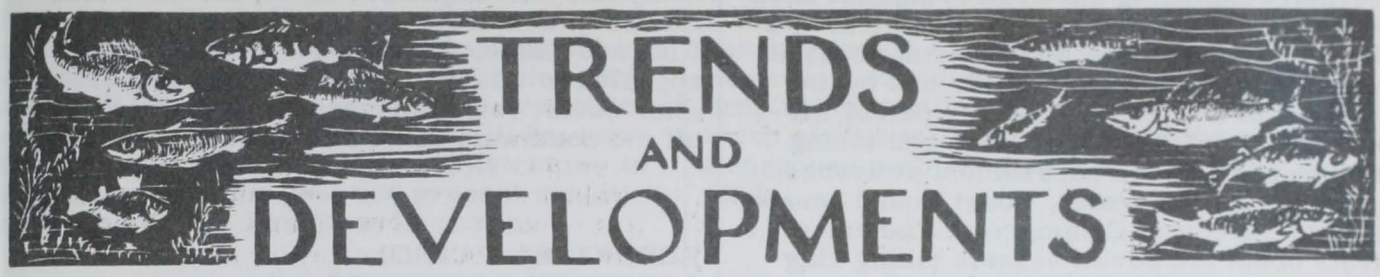

Alaska

FOREIGN FISHING ACTIVITIES IN BERING SEA AND GULF OF ALASKA:

There was a progressive reduction in the number of foreign fishing vessels operating in the Bering Sea and Gulf of Alaska during September 1963, mainly with the Japanese. Several of the long-line fleets were reportedly scheduled to have returned to Japan. By month's end an estimated 130 Japanese and 70 Soviet vessels were believed to be fishing in the Bering Sea and Gulf of Alaska.

Most of the Soviet trawl fleet moved south from the Portlock Bank area until major efforts were concentrated on Albatross Bank east of Kodiak Island. That fleet appeared to be the bulk of the Soviet fishing effort and was composed of about 30 SRT trawlers, 2 SRT-R trawlers, 3 BMRT trawlers, 8 refrigerator ships, and a few support vessels.

Japanese fisheries efforts were rapidly drawing to a close in the Bering Sea as vessels departed for the home islands. The two king crab fleets reportedly may extend their scheduled departure dates as they were behind in their quota. The Japanese fleet in waters adjacent to Alaska during September was estimated to be about 130 vessels of all types.

Foreign fishing activities off Alaska were curtailed even more by mid-October. From a high of more than 400 Soviet and Japanese vessels engaged in the fisheries during July, the foreign fleet strengths dwindled to about 45 vessels in October. Shrimp fishing north and west of the Pribilof Islands was then the sole remaining Japanese fishery in the eastern Bering Sea. Nearly 200 other Japanese vessels which were harvesting king crab, whales, Pacific ocean perch, cod, and flatfishes returned to their home bases. Japanese operations in the Gulf of Alaska during October were restricted to two stern ramp factory trawlers fishing off southeast Kodiak Island. Observations of those trawlers showed they were catching mainly Pacific ocean perch and that they were intermittently serviced by various types of support vessels.

The Soviet trawling fleet operating near Kodiak Island in October had diminished to less than 15 vessels, in contrast to over 150 vessels in the same area during July. It was anticipated that the Soviets will follow a pattern similar to previous years, returning to fish the eastern Bering Sea later in the winter when the edges of the pack ice have advanced to the fishing grounds and can be used for protection from the frequent storms in that area.

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SOVIET TRAWLERS AGAIN FORCE ABANDONMENT OF KODIAK KING CRAB GROUNDS:

In September 1962 Soviet trawlers invaded grounds off Kodiak being fished by United States king crab fishermen. The resulting losses of stationary king crab pot gear to mobile Soviet trawls generated a storm of protest from United States fishermen, congressional delegations, and the press. High losses of expensive crab pots caused many fishermen to make threats of armed retaliation. However, there was no evidence that the Soviet fishermen were taking any species other than Pacific ocean perch.

In September 1963, a similar situation arose when Soviet trawlers moved inshore and began bottom trawling around and through United States crab fishermen's gear. This time, however, the evidence appeared conclusive that the Soviets were taking king crab in commercial quantities in the vicinity of Alitak Bay and the Trinity Islands south of Kodiak.

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SOVIET VESSELS LEAVE CRAB GROUNDS WHEN U. S. PATROLS ARRIVE:

Alaskans aboard the United States king crab vessels stated that the Soviets were de-

liberately damaging and destroying gear used by the Americans. It was reported that the Soviets appeared to be very blatant about it and seemed completely undisturbed by the presence of a U. S. Coast Guard patrol aircraft flying overhead observing and taking photographs of their harassment activities. United States fishermen, Coast Guard personnel, and Bureau of Commercial Fisheries agents observed Soviet vessels taking king crab. Documented evidence and films of the Soviet operations were forwarded to Washington, D. C.

The Coast Guard Cutters Winona and Storis were dispatched from the Bering Sea Patrol to the scene, with the Winona arriving there on September 7 and the Storis on September 8. When the Winona arrived, the staff aboard found United States and Soviet vessels intermingling in the international waters west of Low Cape on the south end of Kodiak Island. Soviet fishing vessels left the immediate area off Kodiak on September 7 when the Coast Guard Cutter Winona appeared on the scene. United States crab fishermen were indignant at the apparently deliberate and ruthless destruction of their expensive gear and a sense of impending violence could be felt in the Kodiak area as threats reached fever pitch.

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U. S. PROTESTS SOVIET KING CRAB TRAWLING OFF KODIAK ISLAND:

The State Department advised Alaska's Governor that it had lodged a protest with the Soviet Embassy in Washington over Soviet trawling on United States king-crab fishing grounds off Kodiak Island. The Deputy Under Secretary of State, informed Governor Egan in a wire that the matter had been taken up with the Soviet Embassy and that they had agreed to take the complaint to Moscow immediately. (Alaska Empire.)

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FOREIGN FISHING FLEETS TARGET OF KODIAK MEETING:

Kodiak fishermen met with the Alaska Attorney General on September 14 concerning their complaints that Soviet fishermen were interfering with the Kodiak king crab vessels. Eight captains of fishing vessels who had difficulty with the Soviet trawlers were flown to Kodiak for public hearings in the District Magistrate's court. The meeting was called to allow the Attorney General to gather testimony and was organized by the Kodiak Island Advisory Committee to the Alaska Board of Fish and Game. The Kodiak crab industry appealed to Alaska's Governor for support after Soviet vessels entered king crab waters off the southwest tip of Kodiak.

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BERING SEA PATROL ACTIVITIES DIMINISHED:

Fisheries patrols in the Bering Sea and Gulf of Alaska were reduced with the depar-

Bureau's research vessel John R. Manning.

ture of the Coast Guard Cutter Winona for her home port of Port Angeles, Wash. The Winona completed the final tour of intensified patrol which began with the Cutter Wachusett and was continued by the Klamath. The Coast Guard Cutter Storis was scheduled to complete the final phase of the joint Bureau of Commercial Fisheries-Coast Guard fisheries patrol on October 1. The Bureau's research vessel John R. Manning was dispatched to the Kodiak king crab grounds to augment the diminished Coast Guard surface patrol. Plans call for the assignment of two additional Coast Guard surface vessels on a rotational basis from October through December 1963, to maintain patrol of the king crab-fishing area off southwest Kodiak.

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INTER-AGENCY SALMON COUNCIL REVIEWS STATUS OF PACIFIC SALMON:

The third meeting of the Inter-Agency Salmon Council Technical Committee was held in Portland, Oreg. Members from all of the

U.S. Pacific states and regions presented initial drafts of salmon status reports for their respective regions. Alaska's assignment included Karluk, Bristol Bay, Peninsula, and Aleutian Chain salmon runs. The reports are adapted to a simple format and will be combined to allow the salmon administrators to see at a glance the past and present condition of the important Pacific salmon runs.

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FISH PROCESSING ADVICE AVAILABLE FROM BUREAU'S KETCHIKAN TECHNOLOGICAL LABORATORY:

Information on subjects such as a home preservation method for raw seal oil, making seafood products from seaweed, sea urchins, sea cucumbers, or a method for preparing sturgeon, is provided by a U.S. Bureau of Commercial Fisheries technical advisor to the Alaska fishing industry. The technical advisor makes his headquarters at the Bureau's Technological Laboratory in Ketchikan and his job is to provide expert advice on processing methods--canning, freezing, curing, smoking--to Alaska's commercial processors. To provide this service, he visits processors to answer their questions, to observe their procedures, and to offer constructive criticism.

In addition to advisory services, limited applied research is conducted to solve specific processing problems revealed on field trips. One vexing problem in king crab is to develop canning procedures that will enable producers to more accurately predict the processed weight of crab meat in a can for a given raw meat input. For this purpose crab-canning experiments are in progress at the Ketchikan laboratory.

Alaska seafood processors may contact the U.S. Bureau of Commercial Fisheries Technological Laboratory, 622 Mission Street, Ketchikan, Alaska, with their questions and processing problems. Solutions to technological questions may not always be readily available but prompt replies to all inquiries will be made.

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CRAB CATCH PROMISING FOR 1963:

According to data tabulated by the Alaska Department of Fish and Game, the king crab catch totaled 33.5 million pounds for the period January-July 1963. The catch of Dungeness crab totaled about 5 million pounds for the same period. Data on the catches for a comparable period in 1962 are not available. However, indications are that the 1963 Alaska crab catches will exceed the record king crab catch of 52.8 million pounds and the record Dungeness crab catch of 9 million pounds in 1962.

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ALASKA CANNED SALMON COMPARISONS:

The total pack of salmon in 1963 will be about 2,676,000 cases, down approximately 734,000 cases or 22 percent when compared with the total 1962 pack of 3,410,000 cases. Southeastern Alaska's pack totaled 1,185,000 cases, in 1963, up 277,000 cases or 30 percent compared with the 1962 pack of 908,000 cases. Central Alaska packed 1,200,000 cases in 1963, down 789,000 cases or 40 percent from the 1962 pack of 1,989,000 cases. Western Alaska packed 291,000 cases in 1963, down 223,000 cases or 43 percent from the previous year's pack of 514,000 cases.

The percentage composition of the Alaska salmon packs by species for the last 3 years were:

Percentage Composition of Alaska Salmon Pack, 1961-63

Species	1963	1962	1961
		(Percent)	
Kings	1.5	1.3	1.7
Chums	15.5	19.9	16.3
Pinks	60.2	54.1	39.1
Reds	18.1	21.6	40.4
Cohos	4.7	3.1	2.5

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SOUTHEASTERN ALASKA SALMON FISHERIES:

Most salmon canneries in the Ketchikan area of Southeastern Alaska closed for the 1963 season after small packs of only 40 to 70 thousand cases. These results were in sharp contrast to the very good seasons enjoyed by the canneries in the Northern panhandle and on the West Coast of Prince of Wales Island where packs generally exceeded 100 thousand cases per plant. A number of seine boats of the Alaska fleet traveled south in 1963 to fish in Puget Sound where a very good seining season had been predicted. This movement extended the seasonal use of those vessels for several weeks and added needed income to several fishing communities. Late reports were that results were modest and most boats were to have returned to Alaska by October 1.

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ALASKAN SHRIMP FISHERIES AT CROSSROADS:

Shrimp processors at Seldovia closed up their 1963 seasonal operation after reporting an increase in production of about 10,000 cases over the previous year's 35,000-case pack. At Seward, the firm producing shrimp logs was terminating operations until possibly March 1964 due to marketing difficulties. Other shrimp producers either closed shop or were producing at a restricted volume. One exception was a plant at Kodiak which has active plans to enter shrimp production concentrating on side-stripe shrimp which are of larger size than the small Alaskan pinks. Tentative plans are to pay the fishermen 10 cents per pound for the side-striped shrimp. This increase of 6 cents per pound over the price paid for pink shrimp is hoped to be sufficient to compensate for catch rates that are expected to be considerably lower than can be realized when fishing for the pinks.

Waterfront rumors attribute the low cost of the Japanese shrimp for much of the difficulties that the Alaskan producers are facing. Other factors such as the increased production of Indian shrimp, and the competition from higher quality domestic production are not often heard.

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NEW FIRM PLANNED FOR JUNEAU AREA:

A newly formed corporation plans to process king crab, Dungeness crab, shrimp, and other seafoods in the Juneau area. The company will continue operations started in 1962 by another firm. The newly formed corporation hopes to purchase an old cannery at Douglas to house processing facilities and a cold-storage facility to handle the production of about ten fishing vessels. The management expects to employ about 25 to 30 plant workers.

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NEW FISHWAY ON KODIAK ISLAND OPENS LARGE SPAWNING AREA FOR SALMON:

Completion of the Frazer Fishway on Kodiak Island has made accessible to salmon one of the greatest potential red salmon producing areas in western Alaska, according to an announcement by the Commissioner of the Alaska Department of Fish and Game.

The fishway, constructed around the 33-foot Frazer Falls, opens up a 5,000-acre rearing area in the 72-square mile Frazer Lake watershed. The falls had been an impassable barrier for salmon to the large basin.

Biologists of the Department estimate that the once barren waters could produce as many as three million red salmon a year if all optimum conditions were met. It is expected, however, that the average yearly production will fall somewhat under that figure even after a population of optimum numbers of spawning salmon has been built up. This will probably take a period of years.

The portable aluminum steep-pass used on the project was developed by the Director of Engineering for the Alaska Department. It was the first practical application of the adaptation of a lightweight shop prefabricated fishway that could be flown out to a remote area and bolted together on the spot. (Alaska Department of Fish and Game, October 15, 1963.)

Department biologists have stocked Frazer Lake since 1951, 12 years prior to the construction, by various methods including eggs and spawning adult salmon. To date, the transportation of adult fish from Red River Lake has proven the least expensive and most feasible method. The adult fish which returned to Frazer this year were the result of plants of eyed-eggs obtained from Karluk Lake five years ago.

The purpose of the egg plants was twofold: (a) to determine whether Frazer Lake could raise red salmon satisfactorily; and (b), to build up a brood stock that would be established by the time money was available for laddering the falls. The topographic survey to select the best route for laddering the falls was made in July 1957.

Two steep-pass fishways designated as A and C were installed side by side so that a comparison could be made of their over-all performance. The A type with vertical baffles was first developed in 1957. It produces a cascading tumbling type of water action somewhat slower than C's which produces a streaming type flow over baffles that have a 30 percent slope.

Even without the completion of the effective leads to guide the salmon into the ladder, which are scheduled for completion next spring, the fishpass was ascended by 2,500 red salmon and 3,000 pink salmon into Frazer

Lake during 1963. Of the red salmon, 65 percent preferred the A and 35 percent the C. Sixty-eight percent of the pinks used the C and 35 percent the A.

The original concept for a steep-pass of this type was developed in Europe, the Director of Engineering for the Alaska Department said. It never caught on in the United States because many early experimenters failed to fully comprehend its basic operating principles. The Engineering Director feels that it is with blocks of up to 10 feet of head that the steep-pass fishway will have its greatest application and that the 33 feet lift in 4 steps at Frazer Falls approaches its upper limits of economic usefulness.

He does not intend the steep-pass to be a substitute for more conventional fish ladders such as those employed on the Columbia River. It was developed by the Department as an effective solution for installation at the host of low control barriers in wilderness areas where conventional construction would be difficult and expensive. Such projects are in line with the State's program of enhancing our fisheries resources by improving and extending the habitat for our salmon thus providing more fish for the future, the Commissioner of the Alaska Department of Fish and Game stated.

Alaska Fisheries Investigations

KARLUK RED SALMON SPAWNING ESCAPEMENT HIGH FOR 1963:

In spite of heavy August commercial fishery in the Karluk lagoon, the 1963 red salmon escapement into Karluk Lake was over 371,000 fish by mid-September. This will constitute a high spawning level in comparison with recent years, although over 500,000 red salmon spawned in the Karluk system in 1962. The usual fall spawning distribution occurred where most of the September spawners were observed in the terminal streams and on the lake beaches.

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BROOKS STATION ECOLOGY STUDIES:

Limnological and trace element experiments were continued at Brooks Station staff during September 1963. Early results suggest that deficiencies in cobalt, lithium, manganese, molybdenum, and vanadium are at times limiting primary productivity. Lake water sampling for detailed analyses was completed. The array of red salmon lakes sampled in 1963 are Nonvianuk, Kukaklek, Coville, Grosvenor, Iliuk Arm, Naknek Lake in South Bay and North Arm basins, Brooks, Becharof, Upper and Lower Ugashik, and Karluk.

Studies on young red salmon and stickleback utilizing holding pens in Brooks Lake have been under way in 1963. A careful inventory in early September showed that mortalities of both species have been quite low. Initial comparison of fish from the different pens seems to indicate that intraspecific competition and not interspecific competition has influenced the growth of the young sockeye.

Sockeye salmon adults from three major spawning waves were captured and the eggs spawned artificially. Over 100 Vibert plastic boxes were buried at specific times, each with 150 eggs. These egg samples have been recovered systematically after known calendar and thermal history. A set of preserved early embryological stages by 10 TU (Centigrade Temperature Units) stages is nearly complete to the 300 TU stage. Boxes will be systematically recovered up to time of fry hatching. A thorough description of the macro and micro embryological development of the sockeye salmon is scheduled on the basis of these samples. Of greater importance is the utility of this information in determining the effects of superimposition. This phase of the egg study will be conducted in late October following the termination of spawning in Brooks River.

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COMMERCIAL SIZED KING CRAB MALES SCARCE ON ALBATROSS AND PORTLOCK BANKS:

The tagging of king crabs aboard the U. S. Bureau of Commercial Fisheries research vessel John R. Manning continued until she was assigned to other duties in mid-September. In one month's effort, only about 600 males were tagged out of 3,500 crabs captured. Large numbers of females were taken in pots, especially on Albatross Bank. Trawling for crabs was not as productive as pot fishing. Severe storms hampered the operations in early September.

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SOUTHEAST ALASKA PINK SALMON RUN SHOWS UNEXPECTED OCEAN MORTALITY:

The total escapement of pink salmon to Sashin Creek at Little Port Walter was about 17,000, representing only 0.3 percent survival of the 5.94 million fry counted from the stream in spring 1962. Based on relationships between numbers of fry migrating to sea in previous years and numbers of adults returning, between 50 and 100 thousand adults were expected. Causes of the unusually high marine mortality are unknown. It would appear, however, that marine mortality may have been density dependent and that herring predation, which was observed in other brood years, was not the major factor because few herring were observed in the area in spring of 1962.

Using Little Port Walter as a base of operations, two weeks were spent in early September fishing for juvenile pink salmon with longline and floating surface round haul seine. The longline was effective for juvenile coho salmon, but not for pink salmon.

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YOUNG PINK SALMON DISCOVERED MOVING TOWARDS OPEN OCEAN IN LARGE CONCENTRATION:

A concentration of immature pink salmon estimated to number in the millions was discovered near Little Port Walter and followed for 50 miles along the west shore of lower Chatham Strait. The rate of migration of this immense school gradually accelerated from $2\frac{1}{2}$ miles a day to over 6 miles a day during the final 3 days of observation. Pink salmon in this vast school ranged in body length from 125 to 220 millimeters. The most successful technique for catching them was on the flood tide near shore. Migrating schools were found to be at or near the surface and could be easily discovered by the jumping of individuals out of the water. The population of young salmon seemed to be transported seaward by the movement of tides. During the flood tides, they maintained their position relative to land; whereas during the ebb tides, they allowed themselves to be carried along by the outgoing water.

Chum salmon juveniles comprised 5 to 10 percent of the salmon schools caught in the seine and averaged from 135 to 195 millimeters in body length. This is the first known instance in which juvenile salmon of this age have been successfully observed and caught in large numbers, and the fishing technique developed represents a major advance in the quest for knowledge of salmon. Detailed studies on these early marine stages will be necessary to understand large unexpected ocean mortalities such as occurred with the present adult run at Little Port Walter.

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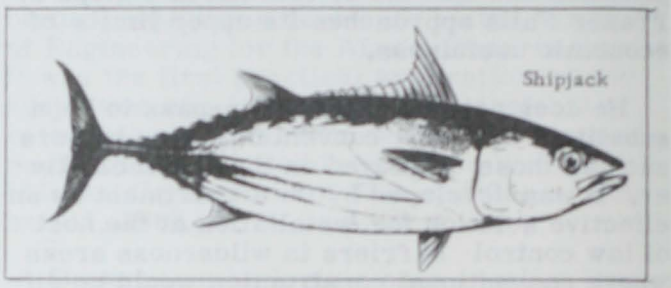
WARM-OCEAN FISH APPEAR IN ALASKA:

In addition to the occurrence of the Pacific bonito in Alaskan waters during the summer of 1963, a large 700-pound leatherback turtle was caught in the region of Cordova, a basking shark was taken in the vicinity of



Haines, and skipjack tuna appeared in the region of Controller Bay. All are indicative of an incursion of warmer southerly or southeasterly waters into the Gulf of Alaska during the summer. The basking shark occurrence may not be as rare as it seems because there have been previous reports of similar sharks in the region. That species is recorded as entering the Gulf of Alaska, but there is no actual documentation of it.

American Samoa

MORE KOREAN TUNA VESSELS FISH OUT OF AMERICAN SAMOA:

The second United States tuna cannery now in operation at American Samoa is reported to have several Korean tuna-fishing vessels delivering tuna to its plant. Japan is concerned over this trend on the part of the two United States tuna-processing plants at American Samoa. These firms appear to be relying more and more on Korean tuna vessels to provide their raw tuna supply. This trend, reportedly, is accelerated in part by the difficulty the United States firms are experiencing in attracting sufficient numbers of Japanese ice vessels to fish for them.

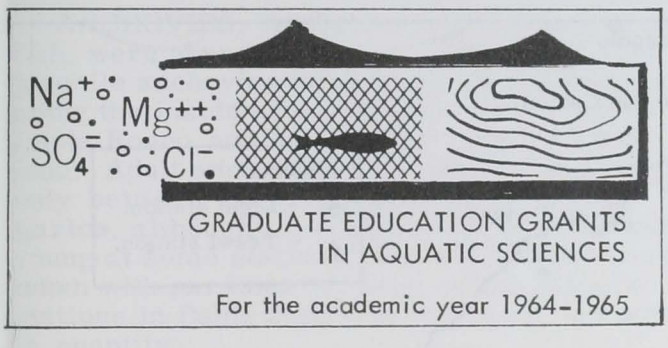
Japanese ice vessel operators are said to be reluctant to fish out of Samoa since they

must travel great distances to the fishing grounds (due to dwindling catches in nearby waters). As their vessels are equipped to hold only fresh fish, they cannot operate efficiently. To solve this problem, they are reported to be seeking permission from the Government to equip their vessels with refrigeration. (Nihon Suisan Shimbun, October 4, 1963, and other sources.)

Aquatic Science Fellowships

UNIVERSITIES INVITED TO PARTICIPATE IN EDUCATIONAL PROGRAM:

The Bureau of Commercial Fisheries, Fish and Wildlife Service, U. S. Department of the Interior, invites applications from colleges and universities for Graduate Education in Aquatic Sciences for the academic year 1964-65.



Applications will be considered only from institutions of higher learning that offer a full-time curriculum leading to the doctorate degree. Application should be made by an authorized officer of the institution. Individual students should not apply to the Bureau. They will be selected by their institutions. Students may be selected any time prior to the beginning of the school year by institutions awarded grants.

Grants may be made in support of students working toward the doctorate degree in a broad series of disciplines related to the study of the ocean, lakes, or rivers, and their natural resources. The number of grants awarded in each discipline will be determined on the basis of anticipated needs and available funds. The following subjects are among those that will be considered for support. Awards may be made in the other fields of study, if funds are available.

Physical Oceanography 1/
Biological Oceanography 1/
Marine Biology and Ecology 1/
Taxonomy (especially invertebrate) 1/
Fishery Biology (especially with training in biometrics) 1/
Food Technology (especially chemistry of fish oils) 1/
Fishery Economics 1/
Chemical Oceanography
Geological Oceanography
Meteorology (oceanographic)
Oceanographic Instrumentation (including engineering)
Limnology

Grants will include:

(1) $3,000 cost of living allowance for the students;
(2) $1,000 additional cost of living allowance for married students with children;
(3) Tuition and fees; and
(4) $500 annual administrative allowance to the institution.

Grants will be awarded for one year on a 12-month basis. They may be renewed in the name of the incumbent for additional one-year periods upon certification of satisfactory progress. Grants currently in effect, which were awarded for 2 years, are not affected by the shift to annual awards.

1/Fields of primary interest which will receive priority in making awards.

Atlantic States Marine Fisheries Commission

ADOPTS RESOLUTION CALLING FOR A 12-MILE FISHING LIMIT:

The Atlantic States Marine Fisheries Commission, at its 22 Annual Meeting in Boston, Mass., September 23-26, 1963, adopted a resolution calling for the extension of United States coastal jurisdiction over fisheries to 12 miles. Such an extension, the resolution stated, "has much to recommend it in terms of providing a better base for sound management of fisheries adjacent to a nation's coast, and in recognizing the particular stake of the coastal nation in such fisheries." The text of the resolution (in part) follows:

". . .Be It Resolved, That the Atlantic States Marine Fisheries Commission go on record as favoring the extension of the United States coastal jurisdiction over fisheries to 12 miles and the extension of the jurisdiction of the states to the same extent as the federal jurisdiction is extended, and direct its officers and staff to present this position as forcefully as possible to the President of the United States, the Secretary of State, and the appropriate Congressional leaders. . . ."

California

PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 63-A-6 (September 6-25, 1963): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska off the Mexican coastal waters of Baja California between Isla Cedros and Punta San Carlos were to:

(1) Survey the fish and invertebrates in the inshore pelagic environment;

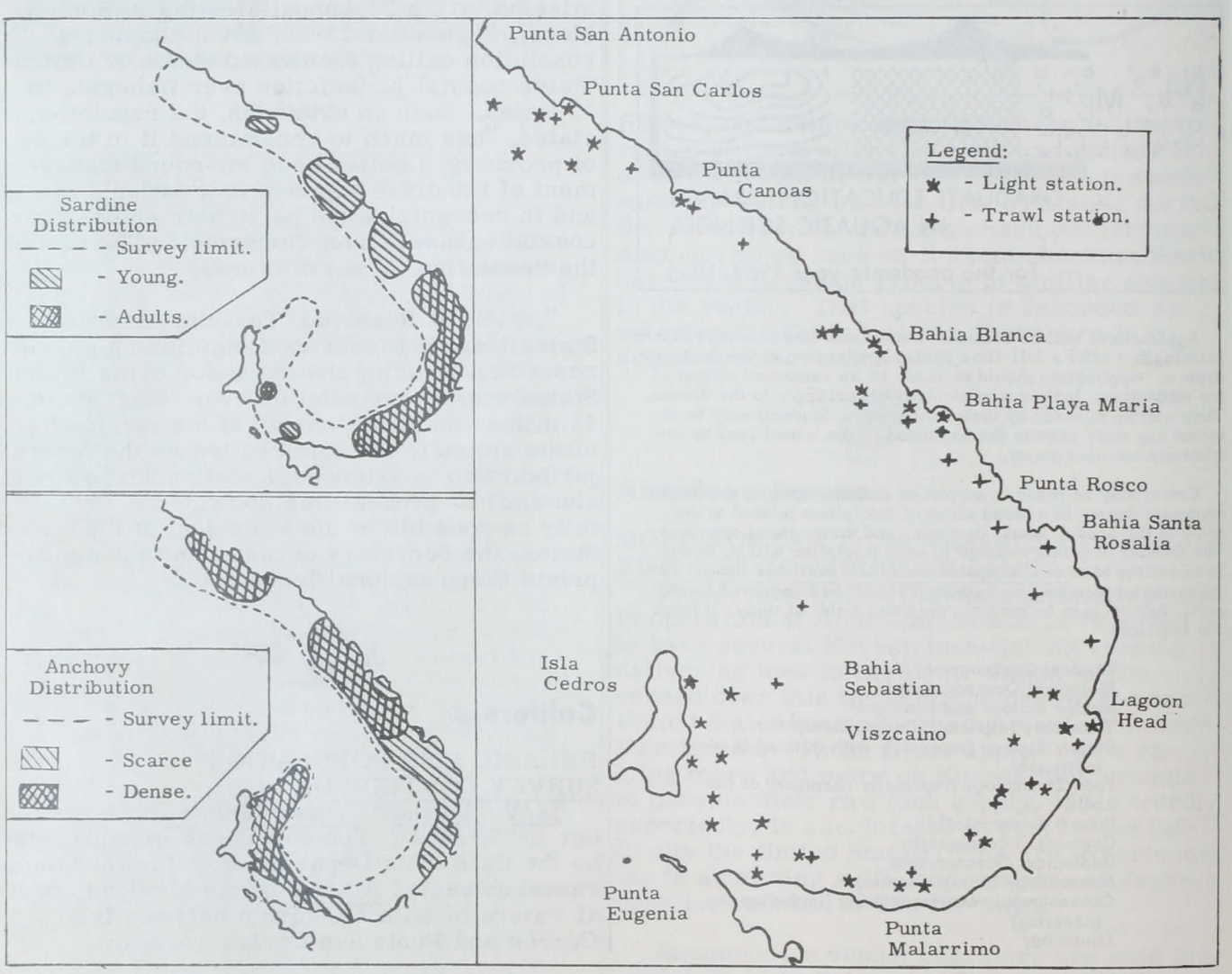
(2) Assess recruitment from this year's spawning of Pacific sardines (Sardinops caeruleus) and to measure the population density of older fish;

(3) Collect live sardines for serology studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla, Calif., and;

(4) Continue comparing midwater-trawl and blanket-net catches.

A midwater-trawl was the major sampling tool used during the survey; however, blanket-net, night-light fishing was carried out in selected areas as a check on trawling and to collect live sardines. Twenty-five midwater-trawl stations and 32 night-light stations were occupied. All survey work was conducted at night.

PACIFIC SARDINES: Sardines were taken at 26 of the 57 stations occupied on the cruise. Adults were abundant in a limited portion of Bahia Sebastian Vizcaino. Between Punta Malarrimo and Bahia Santa Rosalia, adults were present at 8 of 9 trawl stations and 8 of 10 night-light stations. Adults were abundant in part of Bahia Sebastian Vizcaino in 1962, but their distribution was more restricted. Most fish were from 160-200 millimeters (6.30-7.87-inches) in length and were either in an advanced stage of maturity or spent. A few running-ripe females were noted. About 500 sardines were delivered alive to the U. S. Bureau of Commercial Fisheries, Biological Laboratory at La Jolla for serological studies.



Pelagic fish population survey continued by the M/V Alaska Cruise 63-A-6 (September 6-25, 1963).

Young sardines (1963 year-class) mixed with northern anchovies (Engraulis mordax) were taken at several stations between Punta Rosco and Bahia Blanca, but made up only a small proportion of the catch. Nevertheless, the catches were significant because young sardines were completely absent in that area last year.

During the cruise, adult sardines were taken at 7 trawl and 9 night-light stations; young sardines at 6 trawl and 2 night-light stations; and mixed adult and young at 2 trawl stations. Since a midwater trawl was used extensively, the results of the survey are not directly comparable with past surveys, but the high percentage of successful sardine stations and the consistency from station to station are more reminiscent of surveys made in the early 1950's than those of recent years.

ANCHOVIES: Anchovies, particularly young fish, were abundant in the survey area. The juvenile anchovies were especially numerous along the inside of Isla Cedros and between Punta Rosco and Bahia Blanca on the mainland. Adult anchovies were taken in quantity only between Punta Canoas and Punta San Carlos, although a few adults were mixed with young at some stations. Anchovies were also taken with sardines at some of the inshore stations in Bahia Sebastian Vizcaino, but not in quantity.

Adult anchovies were taken at 3 trawl stations; juvenile anchovies were taken at 12 trawl and 10 light stations; and mixed adults and juveniles were taken at 4 trawl stations.

PACIFIC MACKEREL: Pacific mackerel (Scomber diego) were taken at scattered locations throughout the area. They were caught at 4 trawl and 6 light stations and were particularly abundant at some stations close to shore. On several occasions, they were noticed around the vessel during daytime anchorage. Most of the fish were young adults, ranging from 250 to 300 millimeters (0.98-1.18 inches) in length.

JACK MACKEREL: Jack mackerel (Trachurus symmetricus) were taken in 8 trawl tows, but at only 2 light stations. The catches were generally small and scattered throughout the survey area. All were juvenile fish.

ROUND HERRING: Round herring (Etrumeus teres) were taken quite frequently in the same area as sardines. Round herring are generally considered to be more adept than sardines at avoiding the blanket net or the night light. This was borne out by the appearance of round herring in 13 midwater-trawl tows but in only 1 light-station catch.

VISUAL SCOUTING: A total of 227 miles were scouted while running between stations at night. Few schools were seen even in areas where many fish were caught. A total of 7 schools of sardines were seen in the southern part of Bahia Sebastian Vizcaino, and 2 more near Bahia Blanca. Anchovy schools were seen only in the northern part of the survey area. A total of 17 anchovy schools were counted near Punta San Carlos where adult fish were trawled. A continuous, thin surface scatter of juvenile anchovies was often seen while running between stations, but no schools were evident.

MISCELLANEOUS OBSERVATIONS: Two observers from the Instituto Nacional de Investigaciones Biologico--Pesqueras, Mexico City, Mexico, joined the cruise at Ensenada.

Sea surface temperatures, ranged from 18.6° C. (65.5° F.) at Punta Canoas to 25.0° C. (77.0° F.) near Punta Eugenia.

The water was very clear, with photometer readings between 90 and 100 (scale 0-100) throughout most of the cruise area. Turbid water was encountered around Punta San Carlos where an inshore photometer reading of 28 was obtained and offshore readings in the 70's were the rule.

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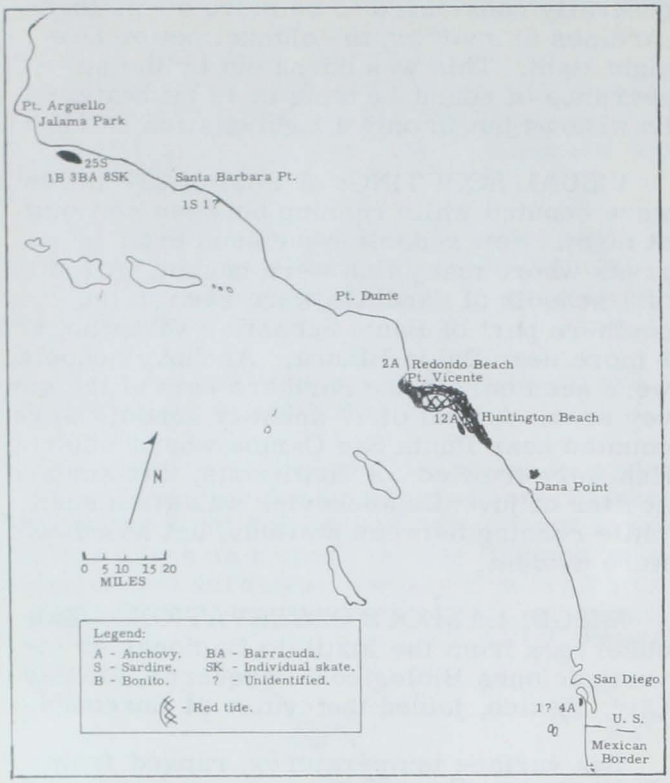
Airplane Spotting Flight 63-9-Pelagic Fish (September 23-25, 1963): To determine the inshore distribution and abundance of pelagic fish schools, the inshore area from the United States-Mexican Border to Bolinas Point, Calif., was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

On September 23, the area from Dana Point to Point Conception was scouted. Low clouds obscured the waters south of Dana Point and light haze prevailed to the north, but the area was visible from the air. There was considerable red tide in the area from Huntington Beach to the western portion of San Pedro Bay. Three small schools of Pacific sardine (Sardinops caeruleus) were



Airplane Spotting Flight 63-9-Pelagic Fish (September 23-25, 1963.)

sighted between Point Conception and Santa Barbara. By flying low over the water, many aggregations of 50-200 sardines also could be seen in the areas. Three schools of California barracuda (Sphyraena argentea) and one school of California bonito (Sarda chiliensis) were also sighted. Twelve schools of northern anchovies (Engraulis mordax) were seen in the Newport-Huntington Beach area and two off Redondo Beach.

On September 24, unfavorable flying conditions prevented an early departure and scouting was possible only in the San Diego area where four schools of anchovies were seen.

On September 25, 1963, the area from Bolinas Point to Santa Monica Bay was scouted. Water and air visibility were very good except in the waters north of Point San Luis, where heavy brownish phytoplankton blooms prevailed. Twenty-three small sardine schools were seen between Point Conception and Santa Barbara from an altitude of 1,500 feet.

Note: See Commercial Fisheries Review, November 1963 p. 21.

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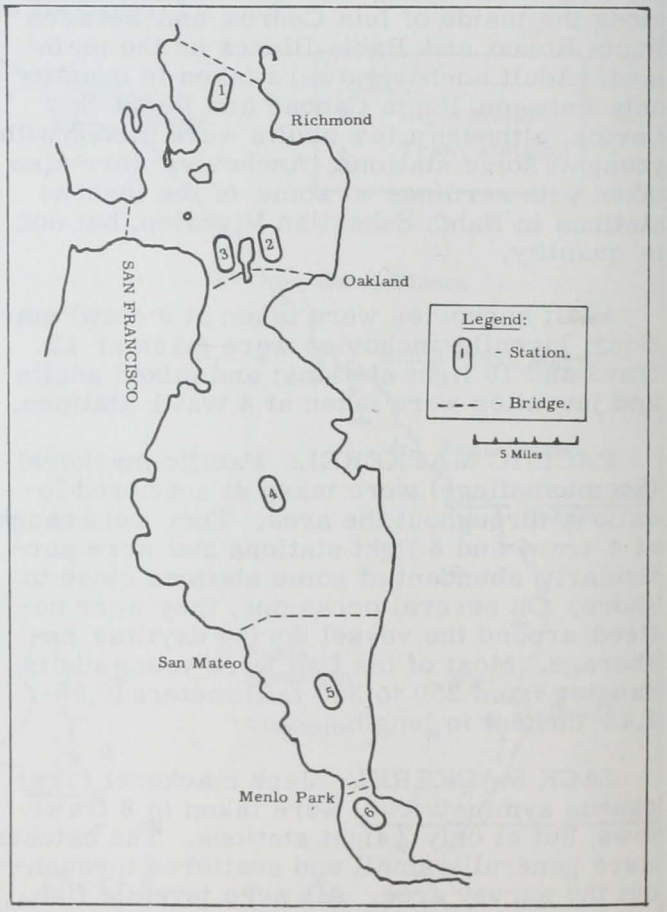
SAN FRANCISCO BAY INVESTIGATIONS CONTINUED:

M/V "Nautilus" Cruise 63-N3g-h S.F. Bay Study (August 19-23 and September 16-20, 1963): The study of San Francisco Bay south of San Pablo Bay by the California Department of Fish and Game research vessel Nautilus was continued in August and September 1963. The objectives were to: (1) collect fish and invertebrates routinely at six established stations to determine distribution and relative abundance under prevailing environmental conditions, (2) define ecological zones of the bay, and (3) determine food of the principal fish and its availability.

A square-mouthed midwater trawl 25 feet on a side was towed for 20 minutes at each station during sampling in August and September 1963. Each station was also sampled by a 15- to 20-minute bottom tow with a beam trawl net 10 feet wide and 4 feet high with 1-inch mesh. A 40-foot Gulf shrimp trawl was



Shows collecting stations during San Francisco Bay study by M/V Nautilus.

Species of Fish Taken in San Francisco Bay during M/V Nautilus Cruise 63-N3g-h, August and September 1963

Common Name	Scientific Name
Anchovy, northern	Engraulis mordax
Bass, striped	Roccus saxatilis
Croaker, white	Genyonemus lineatus
Flounder, starry	Platichthys stellatus
Goby, bay	Lepidogobius lepidus
Gunnel, saddleback 1/	Pholis ornata
Herring, Pacific	Clupea pallasi
Jacksmelt	Atherinopsis californiensis
Lance, Pacific sand 1/	Amnodytes hexapterus
Lingcod	Ophiodon elongatus
Midshipman, northern	Porichthys notatus
Midshipman, slim	Porichthys myriaster
Perch, black 1/	Embiotoca jacksoni
Perch, pile	Rhacochilis vacca
Perch, shiner	Cymatogaster aggregata
Poacher, pricklebreast	Stellerina xyosterna
Ray, bat	Myliobatis californicus
Rockfish, brown	Sebastodes auriculatus
Salmon, king	Oncorhynchus tshawytscha
Sanddab, Pacific	Citharichthys sordidus
Sculpin, buffalo	Enophrys bison
Sculpin, staghorn	Leptocottus armatus
Shark, leopard	Triakis semifasciata
Shark, sevengill 1/	Notorynchus maculatus
Smelt, whitebait 1/	Allosmerus elongatus
Smoothhound, brown	Triakis henlei
Sole, English	Parophrys vetulus
Sole, sand	Psettichthys melanostictus
Tomcod, Pacific	Microgadus proximus
Topsmelt 1/	Atherinops affinis
Turbot, hornyhead	Pleuronichthys verticalis

1/Not taken in the bay during cruises in February, March, April, May, and June 1963.

used to make 3 hauls, but it appeared to fish less effectively than the beam trawl.

Temperature and salinity measurements were taken from both surface and bottom water where the depths were sufficient to make a measurable difference. At the shallow stations, only surface observations were made. Bottom water samples were collected with a modified Eckman bottle secured to the orange-peel dredge line two feet above the dredge. Temperature was measured to 0.1° C. and salinity to 0.1 o/oo.

Two nets were torn by fouling on submerged objects. Clear water, in which fish evade gear, made the total number of fish caught less than on previous cruises. Of 31 species collected, 6 were new to the study. A total of 49 species of fish have been taken since the current study of San Francisco Bay began in late January 1963.

Note: See Commercial Fisheries Review, Sept. 1963 p. 15.

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SURVEY OF SHRIMP RESOURCES IN NORTHERN AND CENTRAL COASTAL WATERS CONTINUED:

M/V "N. B. Scofield" Cruise 63-S-6: (August 29-September 24, 1963): The main objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield off central and northern California from Bodega Bay to the Oregon were to:

(1) Locate concentrations of pink shrimp (Pandalus jordani) for population estimates and a determination of natural mortality rates in Area A, B-1, and B-2 (figures 1-3);

(2) Determine sex ratio, year-class composition, and weight of shrimp in each area;

(3) Make bathythermograph and Nansen-bottle casts for bottom temperatures and water samples in productive shrimp areas;

(4) Count and weigh incidentally caught fish; and

(5) Collect fish and shellfish specimens for special study.

AREA A: Seventy 20-minute tows were made with a 41-foot head rope Gulf otter trawl between Trinidad and the Oregon border in 51 to 90 fathoms. In 2 widely separated

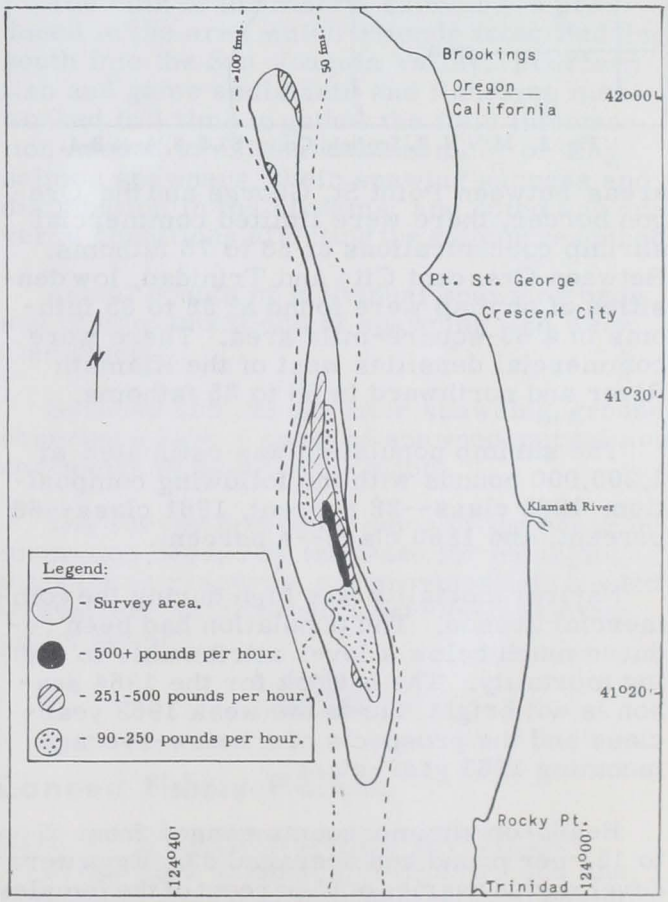

Fig. 1 - M/V N. B. Scofield Cruise 63-S-6, Area A.

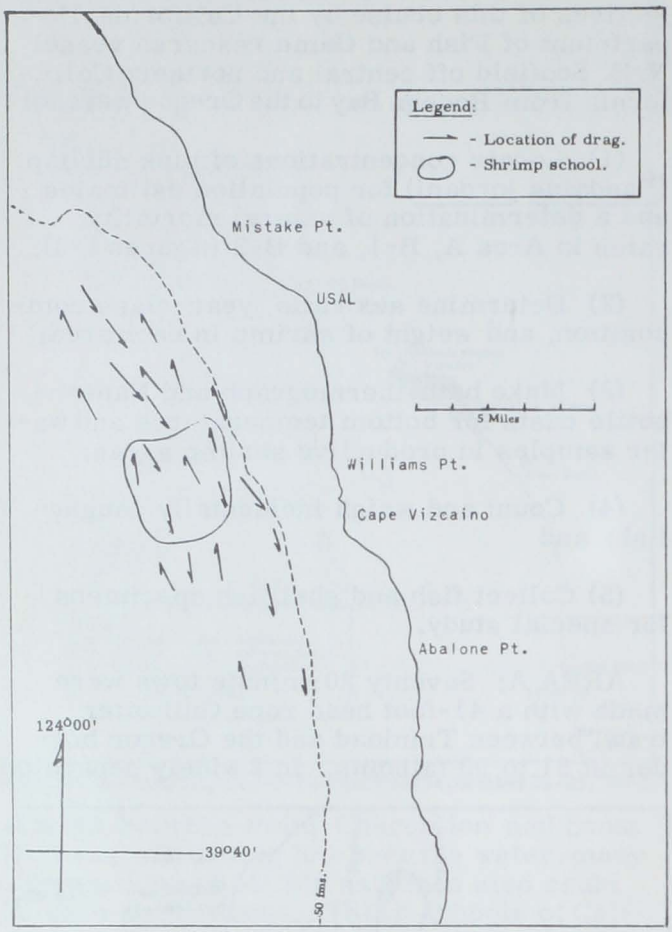

Fig. 2 - M/V N. B. Scofield Cruise 63-S-6, Area B-1.

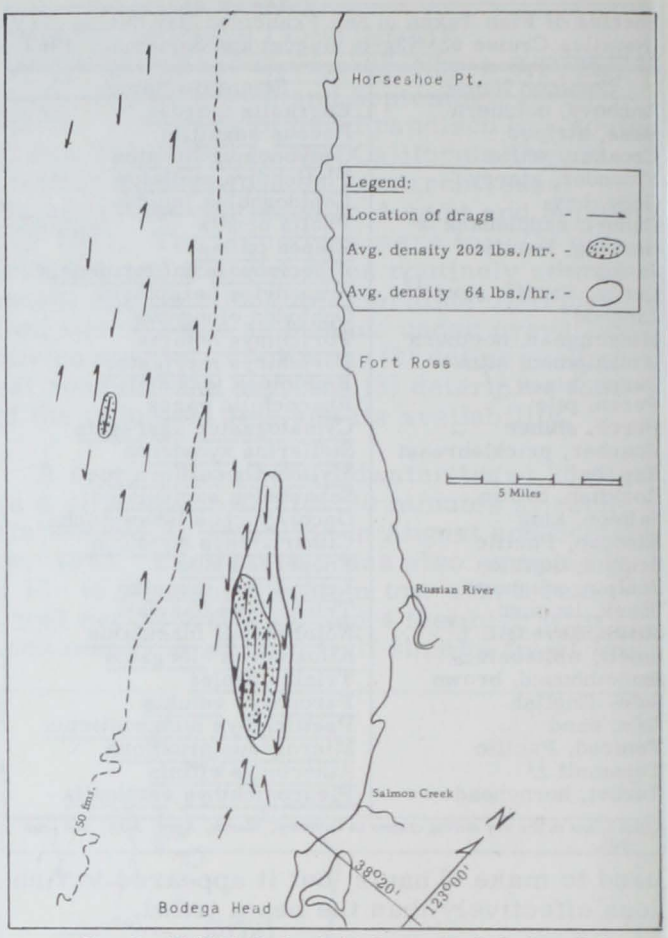

Fig. 3 - M/V N. B. Scofield Cruise 63-S-6, Area B-2.

areas between Point St. George and the Oregon border, there were limited commercial shrimp concentrations at 68 to 75 fathoms. Between Crescent City and Trinidad, low densities of shrimp were found at 58 to 85 fathoms in a 65-square-mile area. There were commercial densities west of the Klamath River and northward in 58 to 85 fathoms.

The shrimp population was estimated at 1,200,000 pounds with the following composition: 1962 class--28 percent, 1961 class--68 percent, and 1960 class--4 percent.

Natural mortality was high during the commercial season. The population had been reduced much below a level attributable to fishing mortality. The outlook for the 1964 season is not bright due to the weak 1962 year-class and the prospects of a below-average incoming 1963 year-class.

Heads-on shrimp counts ranged from 67 to 151 per pound and averaged 93. Eggs were developed in ovaries of 65 percent of the females.

Hake (Merluccius productus) dominated the fish catch. Slender sole (Lyopsetta exilis) and arrowtooth flounder (Atheresthes stomias) were taken at most stations.

Bottom water samples were taken at nine stations for salinity determinations. A total of 39 bathythermograph casts were made. Surface temperatures averaged 14.7° C. (58.5° F.); bottom temperatures averaged 9.0° C. (48.2° F.).

AREA B-1: Twenty-four 20-minute tows were made from Abalone Point to Mistake Point in 50 to 82 fathoms. Shrimp were found in light concentrations between 60 and 76 fathoms in an area covering 8.6 square miles off Cape Vizcaino and Williams Point. The average catch for 6 tows within that area was 62.5 pounds per hour and ranged from 45 to 105 pounds per hour. Based on those tows, the population within the area was estimated at approximately 45,000 pounds with the following composition: 1963 class--trace, 1962 class--58.7 percent; and 1961 class--41.3 percent.

Heads-on counts per pound averaged 94.5 with a range of 87 to 102. Shrimp of the year (1963 year-class) were present throughout much of the area. Ovary development was in the head-roe stage.

Bathythermograph casts were made at 18 stations and bottom water samples for salinity determinations were obtained from 9 stations. Bottom temperatures averaged 10.0° C. (50.0° F.) at 60 fathoms, and surface temperatures averaged 14.1° C. (57.4° F.).

Fish catches were light and no appreciable quantities of commercially important fish were caught. Hake were most common, and sablefish (Anoplopoma fimbria) were taken at five stations. The flatfish catch included slender sole, rex sole (Glyptocephalus zachirus), sand dabs (Citharichthys sordidus), and dover sole (Microstomus pacificus). Rockfish catches consisted mainly of stripetail (Sebastodes saxicola), darkblotch (S. crameri), greenstripe (S. elongatus), splitnose (S. diploproa), and occasionally chilipepper (S. goodei) and shortbelly (S. jordani).

AREA B-2: Forty-seven 20-minute tows were made from Bodega Head to Horseshoe Point in 29 to 68 fathoms. Shrimp were found in moderate density in 36 to 44 fathoms from due west of the Russian River to Salmon Creek. The school covered 9.2 square miles and extended for 8 miles. Six tows yielded catches ranging from 150 to 375 pounds per hour within an area of 3.8 square miles. Five tows, yielding an average catch of 64 pounds per hour, described an additional area covering 5.4 square miles. The population within the 9.2 square miles was estimated at 100,000 pounds. One tow, due west of the Russian River in 59 fathoms, produced 95 pounds in 20 minutes but the spot was found to be separate from the main concentration of shrimp.

Heads-on counts per pound ranged from 100 to 125 and averaged 112. The age-class composition was: 1962 class--60.6 percent, 1961 class--39.1 percent, and 1960 class--0.3 percent. Shrimp of the year (1963 class) were absent from all tows. Ovary development was in the head-roe stage, so no eggs were found on the pleopods.

Bathythermograph casts were made at 11 stations and water samples were taken at 8 stations. Bottom temperatures averaged 9.6° C. (49.3° F.) at 38 fathoms and surface temperatures averaged 11.5° C. (52.7° F.).

Many different species of fish were caught but there were no appreciable numbers of commercially exploited species. Flatfish were taken frequently. Rex sole were found at all stations. English sole (Parophrys vetulus), sand dabs, slender sole, and dover sole were found at most stations, while petrale sole (Eopsetta jordani) and arrowtooth sole were less common. Hake were caught in nearly every tow and sablefish were also commonly caught. Rockfish catches were very light, with most catches consisting of stripetail, darkblotch, and greenstripe rockfish. Commercially important copper rockfish (Sebastodes caurinus), canary rockfish (S. pinniger), and chilipepper were seldon caught.

Note: See Commercial Fisheries Review, July 1963 p. 32.

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ANNUAL SALMON SPAWNING SURVEY CONDUCTED:

The annual survey of salmon spawning stock on all the salmon streams in the Central Valley was started on October 1, 1963, by the California Department of Fish and Game.

The bulk of the State's salmon are produced in the area which extends from Redding south into the San Joaquin Valley. Fourteen fish and game assistants and fisheries men worked full time to gather the field information needed to estimate the number of king salmon spawners, their spawing success and distribution in the streams, and noted any adverse conditions affecting the salmon resource.

Aerial counts of individual spawning beds and of concentrations of spawning fish were also made.

Because salmon die after spawning, ground observers keep a count of spawned-out salmon carcasses to avoid duplication.

The survey furnishes much of the basic information needed by the State for managing the salmon resource, and provides data needed to evaluate water project developments that affect salmon.

Canned Fishery Products

STRUVITE CRYSTALS ARE HARMLESS:

From time to time both industry and the U. S. Food and Drug Administration receive

reports from consumers who believe they have found glass in canned fish or shellfish, especially shrimp.

Examination, however, usually reveals it is not glass at all, but "struvite" (a crystalline magnesium ammonium phosphate) which occasionally forms in canned fish or shellfish from normally present constituents.

While struvite is not actually desirable, it does not affect the safety of the food. Canners have devoted considerable attention to the problem of struvite formation, but still have not been able to prevent it.

A simple test to distinguish between struvite and glass is to place the material in warm vinegar for a while. The struvite crystals will dissolve--glass, or course, will not.

Cans--Shipments for Fishery Products, January-August 1963

A total of 2,114,241 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-August 1963, a decline of 4.4 percent from the 2,210,492 base boxes used during the same period in 1962. Most of the decline was due to a smaller pack of tuna in the first part of 1963.

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 (tinplate) cans are derived by use of 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

FACTORS AFFECTING ABUNDANCE OF SUMMER SKIPJACK TUNA IN HAWAIIAN WATERS:

A reexamination has been made of the annual forecast of abundance which the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu has been issuing to the Hawaiian skipjack tuna fishery.

Several years ago oceanographers and biologists at the Honolulu Laboratory noticed an apparent relationship between the pattern of changes in ocean water temperatures around Hawaii in the spring and the relative success of the ensuing summer fishery for skipjack tuna. Since the fishery is by far the most important in the Islands, and since the great year-to-year fluctuations in its landings seriously hinder the industry's production planning, the relationship was studied in the hope that it would provide a basis for predicting the availability of tuna before the start of the summer fishing season.

It was found that when the annual warming of the surface waters began earlier than usual, the year's landings were above average, while smaller than average catches were recorded in years of late warming. This relationship held good for every year for which suitable data on ocean temperatures were available, and the Laboratory began in 1959 to issue a yearly forecast to the fishing industry on this basis. Although the predictions were based on purely empirical evidence and the reasons for the association between time of warming and skipjack availability were not understood, the forecasts proved out for each year through 1962 and confidence in the method grew firmer.

On April 1, 1963, the Laboratory predicted an above-average skipjack catch for the year since the waters around the island of Oahu had begun to warm unusually early. But as the fishing season progressed, it became clear that catches were falling below the average level, and by the end of September 1963, the total catch was estimated to be only 7,325,000 pounds, or 1,352,000 pounds below the 1948-62 average for the period.

This failure of the skipjack to run true to form caused scientists at the Laboratory to make a review of oceanographic data for past years. It now appears that predictions of skipjack availability require an examination of more factors than had previously been thought necessary. There are in fact at least two major conditions which must be satisfied in order to justify a prediction of better than average fishing. First, the Hawaiian Islands must be surrounded by low salinity water of the California Current Extension type, which is considered to be the "home water" of the Hawaiian "season" skipjack. Secondly, the dynamic conditions must be such that there is early warming of the waters around the Hawaiian Islands. In retrospect, it appears that in making the 1963 forecast not enough weight was

given to the first of those factors, for although the temperature rise this spring indicated favorable dynamic conditions, the salinity has remained high.

A reexamination of data from past years now indicates that better than average landings were made in years when both factors were favorable. Poor catches marked the years when salinity was high and the spring warming of the ocean was late. In years when one or the other of the factors was unfavorable, catches were average or somewhat below average.

It is expected that the Honolulu Biological Laboratory will continue to make preseason forecasts of the availability of skipjack to the Hawaiian fishery. Future forecasts will be based on the more refined analysis that has resulted from this year's experience and should therefore be more reliable.

Note: See Commercial Fisheries Review, June 1963 p. 22.

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TUNA STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 69--Ahipalaha II: To find the spawning grounds of albacore tuna is the primary objective of this

Research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries.

long cruise in the South Pacific by the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert. The vessel sailed from Honolulu, Hawaii, on October 7, 1963, and is scheduled to return on December 20, 1963, after visiting Marakei Atoll in the Gilbert Islands; Suva in the Fiji Islands; Espiritu Santo, New Hebrides; Noumea, New Caledonia; and Pago Pago, American Samoa.

The purpose of the cruise is reflected in its designation because ahipalaha is the Hawaiian name for albacore tuna. The first survey in this series was made in the spring of 1962.

The expedition will fish with tuna longlines for mature albacore and will attempt to collect larval and juvenile specimens with plankton nets, trawls, and small-mesh gill nets. Aquaria were installed in the vessel so that small tuna may be kept alive for observation. Artificial fertilization and rearing experiments will be undertaken if ripe spawners are captured. Many details of the early development of tuna are not yet well known, and scientists are not in complete agreement on the identification of the smallest stages of some species.

A number of other projects will be carried out during the cruise. The stop at Marakei Atoll was scheduled in order to collect algae and fish for use in the poison fish studies of a scientist at the University of Hawaii. Samples of blood from tuna and marlin will be flown back to the U. S. Bureau of Commercial Fisheries, Honolulu Biological Laboratory from ports along the route for use in subpopulation studies. Drift cards will be released along the way to study ocean currents. Special requests have even been received for the flying fish that may come aboard the vessel at night and for the remoras (shark suckers) from sharks and marlin caught on longlines.

At Espititu Santo, where a Japanese tuna fishery is based, expedition members will consult with government and fishing company officials. In Noumea, conferences are scheduled with scientists of the Institut Francais d'Oceanie concerning cooperative research on tuna. The U. S. Bureau of Commercial Fisheries now maintains a field laboratory at Pago Pago in American Samoa, where there is a thriving tuna fishery, and the call at that port will allow consultation with field station personnel.

A fishery trainee from South Korea, will participate in the expedition as far as Samoa, where he will leave the ship to spend several months in training on Pago Pago-based fishing boats.

Note: See Commercial Fisheries Review, June 1962 p. 8, and August 1962 p. 17.

Fur Seals

PRICES FOR ALASKA FUR SEAL SKINS AT FALL 1963 AUCTION LOWER:

The fall auction in 1963 (October 17-18) of United States Government-owned fur seal

skins yielded close to $3.1 million. The average price per skin received for male fur seal skins (Black, Kitovi, and Matara) was $111.72. This average price compares with an average of $122.52 paid at the spring 1963 auction, and the $107.53 average for skins sold in the fall 1962 auction. In addition, the average price received for Lakoda or female sheared seal skins was $40.63 as compared with an average of $43.09 received at the spring 1963 auction and an average of $48.40 received at the fall 1962 auction.

Average prices per skin received for processed male fur seal skins at the fall 1963 auction were (average for spring auction in parentheses): Black, $126.13 ($125.87); Kitovi, $95.58 ($116.81); Matara, $103.94 ($121.01).

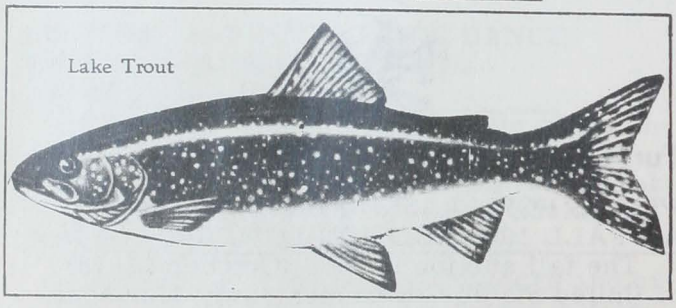
Prices received at the fall 1963 auction for Japanese-owned fur seal skins as compared with the spring 1963 auction were: Black, $124.96 (down 1.4 percent); Kitovi, $99.35 (down 16.9 percent); Matara, $111.03 (down 10.4 percent); and Lakoda $35.26 (up 4.7 percent).

Prices received at the fall 1963 auction for South African skins as compared with the spring 1963 auction were: Black, $31.75 (down 49.7 percent); Deep Blue, $46.96 (down 20.5 percent; and Neutral, $66.25 (down 6.4 percent).

Great Lakes Fishery Investigations

LAKE TROUT DISTRIBUTION STUDIES CONTINUED:

M/V "Siscowet" Cruise 7 (September 9-18, 1963): To determine the abundance of juvenile lake trout at three index stations in the Apostle Islands region and to collect young-of-the-year lake trout south of Outer Island were the main objectives of this cruise in Lake Superior by the U. S. Bureau of Commercial Fisheries research Siscowet. Semi-balloon bottom trawls were fished at depths of 5-26 fathoms.



The number of lake trout captured per 15-minute trawl tow at the 3 index stations ranged from 1 to 47, and averaged 4.8 east of Madeline Island, 8.0 southeast of Bear Island, and 29.9 east of Basswood Island. The total catch was 448 lake trout, of which 445 (99 percent) were fin-clipped. Lake trout planted at Bayfield in the spring of 1963 predominated in the catches, although ten different trout plantings were represented in the over-all catch.

Seven trawl tows at 5-10 fathoms just south of Outer Island failed to capture young-of-the-year lake trout, although 9 had been taken in the area by the Cisco in 1953, and 3 by the Siscowet in 1959.

Surface water temperatures during the cruise ranged from 55.0° F. south of Outer Island to 63.7° F. east of Madeline Island.

M/V "Siscowet" Cruise 8 (September 23-October 4, 1963): To measure the relative abundance of juvenile lake trout and to study fall environmental conditions at three limnological stations were the main objectives of this cruise in the Apostle Islands region of Lake Superior by the U. S. Bureau of Commercial Fisheries research vessel Siscowet.

Surface water temperatures ranged from 53.1° F. in the open lake to 57.6° F. in protected waters among the islands. A somewhat unusual condition was the clearly defined thermocline which still existed in most areas. In most years, the water is nearly homothermous by the end of September as a result of cooling air temperatures and fall storms.

U. S. Bureau of Commercial Fisheries research Siscowet.

Two experimental gill nets (each of 6 mesh sizes from 2 to $3\frac{1}{2}$ inches) were fished at 12-28 fathoms at Presque Isle Bay, Punky Bay, and just east of Madeline Island. Lake trout were most abundant at depths above 20 fathoms. The total catch from fourteen 2-night sets (45,600 feet of gill nets) was 390 lake trout (range in length 6.6 to 28.0 inches). Of the 332 lake trout less than 17 inches long, 312 (94 percent) were fin-clipped. Most of the fin-clipped fish were from the 1960-61 plants at Bayfield shore.

Other species taken in the gill nets were smelt, chubs, longnose suckers, burbot, and alewives. The catch of 32 alewives (7-9 inches long) was by far the largest made in gill-net sets by the Siscowet since the vessel was assigned to the Ashland Station in 1958.

Gulf Exploratory Fishery Program

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 46 (August 21-23, 1963) and Cruise 47 (August 27-October 5, 1963 and October 11-30, 1963): The objectives of these cruises by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers were to: (1) conduct comparative towing tests of standard shrimp trawl doors and a pair of experimental doors of a dihedral or V-design, (2) continue field tests of trawl instrumentation units under development, (3) observe the performance of the prototype electrical shrimp trawl, and (4) make shrimp burrowing observations on various bottom types.

The U. S. Bureau of Commercial Fisheries exploratory fishing vessel, George M. Bowers.

EXPERIMENTAL TRAWL DOORS: In making trawl door comparisons, the 2 assemblies (40-foot flat trawls) were towed simultaneously from outriggers. Measurements were obtained at towing speeds (bottom speed) of 1.5, 2.0, and 2.5 knots and scope ratios of 5:1 and 10:1. Water depth was 5 fathoms and the bottom type was hard sand. The measurements obtained at each speed were horizontal spread, total load (measured on deck), and bottom speed. Since the weight in water of the standard doors was only 20 pounds, tests were also made with the standard doors weighted to equal that of the experimental doors (170 pounds in water).

The results of the tests indicated: (1) the experimental doors towed somewhat easier and spread the trawl more than the standard doors, and (2) the weighted standard doors spread the trawl more than the experimental doors and towed harder. The total load difference, however, decreased markedly with increased speed.

INSTRUMENTATION: The devices tested were the bottom-speed indicator and a closed circuit television system. The indicator functioned very well and is a considerable improvement over the recording method or readout. The television system was tested on a shrimp trawl in clear water. The results were satisfactory, particularly for close-up viewing.

ELECTRICAL SHRIMP TRAWL: A prototype 40-foot electrical shrimp trawl with various electrode array designs was designed and constructed on the basis of data from towing tests with a 20-foot model. While being towed, the prototype was observed by divers to determine the optimum rigging to provide the desired operational and handling characteristics.

SHRIMP BURROWING: Observations and photographs of burrowing behavior of pink shrimp on five bottom types (sand, sand-shell, silt-clay, sand-silt, and grass) were obtained. Also, a diving bell built to the specifications of a unit used by the U. S. Navy Mine Defense

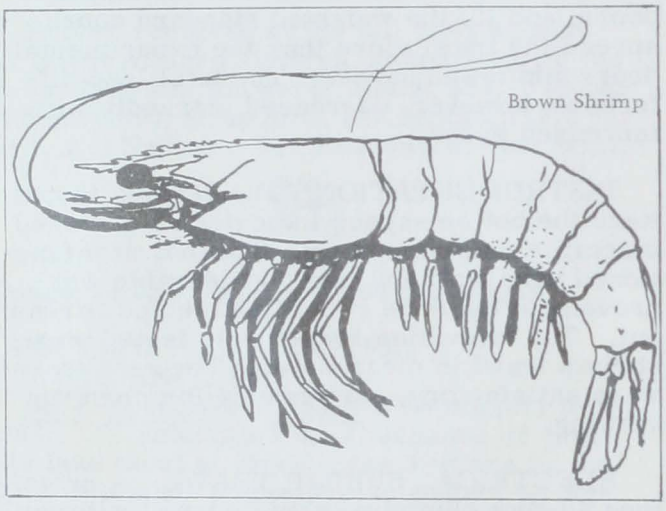
Laboratory was tested. The bell worked very well and shows promise as a means of observation in future behavior studies.
Note: See Commercial Fisheries Review, July 1963 p. 39.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1963:

SHRIMP FISHERY PROGRAM: Shrimp Spawning Populations: The examination of ovary samples from slightly more than 7,000 brown shrimp collected systematically during 1962 was almost completed. More than 6,100 of the females could be classified according to the stage of ovary maturity. The criteria for determining ovary condition is being refined, and the independent results of two observers are now in fairly close (80-90 percent) agreement. Ovaries in the process of redeveloping after a previous spawn are the most difficult to classify.

In comparing the seasonal size composition of brown shrimp inhabiting the coastal area between Freeport, Tex., and Cameron, La., observations based on 1962



data proved to be quite similar to those made in 1961. Brown shrimp, almost all subadults--90 to 150 millimeters (3.5 to 5.9 inches) in length--occurred in the 7½-fathom depth zone only during May through November. In the 15-fathom zone, subadults first appeared during June in both years. During 1961, the seaward movement of shrimp into that zone continued through December, but in 1962, brown shrimp less than 150 millimeters (5.9 inches) long were not in evidence after July. Sampling at depths greater than 25 fathoms seldom yielded any but large, mature brown shrimp.

Shrimp Larval Studies: IDENTIFICATION: Several brown shrimp spawned in the laboratory during the third quarter of 1963. On one occasion, the resulting larvae were reared to the second protozoeal stage, which was one stage more advanced than had been obtained in any previous trial. Although the primary effort in this project has been directed toward rearing brown shrimp from larvae to the adult stage, ripe females of four other species were also collected and isolated in the laboratory where they subsequently spawned. Larvae of rock shrimp (Sicyonia dorsalis and S. brevirostris) were reared to the first protozoeal stage. Eggs were also obtained from pink shrimp and Trachypeneus similis, but they did not hatch. Three juvenile rock shrimp (S. brevirostris) reared from a spawn in the spring of 1963 had survived and the largest of those was 25 millimeters (0.98 inches) long in September 1963.

Encouraging progress was made in maintaining mass cultures of penaeid larvae, although contamination of the rearing media by bacteria and other micro-organisms still poses a serious problem. Several antibiotics (penicillin, dihydrostreptomycin, and chloromycetin) and certain commercial preparations are being screened to determine their effectiveness in controlling microorganisms. In preliminary experiments, a penicillin-dihydrostreptomycin combination gave the best results, repressing the bacteria and reducing the activity of ciliates and other motile forms. Addition of the dihydrostreptomycin is associated with a rapid growth of fungus, but it appears that this side effect can be controlled.

In an effort to ascertain the most suitable media for rearing shrimp larvae, actual marine water transported from offshore was compared with water in the recirculating sea water system. Each kind of water was used as a medium: (1) after being autoclaved, (2) with antibiotics added, (3) untreated, and (4) in various combinations of the preceding three. The preliminary experiments indicate that treated water generally gives better results than untreated water. Heavy shrimp larvae mortalities usually occurred in untreated water in the recirculating sea water system, but when sterilized or treated with antibiotics, its quality compared favorably with that of the offshore water.

DISTRIBUTION AND ABUNDANCE: Penaeus larvae and postlarvae, occurring in greater numbers than at any previous period in 1962, were removed and identified from 57 plankton samples collected in November 1962. Concentrations were greatest in the samples collected between Galveston and Brownsville, Tex. (statistical areas 18 to 21). Larval and postlarval stages were 2½ to 5 times more abundant at 25-fathom stations than at the 15-, 35-, 45-, or 60-fathom stations. No planktonic stages of Penaeus species were encountered at 7½-fathom stations. The monthly catch composition by stage consisted of 29 percent nauplii, 21 percent protozoea, 16 percent mysis, and 34 percent postlarvae, all of which indicates continued spawning and a possible build-up of postlarvae in offshore waters.

In addition to vessel operations to carry out regularly scheduled plankton work, three short cruises were made to calibrate flow meters and to investigate the vertical (diurnal) distribution of shrimp larvae and postlarvae. Although data from the vertical distribution study have only been partially analyzed, they suggest that some penaeid planktonic stages exhibit negative phototropism down to depths of at least 18 meters.

Shrimp Postlarval Abundance Survey and Bait (Juvenile) Shrimp Fishery: Semiweekly sampling of postlarval shrimp to determine their abundance as they moved into the Galveston Bay (Tex.) system continued during July-September 1963. Weekly sampling also

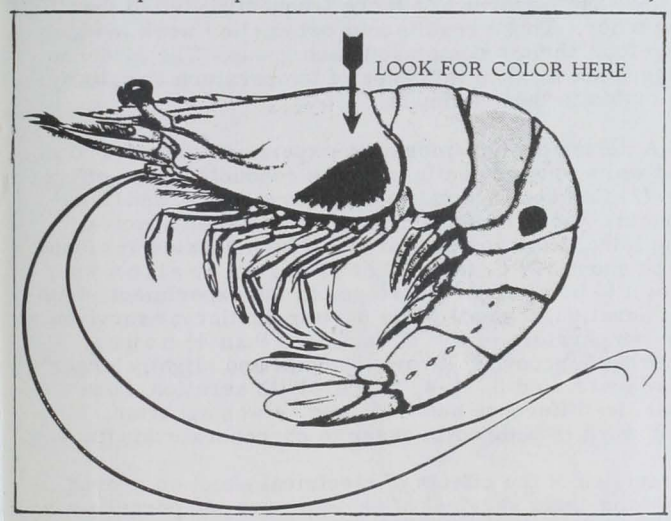
continued at Port Aransas (Tex.), Sabine Pass (Tex.), and Caminada Pass (La.). Sampling at Port Isabel (Tex.), Pascagoula (Miss.), and St. Petersburg Beach (Fla.) was discontinued in mid-August 1963.

Table 1 - Shrimp Catch and Fishing Effort in Galveston Bay Bait Fishery, 1962-1963

Month	Year	Catch	Catch Composition Shrimp		Fishing Effort	Average Catch Per Hour
			Brown	White		
		Lbs.	. . (Percent) . .		Hrs.	Lbs.
July	1963	191,000	42	58	6,730	28.4
	1962	189,400	72	28	6,320	28.5
Aug.	1963	189,200	14	86	4,450	42.5
	1962	189,800	17	83	7,920	25.2
Sept.	1963	140,300	7	93	4,650	30.2
	1962	138,100	13	87	4,830	28.6

The harvest of bait-size shrimp from Galveston Bay in July-August 1963 showed a slight increase over that in the same period of 1962. The fishing effort expended in July-August 1963 decreased by 27 percent from 1962 estimates, with the catch per unit of effort indicating that shrimp were more abundant on the nursery grounds during the third quarter of 1963 than in the same period of 1962.

Migrations, Growth, and Mortality of Brown and White Shrimp: During the third quarter of 1963, two mark-recapture experiments to determine movements,



Shrimp are marked with blue, green and red biological stains in order to obtain information on migrations and growth. The color appears only on both sides of the head (in the gills) as shown in the illustration.

growth, and mortality in stocks of brown shrimp were carried out. In June 1963, a total of 4,804 stained and 1,208 tagged brown shrimp were released off the Mississippi coast, and by the end of September, 412 stained and 62 tagged specimens had been recovered. In August 1963, a total of 3,016 brown shrimp were stained and released off Aransas Pass, Tex. A total of 52 shrimp were recovered from that experiment. One mark-recapture experiment with white shrimp, also designed to provide information on growth rates, movements, and mortality, was begun during August 1963 in Galveston Bay, Tex. Of the 3,115 stained white shrimp released, 346 were returned. Returns from all three experiments will continue in the latter part of 1963. Tests to determine the rate of nondetection of marked shrimp in different processing plants were carried on in conjunction with each experiment.

Commercial Catch Sampling: Several aspects of port sampling operations were modified during the third quarter of 1963 in order to concentrate efforts on particular problems and in areas where the greatest fishing activity occurs. Sampling is now confined to three study areas--the central Texas coast with samplers stationed at Aransas Pass and Freeport, the central Louisiana coast with men at Morgan City and Houma, and the Dry Tortugas area off the southwest coast of Florida with two biologists located at Key West.

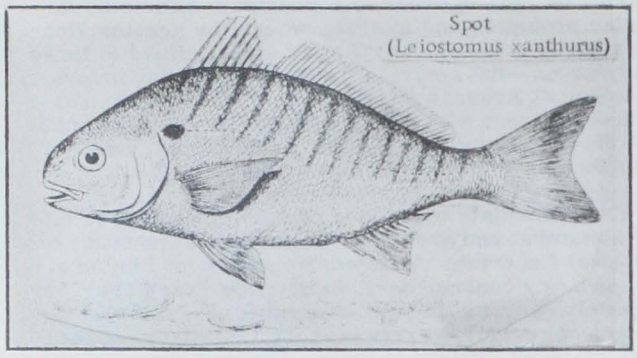
The immediate objectives of work in each area differ somewhat and are dependent on characteristics of the local fisheries. An intensive survey of fishing effort is being conducted within both the Texas and Tortugas study areas through interviews of vessel captains, occasional aerial surveys, and detailed studies of landings made by certain vessels. The size distribution of pink shrimp from the Tortugas grounds and of white and brown shrimp from Louisiana waters are being obtained regularly for use in growth and mortality studies. The species composition of mixed landings and the actual size distribution of box and machine-graded landings are being surveyed at Texas and Louisiana ports. Estimates of the number of small shrimp discarded at sea are also being obtained when possible.

Population Dynamics: Field studies designed to demonstrate the selective action of shrimp nets were initiated and four comparative fishing trials at sea were completed. Various combinations of nets and detachable cod ends with different mesh sizes were used to distinguish escapement from the body of a net and from the cod end. Preliminary results indicated that a significant degree of escapement occurs from both sections of nets with large meshes throughout, but that very few marketable shrimp escape from those nets commonly used in the commercial fishery. In contrast to findings reported for many species of fish, the relationship between mesh size and shrimp escapement is not rectilinear. It is quite likely that the observed divergence results from the manner in which shrimp swim when startled. Several more field trips will be required before final conclusions can be reached.

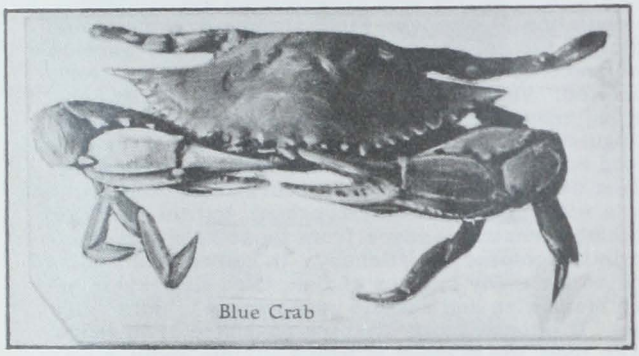
Florida Bay Ecology Studies: Mark-recapture experiments with pink shrimp in south Florida waters have demonstrated that young shrimp which utilize certain shallow coastal waters as nursery grounds, eventually migrate as subadults to the Tortugas area in the Gulf of Mexico where they later support an important commercial fishery. To determine the magnitude of losses suffered during migration, a new project was designed to relate the seasonal and yearly abundance of juvenile pink shrimp in the nursery areas of eastern Florida Bay to the subsequent abundance of shrimp taken in the Tortugas fishery. The project will also include ecological studies to define conditions affecting the survival and well-being of juvenile pink shrimp while in those nursery areas.

Efforts during the third quarter of 1963 were directed toward: (1) reviewing background information pertaining to pink shrimp ecology in eastern Florida Bay; (2) surveying the Bay for the purpose of establishing sampling stations; and (3) developing methods of quantitatively sampling for the abundance of juvenile shrimp. Two collection methods now under consideration or development are trapping and pumping.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Sampling throughout the Galveston Bay system continued under the revised scheme initiated in January 1963. Automated data processing methods were introduced to expedite handling of the large amount of



data being collected. The species receiving greatest attention with regard to population density and life history studies are Atlantic croaker, spot, and sand seatrout, bay anchovy, brown shrimp, white shrimp, and blue crab. Effort is being directed toward relating the distribution and abundance of each species to space-time variation in measurable hydrological factors.



Due to lower than normal rainfall prior to and during the third quarter of 1963, salinities remained relatively high throughout the Bay system as compared with previous years. A well defined salinity gradient persisted, however, between the Gulf of Mexico and Trinity Bay (table 2).

Table 2 - Salinity Values Between the Gulf of Mexico and Trinity Bay, July-September 1963

Subarea	No. of Stations	Salinity (°/oo)		
		Average	Minimum	Maximum
Gulf of Mexico	2	35.7	33.4	36.6
Galveston Entrance	4	35.5	33.0	36.6
Lower Galveston Bay	14	28.2	22.4	31.4
East Bay	14	21.0	16.1	24.1
Upper Galveston Bay	10	19.9	16.2	24.7
Mouth of San Jacinto River	5	17.9	14.5	22.4
Trinity Bay	14	13.0	4.5	19.9

Early in the summer of 1963, a study of the relationship between bottom types and bottom fauna was begun. Bottom types are being defined according to organic and inorganic constituents, and the percentages of gravel, sand, and fine particles. At each of the previously established biological and hydrological stations, and at five additional stations in Clear Lake, bottom sediments were sampled with a dredge, and bottom fauna were collected with a small oyster dredge lined with $\frac{1}{4}$-inch mesh hardware cloth as well as with a modified beam trawl with $\frac{1}{8}$-inch mesh netting. All bottom fauna were identified and their numbers tabulated.

Accompanied by 80-mile-per-hour winds which produced a $4\frac{1}{2}$-foot tide, Hurricane Cindy passed through the study area on September 17, 1963. Fortunately, weekly sampling was so scheduled that one collection period ended 5 days prior to the hurricane, and the next collection began 5 days following its passage. It is hoped that the resulting data will give some indication of the hurricane's effect on both the fauna and hydrology of the area.

In mid-August 1963, the Texas Water Pollution Control Board initiated a detailed water quality study which covers the entire Galveston Bay system. Of 145 stations established for this study, 32 correspond to those regularly occupied by the U. S. Bureau of Commercial Fisheries during sampling operations. Arrangements were made with the Board for the mutual exchange of hydrological data.

PHYSIOLOGY AND BEHAVIOR PROGRAM: Behavior and Tolerances: During July-September 1963, additional data were obtained on the distribution of grooved shrimp postlarvae in continuous salinity gradients. Six specimens were individually tested at 32° C. (90° F.) and 4 at 17°-19° C. (62°-66° F.). At the higher temperature, the 10°/oo -14°/oo salinity level was the most frequently occupied zone, whereas at 17°-19° C., the 20°/oo -24°/oo level was more frequently visited than any other. Those results support earlier work in which only four shrimp comprised each group. The evidence suggests a marked influence of temperature on salinity selection in these animals.

A series of time-mortality experiments using brown and white shrimp postlarvae was conducted in an effort to: (1) find upper lethal temperature limits, and (2) determine whether such limits differ between species. The lethal limit for postlarvae of both species was found to be about 37° C. (99° F.) at 25°/oo. Aeration was shown to be of vital importance in the experiment. Without aeration, 5 small white shrimp postlarvae survived the temperature of 37° C. for more than $4\frac{1}{2}$ hours, whereas 5 "grooved" (brown shrimp) and slightly larger postlarvae died in $1\frac{1}{2}$-$4\frac{1}{2}$ hours. With aeration, however, no difference between species was apparent. Further work is planned in order to corroborate this finding.

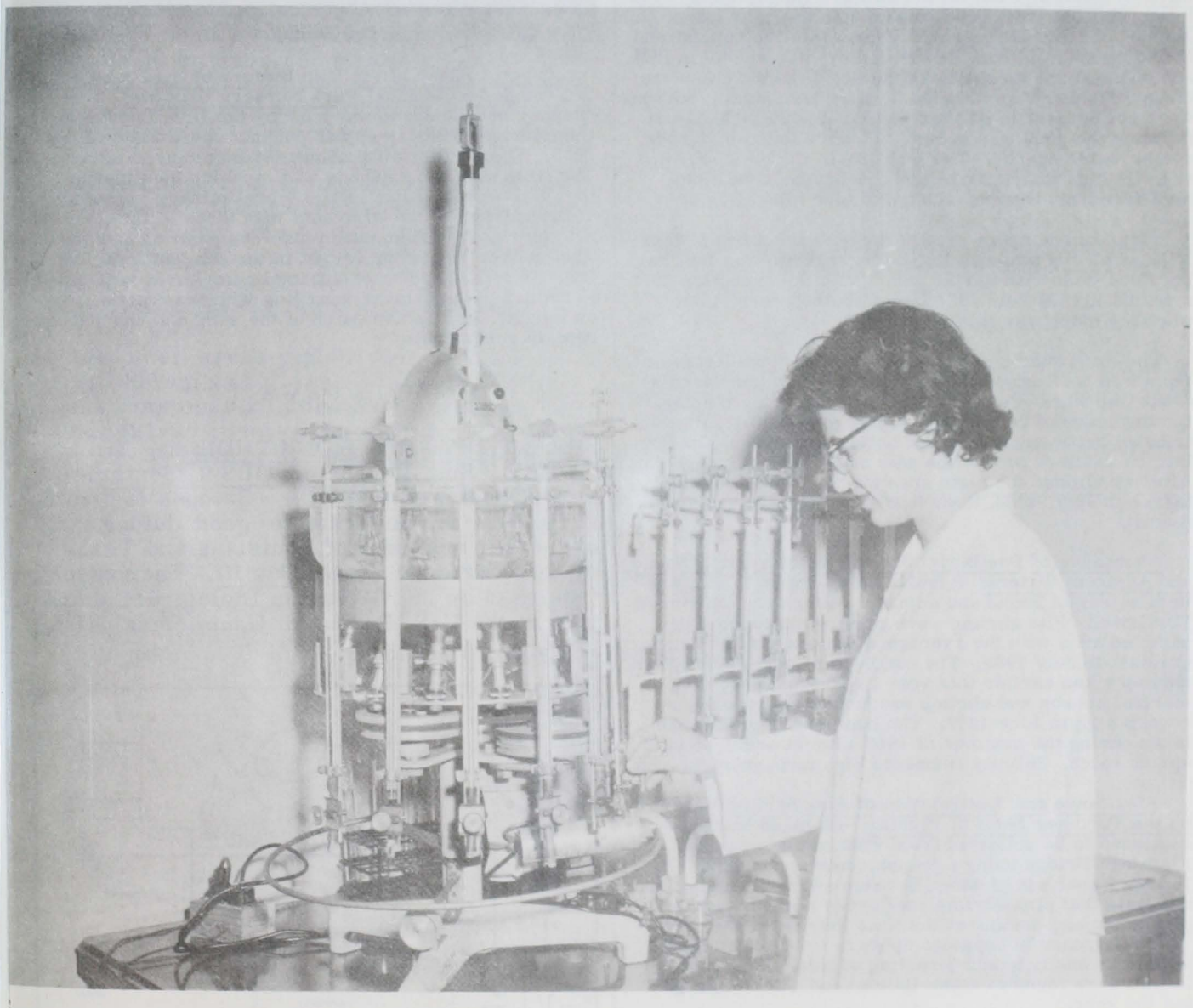
Studies of the effects of electrical shock on growth and long-term survival of shrimp were temporarily suspended because attempts to hold adult brown shrimp in the laboratory's sea water system for extended periods of time have been unsuccessful. On two occasions, 64 specimens were divided into subgroups, in half of which each shrimp was isolated to prevent cannibalism. All experimental shrimp were held in flowing water and regularly fed bits of fresh fish. Of the 128 shrimp brought into the sea water systems, only 33 survived for 4 weeks. After 6 weeks, only 8 remained alive. In both experiments, mortality in the East Lagoon system (92 percent in 4 weeks) was more rapid than that of shrimp kept in the circulating system at Fort Crockett (56 percent). This difference in mortality was greater than that noted between groups in which shrimp were isolated from each other and groups in which individuals were not partitioned. One factor which may have contributed to mortality in the Lagoon system was the occurrence of a dense population of Gonyaulax moni-

lita (a dinoflagellate known to be toxic to fish) in the Lagoon itself and, consequently, in the water supplying the system.

Further study of a flatworm parasite of shrimp in Galveston Bay has brought to light another stage in the worm's life cycle. The new form, which is more mature than the stage occurring in shrimp, is found in the gut of elasmobranchs. This finding directly implicates the elasmobranch as a predator of commercially important shrimp.

Growth of Metabolism: A second growth experiment to test the combined effects of salinity and temperature on postlarval penaeid shrimp was completed. Using postlarval white shrimp as test specimens, trials were run in 5 salt concentrations--2 ‰, 5 ‰, 11 ‰, 25 ‰, and 35 ‰--at each of 4 levels of temperature--11°, 18°, 25°, and 32° C. (50°, 65°, 77°, and 90° F.). In addition, "grooved" (brown shrimp) postlarvae collected along with white shrimp material and treated as control animals were tested at 25 ‰ salinity and temperatures of 18° and 32° C. As in a previous experiment with grooved postlarvae, differences in growth rate were more closely associated with temperature than with salinity.

In contrast to results of the earlier experiment, no animals survived at 11° C., even though experimental salinity levels were within the range in which grooved postlarvae had been previously maintained for as long as 28 days. Survival at the highest temperature (32° C.) was improved, however, with 75 to 80 percent of the white shrimp surviving in all concentrations but that of



Warburg apparatus used in respiration studies of shrimp tissues.

2 °/oo, in which only 35 percent survived. Of the "control" (grooved) postlarvae tested at 32° C., only 34 percent survived 27 days in the 25 °/oo medium. Of the white shrimp postlarvae tested at 18° C., 55 percent survived in the 35 °/oo concentration but only 25 percent in 2 °/oo. The results seem to indicate that white shrimp postlarvae can withstand higher temperatures than grooved (brown shrimp) postlarvae and, conversely, that grooved postlarvae are able to tolerate lower temperatures within a broader salinity range than postlarvae of the white shrimp. This speculation was reinforced by the results of studies involving isolated brown and white shrimp postlarvae at the same temperature levels. Brown shrimp postlarvae appeared to grow and survive better at 18° C. than did white postlarvae, with the reverse being the case at 32° C.

CONTRACT RESEARCH: Seasonal Distribution Patterns of Adult and Larval Shrimp in Aransas Pass (Tex.) Inlet: The concrete pond sodded with mud and grass in March 1963 and stocked with representative populations, including shrimp from Red Fish Bay, was seined in July. Although all specimens were removed, no shrimp were taken. They had apparently died or been eaten. Shrimp were not present in similar habitat in Red Fish Bay at the time the pond was seined, but were found in deeper, cooler water nearby. The inability of the pond shrimp to avoid high temperature and low oxygen conditions may have been the main cause for the mortality.

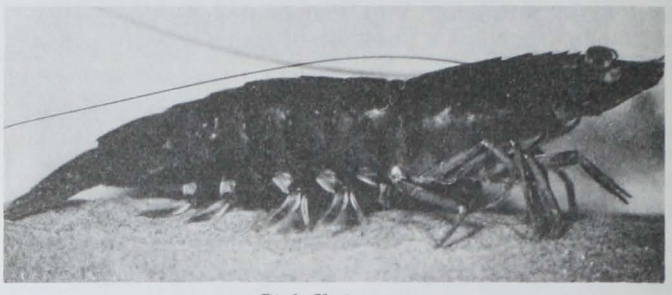
Tide-trap samples were taken several times a week. In general, the biomass (including shrimp) was less during flood tides than during ebb. With the exception of a period in mid-July 1963, most shrimp were taken when the moon was full.

The examination of plankton samples from Aransas Pass was not completed. Catches of planktonic forms of shrimp were greatest at the bottom during the day. During hours of darkness, catches were equally distributed between surface and bottom samples. The largest catch of postlarvae was made during June 1963. After an almost complete absence of penaeid shrimp larvae in July 1963, their numbers increased in early August.

Abundance of Postlarval Shrimp in Mississippi Sound and Adjacent Waters: Regular sampling at 18 stations in Mississippi Sound and adjacent waters was continued. Postlarval white shrimp were present throughout the sampled area with the average catch per station being greatest in July 1963. The numbers of postlarval brown shrimp taken earlier this year indicated a good commercial season and shrimp production approached a record high in June 1963. The numbers of postlarvae taken during the summer of 1963 almost equalled the spring catch. Salinity remained high throughout the area.

Abundance and Distribution of Pink Shrimp Larvae on the Tortugas Shelf of Florida: Plankton samples continued to be collected from Buttonwood Canal at Flamingo Bridge using a 3-inch centrifugal pump. Preliminary analysis of samples taken since October 1962 suggests that pink shrimp postlarvae are alternately planktonic and benthic at the time they enter the canal. This difference in behavior appears to be associated with light intensity and direction of tidal flow. Postlarvae were found to enter Buttonwood Canal throughout the year.

Six cruises to sample plankton over portions of the Tortugas shelf were completed aboard the vessel Miss Fleta. One station was occupied for 24 hours on the July 30-August 1, 1963, cruise. The number of Penaeus larvae taken at that station during midday was nearly double the number taken around midnight. Postlarvae dominated the midnight tows and protozoea were most abundant during the midday tows.



Pink Shrimp.

Juvenile Phase of the Life History of the Pink Shrimp in Everglades National Park Nursery Grounds: A new channel net, designed and built by the U. S. Bureau of Commercial Fisheries, was put into operation on July 30, 1963. The performance of the net was very satisfactory. The wing nets were rehung with webbing identical to that used in the channel net. A preliminary comparison of the catches of the wing nets with those of the channel net show good agreement in size composition and range. The number of shrimp caught in the wing nets varied from 18 to 32 percent of the total sample. It is planned to reduce the amount of sampling with the channel net as long as the relative catch of the wing and channel nets remain comparable.

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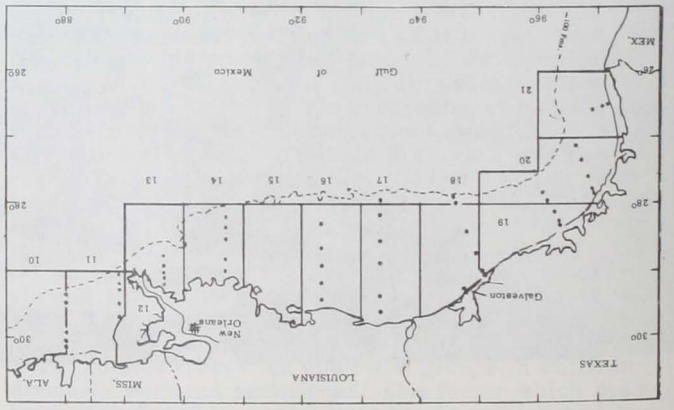
SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS 9 (September 22-October 5, 1963): Catches of brown shrimp were moderate to good during this cruise off the coast of Louisiana and Texas by the chartered vessel Gus III. The vessel (operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fish-



Shows the station pattern for the shrimp distribution studies in the Gulf of Mexico during 1963.

eries) was engaged in a continuing study of the distribution of shrimp in the Gulf of Mexico.

Eight statistical areas (13, 14, 16, 17, 18, 19, 20, and 21) were covered. One 3-hour tow with a 45-foot shrimp trawl was made in each of 3 depth ranges (0-10, 10-20, and over 20 fathoms) in those areas. Work was hampered on the eastern portion of the cruise by unusually heavy seas.

The best catches of brown shrimp during the cruise were made in 10-20 fathoms off Cameron, La., and Galveston, Tex. Those waters also produced large catches of small white shrimp from under 10 fathoms. Area 17 yielded 89 pounds of 21-25 count brown shrimp from 10-20 fathoms, 38 pounds of 21-25 count brown shrimp from over 20 fathoms, and 64 pounds of over 68 count white shrimp from the depth under 10 fathoms. Area 18 produced a catch of 54 pounds of 15-20 count brown shrimp from the 10-20 fathom range, 36 pounds of 15-20 count brown shrimp from over 20 fathoms, and 47 pounds of 51-67 count white shrimp from under 10 fathoms. In area 19, a tow at the 10-20 fathom depth yielded 158 pounds of 21-25 count brown shrimp.

The other areas yielded fair catches of brown shrimp as follows: 30 pounds (26-30 count) from over 20 fathoms in area 13; 39 pounds (21-25 count) from over 20 fathoms in area 16; 36 pounds (31-40 count) from the 10-20 fathom depth in area 20; and 33 pounds (26-30 count) from 10-20 fathoms in area 21.

The catch of pink shrimp did not exceed two pounds at any station during the cruise.

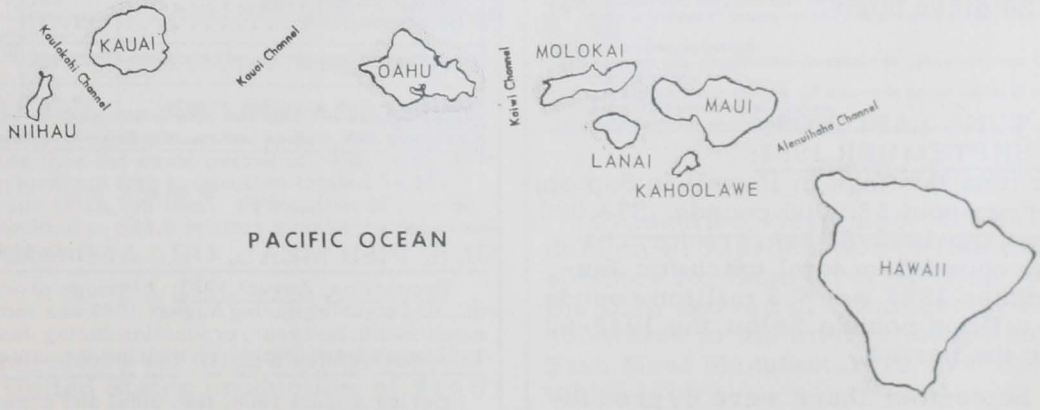
Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, Oct. 1963 p. 23.

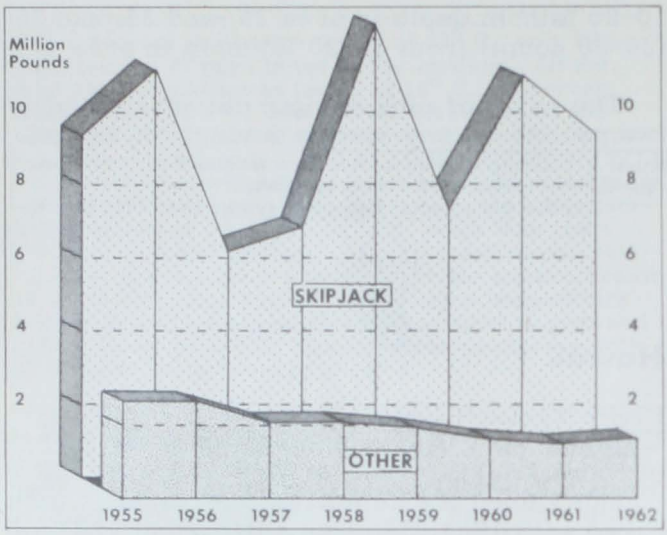
Hawaii

FISHERY LANDINGS, 1962:

Landings of fish and shellfish in the State of Hawaii during 1962 totaled 13.2 million pounds valued at $2.8 million ex-vessel. Compared with 1961, this was a decrease of 1.3 million pounds or 9 percent in quantity and $76,900 or 3 percent in value.

The decline in quantity in 1962 was due largely to a reduction in skipjack tuna landings which fell 1.5 million pounds below the level of the previous year. The catch of skipjack amounted to 9.4 million pounds--400,000 pounds less than the 1948-62 average of 9.8 million pounds. The decrease fulfilled predictions made early in 1962 of a slightly below average skipjack year. The best yield of skipjack (2.3 million pounds) occurred in June, when there was a great influx of 25-pound fish, which had not been present previously.





Hawaii tuna catch, 1955-62.

After this month of peak production, the quantity dropped sharply.

Other important species which declined included black marlin, down 87,100 pounds and big-eyed scad, down 66,400 pounds. Among the species which showed increased landings were big-eyed tuna and jack mackerel, up 183,000 and 179,600 pounds, respectively. Tuna accounted for 84 percent of the quantity and 68 percent of the value of all fishery products landed in Hawaii.

Oahu led the islands in landings with 10.1 million pounds or 77 percent of the total. The Island of Hawaii was next with 1.6 million pounds, followed by Maui with 1.2 million pounds. The remainder of the catch was landed at ports on the Islands of Molokai, Kauai, and Lanai.

The 1962 catch was taken by 817 fishermen. Fishing craft operated during the year included 60 vessels of 5 net tons and over, 318 motor boats, and 20 other boats.

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SKIPJACK TUNA LANDINGS, JANUARY-SEPTEMBER 1963:

Skipjack tuna landings in Hawaii in September 1963 were about 580,000 pounds, 373,000 pounds below the 1948-62 average for the month. The cumulative total catch for January-September 1963 was 7.3 million pounds, almost 1.4 million pounds below the 1948-62 average for the period.

During September there were 69 productive trips, giving an average of 5,818 pounds per productive trip. Individual catches ranged from 197 pounds to 20,000 pounds.

Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-August 1963: Based on domestic production and imports, the United States available supply of fish meal for January-August 1963 amounted to 439,923 short tons--27,049 tons (or 6.6 percent) more than during the same period in 1962. Domestic production was 47,099 tons (or 21.6 percent) less, but imports were 74,148 tons (or 38.0 percent) higher than in the same period in 1962. Peru continued to lead other countries with shipments of 201,764 tons.

The United States supply of fish solubles (including homogenized fish) during January-August 1963 amounted to 77,361 tons--a decrease of 18,182 tons as compared with the same period in 1962. Domestic production and imports dropped 17.6 percent and 44.8 percent, respectively.

U. S. Supply of Fish Meal and Solubles, January-August 1963 with Comparisons

Item	Jan.-Aug. 1/1963	Jan.-Aug. 1962	Total 1962
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	135,185	171,687	238,680
Tuna and mackerel	13,969	19,227	26,559
Herring	5,127	3,811	5,095
Other	16,498	23,153	40,898
Total production	170,779	217,878	311,232
Imports:			
Canada	35,739	30,765	42,806
Peru	201,764	146,195	186,249
Chile	22,637	8,146	9,247
So. Africa Republic	5,975	9,184	10,084
Other countries	3,029	706	3,921
Total imports	269,144	194,996	252,307
Available fish meal supply	439,923	412,874	563,539
Fish Solubles:			
Domestic production 2/	74,592	90,525	124,334
Imports:			
Canada	1,541	795	1,335
Iceland	-	2,205	2,332
So. Africa Republic	191	1,091	1,717
Other countries	1,037	927	924
Total imports	2,769	5,018	6,308
Available fish solubles supply	77,361	95,543	130,642

1/Preliminary.
2/50-percent solids. Includes production of homogenized condensed fish.

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U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, August 1963: Although production of meal, oil, and solubles during August 1963 was more than for the same month last year, production during January-August 1963 was significantly less than for the same period in 1962.

During August 1963, fish meal and scrap production amounted to 42,486 tons--83 percent from menhaden.

Fish being delivered to the dehydration plant for processing.

Fish solubles and homogenized fish amounted to 18,087 tons, and marine animal oil totaled 34.2 million pounds--88 percent from menhaden. Compared with August 1962, production of fish meal and scrap was up 5 percent, fish solubles and homogenized fish up 8 percent, and marine animal oil up 3 percent.

Table 1 - U. S. Production of Fish Meal, Oil, and Solubles, August 1963 1/with Comparisons

Product	August		Jan.-Aug.		Total
	1/1963	1962	1/1963	1962	1962
	(Short Tons)				
Fish Meal and Scrap:					
Herring	2,401	1,115	5,127	3,811	5,095
Menhaden 2/	35,379	33,712	135,185	171,687	238,680
Sardine, Pacific	-	17	9	665	702
Tuna and mackerel	2,318	2,111	13,969	19,227	26,559
Unclassified	2,388	3,485	16,489	22,488	27,297
Total	42,486	40,440	170,779	217,878	298,333
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	12,899
Grand total meal and scrap	3/	3/	3/	3/	311,232
Fish solubles:					
Menhaden	15,442	12,860	55,366	61,369	84,885
Other	1,883	3,101	12,092	20,286	28,353
Total	17,325	15,961	67,458	81,655	113,238
Homogenized condensed fish	762	850	7,134	8,870	11,096
	(1,000 Pounds)				
Oil, body:					
Herring	2,246	1,515	4,672	4,117	5,255
Menhaden 2/	30,169	30,400	120,086	162,592	237,815
Sardine, Pacific	-	10	-	158	167
Tuna and mackerel	811	625	2,854	3,328	5,175
Other (including whale)	1,010	844	6,312	6,493	7,396
Total oil	34,236	33,394	133,924	176,688	255,808

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Not available on a monthly basis.
Note: Beginning with February 1963, fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

The quantity of fish meal and scrap processed during the first 8 months of 1963 amounted to 170,779 tons--47,099 tons less than the same period of 1962. Fish solubles and homogenized fish production totaled 74,592 tons--a decrease of 15,933 tons. Production of marine animal oil amounted to 134.0 million pounds--a decrease of 42.8 million pounds.

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Major Indicators for U. S. Supply, September 1963: United States production of fish meal and fish oil in September 1963 was lower by 21.1 and 36.8 percent, respectively, as compared with September 1962. Fish solubles production was down 3.3 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, September 1963

Item and Period	1963	1962	1961	1960	1959
	(Short Tons)				
Fish Meal:					
Production 1/:					
November	-	11,023	10,058	8,725	10,797
October	-	36,614	16,852	24,455	22,026
September	24,604	31,165	28,642	36,239	36,874
January-August	170,779	217,878	228,757	196,344	190,969
Jan.-Dec. prelim. totals 2/	-	288,336	289,039	257,969	275,396
Jan.-Dec. final tot.	-	311,232	311,265	290,137	306,551
Imports:					
November	-	11,904	25,649	6,149	3,673
October	-	12,732	9,425	12,515	3,821
September	-	13,698	13,941	9,487	9,224
January-August	269,144	194,996	145,199	87,846	111,419
Jan.-Dec. totals	-	252,307	217,845	131,561	133,955
Fish Solubles:					
Production 3/:					
November	-	4,147	5,153	2,891	5,451
October	-	15,510	8,418	11,139	13,946
September	11,609	12,009	11,415	12,367	25,651
January-August	74,592	90,525	79,426	76,390	126,826
Jan.-Dec. prelim. totals	-	120,886	109,018	106,361	176,913
Jan.-Dec. final tot.	-	124,334	112,241	98,929	165,359
Imports:					
November	-	435	3,649	282	3,089
October	-	290	110	-	1,908
September	-	178	263	38	1,732
January-Aug.	2,769	5,018	2,245	2,794	19,481
Jan.-Dec. totals	-	6,308	6,739	3,174	26,630
	(1,000 Pounds) 5/				
Fish Oils:					
Production:					
November	-	7,956	10,539	9,315	8,887
October	-	39,563	14,734	23,439	16,866
September	19,419	30,723	24,988	30,530	22,383
January-August	133,924	176,688	196,580	132,515	124,228
Jan.-Dec. prelim. totals 4/	-	257,131	259,400	206,848	189,240
Jan.-Dec. final tot.	-	255,808	266,670	215,861	193,324
Exports:					
November	-	171	1,425	14,640	6,096
October	-	26,003	15,202	4,434	14,331
September	-	219	9,521	13,959	8,469
January-August	164,602	96,405	85,852	94,836	96,001
Jan.-Dec. totals	-	123,050	122,486	143,659	144,481

1/Does not include crab meat, shrimp, and misc. meals.
2/Preliminary data computed from monthly data. Fish meal production reported currently comprised 90 percent for 1959, 89 percent for 1960, 93 percent for 1961 and 1962.
3/Includes homogenized fish.
4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.
5/Beginning with March 1963 fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.
Note: Data for 1963 are preliminary.

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Production, September 1963: Preliminary data on U. S. production of fish meal, oil, and solubles for September 1963 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production[1] of Fish Meal, Oil, and Solubles, September 1963 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homog-enized[3]
	Short Tons	1,000 Pounds	Short Tons	Short Tons
September 1963:				
East & Gulf Coasts	21,783	18,579	9,491	82
West Coast[2]	2,821	840	2,036	-
Total	24,604	19,419	11,527	82
Jan.-Sept. 1963 Total	195,383	153,343	78,985	7,216
Jan.-Sept. 1962 Total	238,340	203,712	93,023	8,065

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes Hawaii, American Samoa, and Puerto Rico.
3/Includes condensed fish.
Note: Beginning with March 1963 fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

Maine Sardines

CANNED STOCKS INCLUDED IN BUREAU OF THE CENSUS SURVEY:

Notice was given in the Federal Register, October 31, 1963, that the U.S. Bureau of the Census plans to conduct its annual survey of inventories covering 29 canned and bottled products, including vegetables, fruits, juices, and fish as of December 31, 1963. Canned Maine sardines is the only fishery product that will be included in the survey. This survey, together with the previous surveys, provides the only continuing source of information on stocks of the specified canned foods held by wholesalers and in the warehouses of retail multiunit organizations.

Reports will not be required from all firms but will be limited to a scientifically selected sample of wholesalers and retail multiunit organizations handling canned foods, in order to provide year-end inventories of the specified canned food items with measurable reliability. In addition, a number of selected multiunit firms will be requested to provide information on the location of establishments maintaining canned food stocks but not currently reporting in the Canned Food Survey.

Massachusetts

REGULATIONS PERTAINING TO ICING AND EVISCERATING FISH ON VESSELS AMENDED:

An amendment to Section 14 of the Rules and Regulations promulgated by the Massachusetts Director of the Division of Marine Fisheries, on December 10, 1957, relative to permits and certificates issued by the Division and to the condition and operation of establishments and vessels where fish, shellfish or crustacea are stored, processed or packed, became effective on October 4, 1963. It will remain in force until amended or rescinded by a subsequent order.

The amendment follows:

14. Icing, Eviscerating:

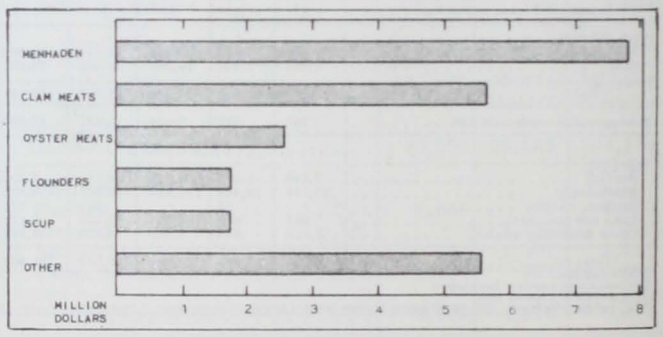
(a) All fish of the following species shall be eviscerated as they are caught and before being packed, iced or stowed aboard the vessels: Haddock, Cod, Pollock, Hake, Cusk and Cat (Wolf) Fish.

(b) The gutting of fish at sea shall be thorough and complete with the removal of all matter from the body cavity. Fish shall be thoroughly washed before being iced. Ice shall be used so that all fish are kept apart in the center of the pens. Ice must be in actual and continuous contact with the fish, it shall effectively separate all fish from bulkheads, sheathing, shelves and pen boards, and must be sufficient in quantity to last for the duration of the storage period.

Middle Atlantic States

FISHERY LANDINGS, 1962:

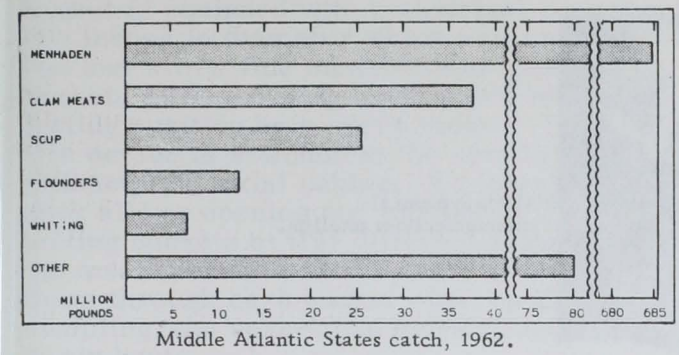
Landings of fish and shellfish in the Middle Atlantic States (New York, New Jersey, and Delaware) during 1962 amounted to 846



Value of Middle Atlantic States catch, 1962.

million pounds valued at $25 million to the fishermen. Landings increased 20.9 million pounds as compared with 1961, due principally to larger catches of fish taken for reduction. The total yield of fish and shellfish was the greatest since 1957. The value was up more than $1 million over the previous year.

Increases were reported in the 1962 landings of clams, 37.4 million pounds (up 3.3



Middle Atlantic States catch, 1962.

million); blue crabs, 3.6 million pounds (up 2.1 million); and sea bass, 3.1 million pounds (up 1.3 million pounds). Fish taken for bait, reduction, and animal food totaled 732.3 million pounds (up 16.7 million pounds). Landings of flounders (12.1 million pounds) and scup (25.6 million pounds) remained about the same as in the previous year.

New Jersey, with 416.6 million pounds, accounted for 49 percent of the catch, followed by Delaware with 29 percent. New Jersey also led in ex-vessel value with $11.8 million or 47 percent of the total; New York was second with 40 percent.

In 1962, there were 8,254 fishermen engaged in the Middle Atlantic fisheries--305 less than in 1961. The decrease occurred in the number of casual fishermen in the shore and boat fisheries, while the number of regular fishermen increased from 1,841 men employed in 1961 to 1,905 in 1962. There were 3,053 fishermen engaged aboard vessels in 1962--32 more than in the previous year. Fishing craft operated in the Middle Atlantic area during the year consisted of 606 vessels totaling 31,622 gross tons, 3,746 motor boats, and 300 other boats.

Nutrition

AN IMPROVED METHOD OF DETERMINING THIAMINASE ACTIVITY OF WHOLE FISH DEVELOPED:

The antimetabolite (thiaminase) produces a typical thiamine (vitamin B_1) deficiency syndrome when certain species of raw fish are fed to fur animals. The resulting deficiency in mink, fox, etc., contributes to the alteration and loss of value of the fur. In addition, the continual feeding of this antimetabolite will result in retarded growth and even eventual death of the animal. The possible economic loss to the fur farming and fishing industries has demanded that work be done to elucidate the properties of thiaminase and the possibilities of altering its activity.

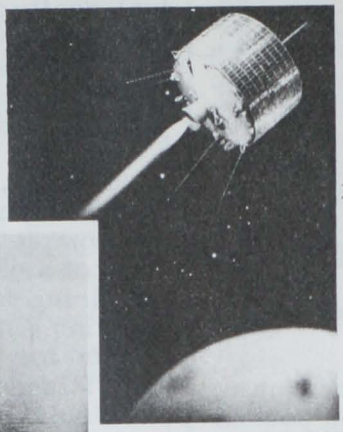
The U.S. Bureau of Commercial Fisheries Technological Laboratory at Ann Arbor, Mich. has completed research on the initial development of a procedure for quantitatively determining thiaminase activity of whole fish utilizing a modification of the thiochrome method for thiamine assay. The procedure has yielded very repeatable results and the data indicates that the method is sufficiently sensitive for use in the study of enzyme kinetics. Studies are in progress to further test the procedure for its effectiveness in determining the thiaminase content of various fish that are currently being used in mink diets. These test are being conducted in cooperation with the U.S. Department of Agriculture Fur Animal Experiment Station at Cornell University, whose staff is obtaining the dietary response of test diets containing thiaminase-fish.

A study of the second phase of the project on thiaminase has been initiated. The work thus far has been restricted to a review of the literature relative to the inactivation of thiaminase by various chemical and physical methods.

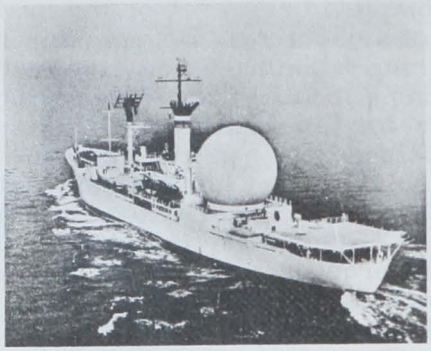
Oceanography

COMMUNICATIONS SATELLITE ASSISTS OCEANOGRAPHERS:

On September 19, 1963, the Syncom II communications satellite gave an assist to marine observers in verifying oceanographic data collected in the Gulf of Guinea off Africa. It was the first time that a satellite transmitted oceanographic data. Participating in EQUALANT II (the second phase of the International Cooperative Investigations of the Tropical Atlantic), the U.S. Bureau of Commercial Fisheries research vessel Geronimo had been taking Nansen casts between Pointe Noire, Republic of Congo, and Freetown, Sierra Leone. The data, collected to depths of some 1,000 meters, were processed aboard the Geronimo and transmitted to the Kingsport, the Syncom surface station anchored in Lagos Harbor, Nigeria. The Kingsport transmitted the material to Syncom II, some 22,300 miles



NASA's Syncom II communications satellite.



USNS Kingsport, the Syncom's surface station anchored in Lagos Harbor, Nigeria.

U. S. Bureau of Commercial Fisheries research vessel Geronimo.

Star performers in oceanographic communication experiment.

above the Atlantic Ocean, which relayed it to a ground station at Lakehurst, N. J. From there the data were sent along conventional ground lines to the National Oceanographic Data Center (NODC) in Washington, D. C.

At NODC the data were compared with available historical records from the five-degree square within which the readings were made. Deviations were then reported to the Geronimo. Although the exercise was primarily a test of communication speed, a quality control problem did develop in the course of the experiment. The oceanographic station data received from the Geronimo showed unusually large equivalent salinity deviations (up to minus 0.40 $^{o}/_{oo}$) which prompted oceanographers to suspect the validity of the salinity values. It was subsequently learned from the scientists aboard the Geronimo that the platinum resistance thermometer in the salinometer was shorting out and that associated malfunctioning was suspected.

The Syncom II satellite was launched July 26, 1963, from Cape Canaveral, Fla. On August 15, 1963, it reached its on-station position above 55 degrees west longitude through the precise firing of on-board gas jets which "walked" the satellite back from where it was injected into synchronous orbit above the east coast of Africa. Syncom II, at an altitude of about 22,300 miles, appears to trace an elongated figure 8 along 55 degrees west longitude to points 33 degrees north and south of the equator. (Newsletter, September 30, 1963, National Oceanographic Data Center.)

* * * * *

ELECTRONIC DEVICE SPEEDS COLLECTION OF PLANKTON:

Plans to use electronically-controlled buckets to scoop up minute marine organisms from 3,300 feet beneath the sea were reported by University of Rhode Island oceanographers as they left on October 1, 1963, for a 2-week cruise aboard the research vessel Trident to an area about 300 miles southeast of Bermuda. Since the new device permits the gathering of samples five times faster than previous methods, it is hoped that it will lead to the development of more information about zooplankton which is composed of minute animals that float in the sea and form the basic food for many marine species.

To take their samples, the scientists on the Trident planned to lower a metal housing containing five of the special buckets. Each

bucket is equipped with cylindrical cups about two inches in diameter which are enclosed at one end with a fine monel-metal mesh. The buckets in the housing are rotated into a collecting position by a servo motor. The entire device is attached to the ship by double-conductor, coaxial cables. A control box on deck allows opening and closing of the collecting buckets at five different depths and the measurement of the volume of water that flows through each bucket when open. During sampling, the vessel can move at speeds up to six knots.

Previously, scientists had to be content with taking one sample at a chosen depth and then spending sometimes an hour or more retrieving their gear and determining what they had found. In the meantime, the zooplankton at other depths could rise or fall, thus making it difficult to learn how the organisms were stratified. (Newsletter, September 30, 1963, National Oceanographic Data Center.)

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DATA QUALITY CONTROL EXPERIMENT:

The National Oceanographic Data Center (NODC) conducted a data quality control experiment in September 1963 with the aid of two vessels participating in the International Cooperative Investigations of the Tropical Atlantic (ICITA). During EQUALANT II, data collected at oceanographic stations by the United States Coast Guard cutter Casco and the Argentine research vessel Comondoro Laserre were transmitted daily to the NODC by radio.

The Coast Guard cutter, Casco, was one of the vessels transmitting daily oceanographic stations by radio to The National Oceanographic Data Center during EQUALANT II.

The data from both vessels were evaluated and compared with averages previously prepared for five-degree squares of latitude and longitude in the area of operations. Evaluation messages in the form of coded histograms were then prepared and sent by radio from NODC to the vessels. Deviations of the observed salinity data from the historical averages were expressed as the mean deviation in equivalent salinity units, and the frequency of deviations of each class were given in percent. The messages provided a background for evaluating the new observations and also served as a basis for intership comparison of data.

The station data from both vessels showed a small constant deviation from the historical data. Had there been a significant difference, the work would have been "suspect." A quality control system of this type becomes more valuable in oceanographic surveys as the number of participating vessels increases.

Ideally, the system could be refined to accept uncorrected data transmitted from ships. The data could be computed and evaluated and suspect techniques or calibrations identified. This would allow research vessels to take appropriate corrective action while still in the area of investigation. (Newsletter, September 30, 1963, National Oceanographic Data Center.)

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INFLUENCE OF WEATHER ON OCEAN CURRENTS STUDIED:

To answer questions regarding the interrelation between weather conditions and ocean currents, scientists at the Virginia Institute of Marine Science are carrying out a large-scale research project with help from several Federal agencies. The area under investigation includes 10,000 square miles of open ocean along the Continental Shelf reaching from Cape Henlopen at the mouth of Delaware Bay to Cape Hatteras, North Carolina.

The Virginia scientists are using drift bottles to indicate surface currents, and seabed drifters to discover the direction in which bottom currents flow. The marine laboratory's research vessel Pathfinder traverses the area monthly to record temperatures and salinity every three miles. In addition, airplanes have recorded ocean surface temperatures with an infrared thermometer.

In June 1963, a United States Navy patrol plane flew over the area and released 6 drift bottles and 5 seabed drifters at each of 110 specified stations. Sea surface temperatures

at the release points were recorded from the plane with an infrared thermometer during the flight.

On the sea below, investigators on the Pathfinder gathered temperature and salinity data to determine the internal hydrographic structure of shelf waters, taking readings every 3 miles along 2 transects which cross the area. For 5 days prior to the release date and 10 days following it, the Navy Weather Research Facility provided weather information over the Continental Shelf from Cape Cod to Cape Hatteras.

Research vessel, Pathfinder, traverses area monthly recording temperatures and salinity data every three miles.

It is hoped that the cards in the drift bottles and the forms printed on the seabed drifters when recovered by crews of fishing vessels, sport fishermen, swimmers, and others will be returned to the Virginia Institute of Marine Science, Gloucester Point, Va.

The pattern established in June for the distribution of current bottles and drifters, and the collection of salinity, temperature, and weather data has been repeated each month and will continue regularly until May 1964. At the termination of the project, the assembled information will be analyzed with data-processing equipment. It is hoped that patterns showing the interrelations between winds and sea currents will emerge that will enable scientists to predict ocean current changes from weather observations.

The investigation may solve riddles surrounding the natural transport of fish larvae from ocean spawning grounds to distant upstream nursery areas. It is also hoped that the movements of adult fish will be better understood. Scientists with other interests are also following results of the project.

Other laboratories along the Atlantic Seaboard are conducting similar studies. The Director of the Virginia Institute stated that the work is an excellent example of the type of cooperative program that will be needed to solve the problems of our coastal resources. He pointed out that the area of the Continental Shelf between Cape Hatteras and Cape Cod is one of the most important, but least known areas of the North Atlantic. He said that those waters exercise a profound effect on Chesapeake Bay and other estuarine systems along our coast and it is important that they be understood. (Virginia Institute of Marine Science, October 10, 1963.)

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MARINE TECHNOLOGY SOCIETY ESTABLISHED:

The Marine Technology Society, a nonprofit organization, was incorporated in the State of New York in June 1963 as a professional membership society concerned with the exploration and exploitation of the oceans and their potentials, promoting marine science education, and the intelligent interpretation of the discoveries of marine sciences in relation to human betterment. To provide the widest communication and participation, the Board of Directors of the society is composed of officials from industry, Government and the academic community.

The society has initiated programs relating to conservation of marine resources; standardization of oceanographic instruments, techniques, and measurements; the potential of marine sciences to nations with limited technological and economic resources; and the identification of the roles of basic research, applied research, and equipment and systems development in the solution of pressing international needs. Specific projects concern a report on the "state-of-the-art," a report on future requirements of undersea vehicles, a study of the use of obsolete underwater communication cables for oceanographic data retrieval, and the collating of all available technical literature pertaining to marine science.

The society will hold their first national conference in Washington, D. C., on March 24-25, 1964. One of the subjects of the confer-

ence will be buoy technology. (Newsletter, September 30, 1963, National Oceanographic Data Center.)

* * * * *

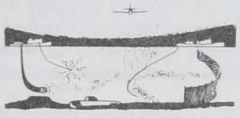
WORLD OCEANOGRAPHIC DATA DISPLAY SYSTEM:

A new electronic computer is being developed to aid oceanographic research. Known as the World Oceanographic Data Display (WODD) System, it stores digital oceanographic data and is programmed to give a visual display output on an oscilloscope as well as a permanent record on paper tape.

The WODD System could be used to plan and prepare charts and atlases in a fraction of the time it now takes; deviations in data could be quickly identified and information retrieval could be performed in a matter of seconds.

With the new system, it would be possible to analyze data in the following combinations: depth vs. temperature, depth vs. salinity, depth vs. oxygen percentage, density vs. depth, density vs. temperature, density vs. salinity, and density vs. oxygen percentage. (Newsletter, September 30, 1963, National Oceanographic Data Center.)

Note: See Commercial Fisheries Review, September 1963 p. 41.



Oysters

PATENT GRANTED FOR CHEMICAL COMPOUND TO CONTROL ENEMIES:

A chemical for increasing oyster production by killing off the marine enemies that prey on oysters received U.S. patent 3,103,202.

The compound, known as Polystream, is now being sprayed experimentally on oyster beds in Long Island Sound and tested by the U.S. Fish and Wildlife Service in cooperation with oyster growers in New York and Connecticut.

The chlorinated hydrocarbon pesticide, manufactured by a Niagara Falls, N.Y., firm is not available for general use until test results show it is safe for humans and oysters.

Preliminary tests have proved its effectiveness aganist flatworms, starfish, Crepidula, and drills, which are marine snails that bore holes in the oyster shells and suck out the soft parts of the oyster. The chemical is sprayed on the cultch, a collection of old shells or any other material, to which the oysters attach themselves approximately two weeks after birth.

As the "spat," or young oysters, fasten to the cultch, the marine predators usually attack. However, in one test described in the patent, the number of live oysters found on Polystream-treated cultch was almost three times as great as on the untreated ones. The percentage of "drilled" oysters was eight and one-half times lower on the treated ones, and the "treated" spat oysters were 3 millimeters (about $\frac{1}{8}$-inch) longer than the others.

The patent was issued to scientists of the Milford, Conn., Shellfish Laboratory of the U.S. Bureau of Commercial Fisheries. (Science Newsletter, September 28, 1963.)

Shrimp

FRESH WATER SHRIMP PLANTED IN CALIFORNIA AND NEVADA LAKES:

The first introduction of fresh-water shrimp into California and Nevada waters was made in September 1963 in Lake Tahoe, the California and Nevada Departments of Fish and Game announced on October 5, 1963.

The first planting of 50,000 fresh-water shrimp was followed 4 days later with a second plant of 50,000, partly in Lake Tahoe and partly in Echo Lake. The shrimp averaged from $\frac{1}{2}$ to $1\frac{1}{4}$-inches in length.

The shrimp planting project is aimed at improving the fishery at Tahoe, and is part of the cooperative Lake Tahoe Fisheries Study being conducted by the two states. The study is partly financed with funds under the Federal Aid to Fish program.

The shrimp (Mysis relicta), were obtained from Upper Waterton Lake in Waterton National Park, Alberta, Canada, through the cooperation of the Canadian National Park Service and the Wildlife Service of the Canadian Department of Northern Affairs and National Resources.

A California Fish and Game plane flew the shrimp to Lake Tahoe.

The two departments hope the shrimp will provide food for lake trout and fill a gap in the food chain to increase the size and number of lake trout. The shrimp is native to the northeastern United States and Canada north to the Arctic Circle, and thrives in deep cold water lakes.

Mysis shrimp, suddenly became established in Kootenay Lake, B. C., 13 years after the original planting, the Departments noted, and has improved the fishery there.

It is hoped that these plants will help insure the establishment of the shrimp by providing a source of supply for further transplants.

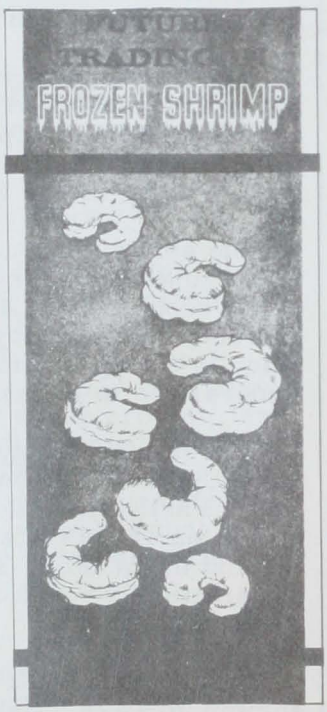
The two Departments expect to plant Mysis shrimp in Tahoe and Echo each year for three successive years.

* * * * *

FUTURES TRADING FOR FROZEN SHRIMP OPENS IN CHICAGO:

Futures trading in frozen shrimp was conducted for the first time on November 11, 1963, on the Chicago Mercantile Exchange, Chicago, Ill. On that opening day, a total of 65 contract units (325,000 pounds) of frozen shrimp was traded for delivery in January and March 1964.

Rules and specifications governing futures trading in frozen shrimp on the Chicago Mercantile Exchange for delivery in January, March, and September 1964, are as follows:



CLASSIFICATION AND GRADE: All futures contracts for Frozen Shrimp shall be U. S. Grade A raw, frozen, grooved, brown, headless Gulf Shrimp with a count of 15/20 to the pound and shall be restricted to the domestic catch of the Gulf of Mexico waters. All shrimp must meet the requirements of standards as promulgated by the United States Department of the Interior, Fish and Wildlife Service.

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

FUTURES PRICE FLUCTUATIONS AND LIMITS: The minimum price fluctuation in the futures market will be 1/10¢ per pound, equivalent of $5.00 per contract. A full cent price change equals $50.00 per contract.

Daily fluctuations are limited to 4¢ (400 points) per pound, upward or downward from the previous day's settling price.

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 sublots with no lot or sublot weighing less than 1,000 pounds. The entire unit must be processed by one packer and must be stored during any one calendar month July through January.

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 commercial 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 cold storage warehouses in the Dallas-Fort Worth, Texas, area. Delivery in approved cold storage warehouses at other Texas and Louisiana points shall be on the same basis as if stored in Dallas-Fort Worth with additional allowance from point of storage to Dallas of 18% of the minimum 25,000-pound carlot rail charge.

PERMISSIBLE SUBSTITUTIONS: Frozen shrimp with a count of less than 15 to the pound shall be deliverable at par. Frozen shrimp with a count of 21/25 to the pound shall be deliverable with an allowance of 5¢ 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 reinspection 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 certificate based on an inspection made on or after the first business day of July of any year shall remain in force until 5 p.m. on the first business day of the following April 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 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.

Note: See Commercial Fisheries Review, November 1963 p. 45.

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UNITED STATES SHRIMP SUPPLY INDICATORS, OCTOBER 1963:

Item and Period	1963	1962	1961	1960	1959
	..... (1,000 Lbs., Heads-Off)				
Total landings, So. Atl. and Gulf States:					
December	-	8,615	6,538	7,099	8,716
November	-	11,604	9,996	14,454	12,412
October	20,700	14,699	12,696	21,688	19,601
September	18,195	13,182	9,691	18,832	18,330
January-August	75,029	57,739	52,474	78,961	71,600
January-December	-	105,839	91,396	141,035	130,660
Quantity canned, Gulf States 1/:					
December	-	1,879	816	894	1,173
November	-	2,727	2,175	1,535	2,122
October	3,500	4,454	2,065	2,480	2,324
September	3,640	1,727	598	2,222	1,936
January-August	16,961	12,423	8,846	19,263	15,104
January-December	-	23,210	14,500	26,394	22,659
Frozen inventories (as of end of each mo.) 2/:					
December 31	-	31,577	19,755	40,913	37,866
November 30	-	27,500	20,668	37,264	37,334
October 31	3/	21,315	17,811	31,209	33,057
September 30	4/27,356	12,843	13,361	24,492	26,119
August 31	4/24,803	12,754	12,728	20,171	23,780
July 31	4/25,460	13,677	14,849	17,397	22,352
June 30	4/24,047	13,796	19,416	15,338	19,283
Imports 5/:					
December	-	15,798	15,442	12,411	10,611
November	-	17,964	14,852	13,516	10,269
October	-	18,279	16,813	14,211	15,340
September	3/	9,696	8,629	8,190	7,541
January-August	90,085	79,446	70,546	65,091	62,794
January-December	-	141,183	126,268	113,418	106,555
	...(¢/lb., 26-30 Count, Heads-Off)....				
Ex-vessel price, all species, So. Atl. & Gulf Ports:					
December	-	82.9	75.2	54.2	48.4
November	-	84.5	73.5	54.0	46.2
October	6/52-62	90.0	68.7	53.0	44.4
September	6/55-61	90.9	70.1	52.2	46.4
August	6/57-71	83.6	66.1	52.0	46.9
July	6/57-78	82.1	55.8	54.6	49.2
June	77.0	84.4	53.7	64.1	60.7
May	80.9	83.7	52.8	62.9	63.3

(Table continued on next column)

Item and Period	1963	1962	1961	1960	1959
	..... (1,000 Lbs., Heads-Off)				
Wholesale price froz. brown (5-lb. pkg.) Chicago, Ill.:					
December	-	101-107	91-92	68-70	64-66
November	-	105-110	89-92	69-73	60-65
October	67-75	108-115	83-90	69-73	59-62
September	73-77	113-118	87-90	65-70	62-64
August	75-81	110-112	76-91	64-67	62-64
July	80-97	3/	70-75	72-77	62-74
June	95-102	102-104	67-72	76-77	73-74
May	98-103	96-103	67-69	74-77	70-76

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30. 3. The figures in the section (Quantity canned, Gulf States) have been completely revised beginning with February 1963 on the basis of a new conversion factor (formerly 33.0 pounds per case).
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Not available.
4/Inventory of June 30, 1963, includes 667,000 pounds; July 31, 1963, includes 925,000 pounds; August 31, 1963, includes 1,011,000 pounds; and September 30, 1963, includes 2,868,000 pounds for firms not reporting previously.
5/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
6/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Texas, only.
Note: Data for 1963 are preliminary. October 1963 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.

U.S. Foreign Trade

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-September 28, 1963, amounted to 38,082,908 pounds (about 1,813,472 std. cases), according to data compiled by the Bureau of Customs. This was 10.0 percent less than the 42,335,267 pounds (about 2,015,965 std. cases) imported during January 1-September 29, 1962.

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1963 at the $12\frac{1}{2}$-percent rate of duty is limited to 63,130,642 pounds (about 3,006,221 std. cases of 48 7-oz. cans). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

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AIRBORNE IMPORTS OF FISHERY PRODUCTS, JUNE-JULY 1963:

Airborne fishery imports into the United States in June 1963 amounted to 1,017,500 pounds valued at $509,900, an increase of 11.0 percent in quantity and 10.6 percent in value from those of the previous month. In July 1963, there was a slight decline with imports of 962,100 pounds valued at $484,600. Total airborne imports in January-July 1963 were up 27.3 percent in quantity and 39.2 percent in value from those in the same period of 1962. The increase was due mainly to larger shipments of shrimp and spiny lobsters.

Raw headless shrimp continued to make up the bulk of the airborne shrimp imports--in June 1963, shipments consisted of 847,895 pounds of fresh or frozen raw headless, 46,088 pounds of frozen peeled and deveined, and 7,265 pounds of unclassified shrimp; in July 1963, shipments consisted of 783,151 pounds of fresh or frozen raw headless, 38,411 pounds of frozen peeled and deveined, and 26,461 pounds of unclassified shrimp. Approximately 98 percent of the total airborne shrimp imports in June and July 1963 entered through the U. S. Customs District of Florida. The

U. S. 1/Airborne Imports of Fishery Products, January-July 1963 with Comparative Data

Product and Origin 2/	June 1963		July 1963		Jan.-July 1963		Jan.-July 1962	
	Qty. 3/	Value 4/	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	1,000 Lbs.	US$ 1,000
Fish:								
Mexico	24.4	7.3	29.1	8.0	177.8	53.9	443.6	76.9
British Honduras	-	-	-	-	33.9	8.6	-	-
Honduras	1.0	0.3	-	-	16.3	4.3	-	-
Japan	-	-	-	-	2.0	8.2	-	-
United Kingdom	0.1	0.3	0.2	0.6	1.6	4.2	-	-
Iran	-	-	-	-	1.2	7.4	-	-
France	-	-	-	-	0.7	0.6	0.3	0.7
Rumania	-	-	-	-	-	-	1.3	11.3
Panama	-	-	-	-	-	-	7.8	1.3
U.S.S.R.	-	-	26.8	70.2	26.8	70.2	-	-
Canada	-	-	-	-	-	-	21.3	16.9
Costa Rica	-	-	-	-	-	-	5.6	0.9
Other countries	-	-	-	-	0.8	0.3	0.3	0.8
Total Fish	25.5	7.9	56.1	78.8	261.3	157.7	480.2	108.8
Shrimp:								
Guatemala	20.6	10.0	3.9	1.9	141.6	74.0	137.4	70.1
El Salvador	34.6	20.9	11.0	7.5	209.1	143.4	339.4	221.7
Honduras	-	-	-	-	22.7	11.9	-	-
Nicaragua	51.9	16.6	71.5	20.9	380.2	122.5	892.0	300.9
Costa Rica	26.7	13.0	64.3	28.9	375.0	179.2	186.4	82.0
Panama	159.2	84.6	171.9	87.6	1,054.6	561.8	849.2	449.8
Venezuela	591.0	293.5	517.2	220.1	3,028.4	1,455.0	1,533.6	796.5
Ecuador	17.3	6.7	-	-	111.6	39.4	12.2	3.4
France	-	-	-	-	2.6	0.9	-	-
Mexico	-	-	8.2	5.1	13.2	6.9	24.8	9.1
Netherlands Antilles	-	-	-	-	-	-	3.1	2.7
Total Shrimp	901.3	445.3	848.0	372.0	5,339.0	2,595.0	3,978.1	1,936.2
Shellfish other than shrimp:								
Mexico	-	-	6.6	2.7	79.6	45.3	31.9	18.1
British Honduras	-	-	4.6	5.0	113.5	83.5	84.7	50.0
El Salvador	-	-	-	-	5.0	3.6	0.5	0.2
Honduras	-	-	-	-	1.9	1.0	60.2	47.7
Nicaragua	9.7	5.1	20.0	7.9	101.0	62.3	0.4	0.3
Costa Rica	-	-	-	-	73.8	60.1	1.4	1.2
Jamaica	3.3	3.3	-	-	51.0	40.1	30.0	21.3
Netherlands Antilles	-	-	-	-	32.8	20.9	15.9	10.0
Colombia	1.3	5.5	0.3	0.4	8.0	21.7	1.7	4.9
Ecuador	-	-	-	-	2.2	1.8	1.8	1.3
Tunisia	-	-	-	-	0.8	0.9	-	-
Leeward and Windward Islands	-	-	-	-	1.6	0.5	20.6	7.6
British Guiana	-	-	-	-	1.7	0.3	-	-
Canada	68.1	34.9	16.7	8.0	213.3	109.2	223.4	90.9
Venezuela	-	-	-	-	13.7	6.0	22.3	13.6
Panama	-	-	-	-	-	-	1.0	1.0
Guatemala	-	-	-	-	-	-	7.4	3.9
Japan	-	-	-	-	-	-	0.1	0.3
France	1.0	1.2	0.1	0.1	1.8	2.1	0.4	1.0
Dominican Republic	7.3	6.7	8.5	9.0	22.0	20.7	6.6	4.8
Peru	-	-	-	-	0.2	0.8	-	-
Yugoslavia	-	-	1.2	0.7	1.2	0.7	-	-
Trinidad	-	-	-	-	-	-	2.3	1.0
Total Shellfish (except shrimp)	90.7	56.7	58.0	33.8	725.1	481.5	512.4	279.0
Grand Total	1,017.5	509.9	962.1	484.6	6,325.4	3,234.2	4,970.7	2,324.0

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.a.s. point of shipment. Does not include U. S. import duties, air freight, or insurance.
5/Less than 50 pounds.
Note: These data are included in the over-all 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, June and July 1963, U. S. Bureau of the Census.

remainder entered through the Customs Districts of New Orleans, (La.) and Los Angeles (Calif.).

Airborne arrivals of live lobsters from Canada amounted to 68,100 pounds in June 1963 and 16,700 pounds in July 1963, all of which entered through the Customs District of Massachusetts. Airborne imports of shellfish other than shrimp in June-July 1963 also included spiny lobster products and crabmeat from Central and South American countries as well as turtles from Yugoslavia and France.

The imports value of airborne finfish products was boosted in July 1963 by the arrival of 26,760 pounds of high-priced caviar from the Soviet Union which entered through the Customs District of New York. From a volume standpoint, fish fillets from Mexico were the leading finfish product imported by air in the first seven months of 1963.

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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UNITED STATES FISHERIES TRADE MISSION TO EUROPE PROPOSED:

It has been proposed by certain segments of the United States commercial fishing industry that the U. S. Bureau of Commercial Fisheries sponsor a fisheries trade mission to certain European countries for the purpose of promoting export sales of United States-produced fishery products in those countries. The mission would be similar to those sponsored by the U. S. Department of Commerce for other industrial groups and is designed to stimulate the United States export trade under the President's Trade Expansion Program.

Recently, strong improvements in European economies plus the advent of modern retail sales facilities have opened up many new sales prospects for United States fishery products abroad. The mission as proposed will be a "Do It Yourself" mission whereby the Government sponsors the project and pays the expenses of the Government representatives who accompany the industry representatives, but the industry participants must defray their entire expenses while serving on the mission. The mission will have official status and will receive the full cooperation of the United States embassies commercial staffs in each of the countries and cities to be visited.

The mission is tentatively scheduled for April or May 1964, and it is estimated that the trip will involve from 4 to 6 weeks travel time. The countries probably to be visited include Belgium, The Netherlands, Luxenbourg, West Germany, France, Italy, United Kingdom, Austria, Switzerland, and Greece. The cities within those countries that will be visited will be determined after an advance trip by a Bureau representative who will arrange reservations, appointments, and other mission details.

The Bureau has sent letters to the various fishery trade associations outlining the purposes and mechanics of the mission with the request that the associations bring this project to the attention of their members.

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WORLD TRADE FAIR SHIP TO EXHIBIT AMERICAN-MADE PRODUCTS:

A unique opportunity for the United States fishing industry to bring its products to the attention of consumers all over the world will soon be available in the form of a world-traveling Trade Fair ship.

The initiator of this country's first efforts to send a Trade Fair ship around the world is Rear Admiral John H. Morrill, U. S. Navy (Retired), who is President of the First United States World Trade Fair Ship, Inc. Admiral Morrill states: "We aim to bring and exhibit American products to the great ports and peoples of the world. More than 40 foreign countries and as many major seaports will be visited."

A contract has been signed with a United States shipbuilding firm to convert a 20,000-ton vessel into the S. S. Trade-

Itinerary of First United States World Trade Fair Ship (Tentative Sailing Date, S/S Tradefair from Port of New York - November 20, 1964)

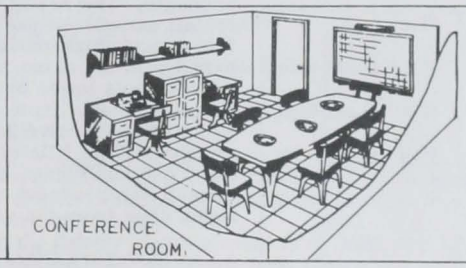
Port Schedule No. 1	No. Days in Port	Port Schedule No. 2	No. Days in Port	Port Schedule No. 3	No. Days in Port	Port Schedule No. 4	No. Days in Port
Reykjavik (Iceland)	2	London	7	Jeddah (Saudi Arabia)	3	Sydney	5
Oslo	3	Bilbao	3	Kuwait	2	Melbourne	4
Helsinki	4	Lisbon	4	Basrah (Iraq)	2	Fremantle (Australia)	3
Stockholm	5	Casablanca	2	Abadan (Iran)	2	Tamatave (Madagascar)	2
Copenhagen	6	Barcelona	5	Karachi	4	Durban (South Africa)	5
Glasgow	5	Marseilles	7	Bombay	5	Cape Town	5
Liverpool	5	Genoa	7	Madras (India)	4	Buenos Aires	5
Dublin	2	Civitavecchia (Rome)	5	Singapore	6	Montevideo	3
Antwerp	7	Venice	6	Hong Kong	5	Santos	5
Hamburg	7	Beirut	7	Keelung (Taiwan)	2	Rio de Janeiro	4
Rotterdam	7	Istanbul	3	Pusan	4	La Guaira (Venezuela)	5
Le Havre	7	Piraeus (Athens)	4	Osaka	7	Cartagena (Colombia)	3
Total Days . . .	60	Total Days . . .	60	Yokohama/Tokyo	8	Colon (Panama)	5
				Manila	6	Veracruz	6
				Total Days . . .	60	Total Days . . .	60

Note: The Ports of Le Havre, Piraeus and Manila will be exhibit change centers.

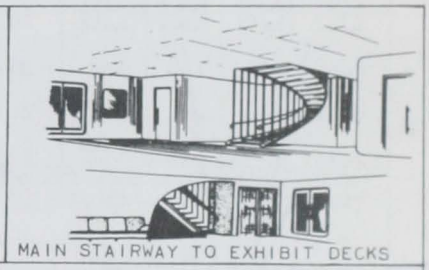
fair, at a cost of about $8 to $10 million. The vessel will contain approximately 115,000 square feet of exhibition space with accommodations for several hundred individual exhibitors, business conference rooms, banquet halls, theater and other entertainment facilities. It will be a showcase for prominent products manufactured by United States industries, will be the businessman's "home away from home," and will include facilities for actual sales and business negotiations.

This First United States World Trade Fair Ship is a multi-purpose enterprise designed to promote American industry in world markets and insure better international relations. As a major objective, it will be useful to all business, commerce, and industry everywhere. Its purpose is to provide United States industries with a unique and unprecedented opportunity to sell its products and widen its markets abroad at a critically competitive time.

REGISTRATION LOBBY



CONFERENCE ROOM



MAIN STAIRWAY TO EXHIBIT DECKS

THE SHIP THAT'S A FAIR . . .

The 20,000 ton displacement Trade Fair Ship with a speed of 18 knots is 525 feet long offering six decks of 115,000 square feet of space for exhibition areas, conference rooms, lounges, theatre with stage, projection rooms, banquet facilities, cocktail lounges, snack bars, air conditioning and exhibit personnel accommodations and communication facilities.

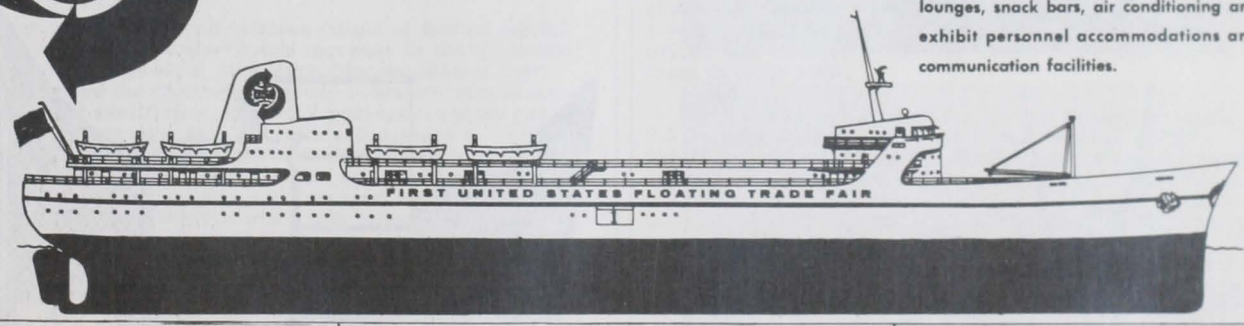


EXHIBIT CONCOURSE

OVER-ALL VIEW OF EXHIBIT DECK

AN EXHIBIT AISLE

The first voyage of this specially designed vessel is scheduled for November 1964 when it will sail to northern and western European ports. Among the ports to be visited on the first voyage are Liverpool, Glasgow, Copenhagen, Hamburg, Antwerp, and London. The vessel will remain in each of the European ports from 4 to 9 days and will spend a total of 68 days in the 10 ports visited during the first voyage. Following completion of the first voyage, the proposed itinerary of the First United States World Trade Fair Ship calls for 3 subsequent port schedules, each comprising 10 port calls ranging from Bilbao to Beirut, all the way to Karachi, Hong Kong, and Yokohama, and then on to Sidney, Cape Town, Buenos Aires, and Colon. The First United States World Trade Fair Ship is an invitation to all American businessmen to "come aboard and sell American."

Vessels

TWO TEXAS SHRIMP FISHING VESSELS FINANCED UNDER MORTGAGE INSURANCE PROGRAM:

The first Brownsville shrimp trawlers financed through the Federal Vessel Mortgage and Loan Insurance Program of the U.S. Bureau of Commercial Fisheries have joined the fleet in Brownsville, Texas. The new vessels, El Indio Loco and Melony Diana will base at that port. The vessels were built by a St. Augustine, Fla., shipyard and were financed by a St. Petersburg, Fla., bank. The bank loans, which provided for $5\frac{1}{2}$ percent simple interest for 8-year maturities, were guaranteed by the U. S. Department of the Interior.

Two modern shrimp trawlers financed through the Federal Government mortgage insurance plan.

Financing the construction of new fishing vessels through the mortgage insurance program has won considerable popularity from commercial fishermen since loans have low interest rates and long maturities. Bankers also, have welcomed such Federal Government assistance since it provides a safe means to extend credit to qualified fishermen.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, OCTOBER 1963:

Wholesale price trends for edible fishery products (fresh, frozen, and canned) were somewhat mixed in October 1963 but at 106.8 percent of the 1957-59 average the index was down 0.3 percent from the previous month. Lower prices this October for specific items in each of the subgroups were offset by price increases for other products. The result was a higher subgroup price index for all categories except the drawn, dressed, or whole finfish group which moved in the opposite direction. Compared with the same month a year earlier, the index this October was lower by 10.3 percent. Although prices were up considerably from October 1962 for large fresh haddock and fresh haddock fillets as well as several species of frozen groundfish fillets, sharply lower prices this October for fresh and frozen shrimp, together with lower-priced canned fish products were principally responsible for the index drop from the same month a year earlier.

At New York City, lower October prices for fresh or frozen king salmon (down 3.8 percent) than in the previous month were mainly responsible for a 3.1-percent drop in the subgroup index for drawn, dressed, or whole finfish. October prices also were lower for Great Lakes fresh-water fish at Chicago and New York but these did not significantly influence the subgroup index drop. Prices for halibut increased slightly (up 1.0 percent) because of light supplies of the higher-priced fresh product although frozen halibut stocks were ample at moderate prices.

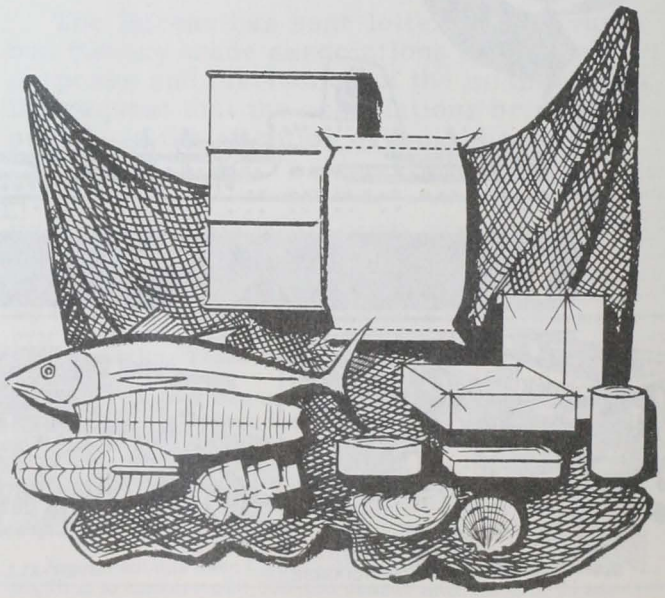


Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1963 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Oct. 1963	Sept. 1963	Oct. 1963	Sept. 1963	Aug. 1963	Oct. 1962
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					106.8	107.1	105.5	119.0
Fresh & Frozen Fishery Products:					110.0	110.6	108.0	124.3
Drawn, Dressed, or Whole Finfish:					121.6	125.6	116.0	120.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.13	104.0	98.5	84.6	82.2
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.44	.44	129.9	128.6	113.8	129.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.95	.99	132.7	138.0	129.2	136.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.53	.68	78.3	100.7	98.5	108.2
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.51	.61	83.5	99.9	104.8	77.8
Processed, Fresh (Fish & Shellfish):					106.6	104.3	104.5	123.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.47	.43	114.1	104.4	91.1	92.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.75	.71	87.9	83.2	82.0	122.5
Oysters, shucked, standards	Norfolk	gal.	7.63	7.75	128.6	130.7	134.9	130.7
Processed, Frozen (Fish & Shellfish):					97.5	97.4	98.9	122.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	98.9	100.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.39	.36	114.3	105.5	105.5	105.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.34	.34	118.4	117.5	115.7	110.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.73	.76	86.0	90.1	93.1	134.0
Canned Fishery Products:					101.7	101.4	101.6	110.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	23.50	24.00	102.4	104.6	104.6	111.1
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.88	10.88	96.6	96.6	96.6	104.4
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	5.75	5.75	97.5	97.5	97.5	2/118.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.84	7.96	113.3	102.1	104.0	116.9

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

2/ One commodity has been dropped in the fishery products index as of December 1962--"Sardines, Calif., tom. pack, No. 1 oval (15-oz.), 24 cans/cs."--and replaced by--"Mackerel, jack, Calif., No. 1 tall (15-oz.), 48 cans/cs." Based on Calif. sardines and not directly comparable with replacement (jack mackerel) for January-October 1963.

The subgroup index this October was 0.7 percent higher when compared with the same month in 1962 principally because of substantially higher prices for ex-vessel large haddock at Boston (up 26.5 percent). Prices this October were higher or lower than a year earlier for other products in the subgroup but these did not measurably influence the subgroup index change.

Higher prices for fresh haddock fillets at Boston (up 9.3 percent) and a 4-cents-per-pound increase in the wholesale price for fresh shrimp at New York City because of light supplies caused the October subgroup index for processed fresh fish and shellfish to climb 2.2 percent from the previous month. Prices for shucked standard oysters at Norfolk were lower (down 1.6 percent) from September to October and were proportionately lower when compared with the same month a year earlier. As compared with the same month in 1962, the subgroup index this October was down 13.9 percent. Lower fresh shrimp prices at New York City (down 28.2 percent) than a year earlier were largely responsible for the drop although this was offset partly by a substantial 23.6-percent increase in prices for fresh haddock fillets.

The slight increase this October in the subgroup index for processed frozen fish and shellfish (up 0.1 percent) was due to higher prices for small haddock fillets (up 8.3 percent) and a fractional increase in prices for ocean perch fillets. The price rise for those products was almost cancelled out by a 4.6-percent drop in frozen shrimp prices at Chicago (wholesale prices down 3 cents a pound). The subgroup this October was 20.5 percent below the same month a year earlier as a direct result of lower frozen shrimp prices this October which were down more than one-third from October 1962.

The October price index for canned fishery products rose 0.3 percent from the previous month because of higher prices for canned Maine sardines. October shipments by canners were reported heavy and this was largely responsible for the market advance. The pack of Maine sardines through October was about 1.6 million cases compared with more than 2 million cases in the 1962 season. Prices for canned tuna were steady and unchanged from September to October but dropped for canned pink salmon (down 2.1 percent). Prices for all canned items in the subgroup this October were below those of a year earlier and the price index was lower by 7.7 percent.