience very low production. Offsetting those decreases was a 17.7-percent drop in the prices of fresh haddock fillets at Boston because of heavier landings of haddock in January 1962.

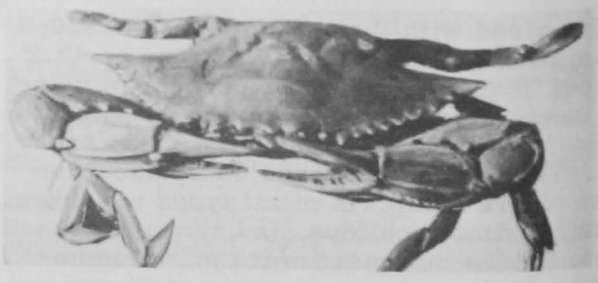
Processed frozen fishery products prices this January were all higher than the previous month, with prices for frozen flounder fillets at Boston up 2.6 percent and frozen ocean perch fillets up 6.4 percent, but haddock fillet prices remained steady at the December 1961 level. Prices for this subgroup this January were up 15.9 percent from the same month a year ago. Prices for frozen flounder fillets were up 1.3 percent, ocean perch fillets were up 11.9 percent, and shrimp a substantial 31.7 percent. On the other hand, frozen haddock fillet prices at Boston dropped 5.7 percent because of larger supplies. Shrimp stocks continued to be substantially lower than a year earlier.

Canned fishery products prices from December to January continued to inch upward principally because of a 3.0-percent rise in the prices for California tomato-packed sardines, the pack of which through January 1962 was still considerably behind the light pack of a year ago. Compared to January 1961, canned fishery products prices this January were up 11.1 percent. Prices for canned pink salmon at Seattle were up 1.8 percent, canned tuna at Los Angeles were up 10.5 percent, canned California sardines at Los Angeles were up 32.1 percent, and canned Maine sardines at New York City were up 44.8 percent. Canned Maine sardine supplies were very light and practically exhausted as of January because of the very light pack in 1961.

Virginia

SCIENTISTS FORECAST DECLINE IN BLUE CRAB FISHERY:

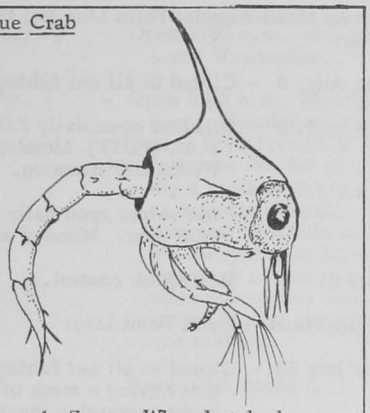
Marine scientists predicted on February 5, that the blue crab catch in Virginia will be much below average for the winter of 1962



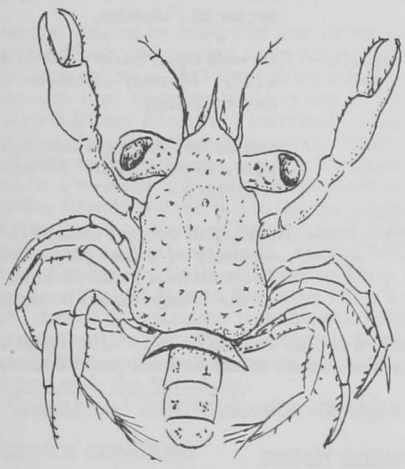
Blue Crab

and the spring of 1963. The forecast of a poor catch may be bad news to Virginia watermen and dealers who have seen wide fluctuations in the supply of crabs for over ten years. Since September of 1960, Chesapeake Bay watermen have found the supply of crabs exceeding even the bumper crop of 1950, which had been the largest in the history of this 80-year-old fishery. Now it appears there is little likelihood of a continuance of these good catches into 1963.

Blue Crab



1. Zoea - When hatched.



2. Megalops - Second form after molting from the zoeal stage.

Scientists conducting crab research at the Virginia Institute of Marine Science (Virginia Fisheries Laboratory), Gloucester Point, Va., since 1955 have been making predictions of the crab supply a year in advance of the fishery. These predictions are based on extensive studies of recently-hatched crabs and are continually verified as the crabs grow to market size. First estimates are made from experimental York River trawl catches between Pages Rock and Bell Rock.

During the survey from September through November 1961, the number of small crabs was significantly lower than found in any previous year.

However, sometimes crabs spawn in large numbers in the fall. If this happened in the fall of 1961, the sampler would not collect any of the small crabs from that spawning until April of this year. When the spring survey is made, a more favorable forecast may be possible.

Although past predictions have been remarkably accurate, the technique is being improved by studying the relation between tidal currents and the number of small crabs caught. It has been found that samples taken during low slack tide are far below those at other stages of the tide. Predictions based on such samples would be too low.

The scientists plan to conduct similar surveys in the Rappahannock River this summer to make comparisons with York River catches.

The crab fishery between now and September is expected to be below average, for the catch will depend on legal-size crabs remaining in the Bay at the close of the winter dredge fishery plus other crabs which wintered over in the river. From September through November, pot fishermen will find their catch considerably below normal.