

# TRENDS AND DEVELOPMENTS

## Alaska

### KING CRAB WORKSHOP SCHEDULED:

A king crab workshop was sponsored by the Department of the Interior's Bureau of Commercial Fisheries technological laboratory at Ketchikan in Anchorage, Alaska, on February 28, 1966. This was the third Industry-Government meeting held to discuss technological problems of king-crab processing. Purposes of the meeting were to (1) discuss problems and needs of the industry, and (2) discuss a preliminary draft of the USDI Quality Standard for frozen king crab blocks. Immediately following the workshop the Alaska King Crab Quality Control and Marketing Board met to discuss its program for 1966. The Board's approved program for 1966 includes a \$50,000 advertising campaign. At this meeting discussion of the Board's quality control responsibilities was planned.

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### U. S. BERING SEA KING CRAB CATCH INCREASES:

Based on catch statistics from the Alaska Department of Fish and Game, a tabulation of the U. S. harvest of king crabs in the Bering Sea was prepared by the Department of the Interior's Bureau of Commercial Fisheries biological laboratory at Auke Bay for the International Pacific Fisheries Commission's annual report. Although modest, catches have increased steadily to a high of over 223,000 crabs in 1965. The table shows that

Year	Crab	Average Weight
	No.	Lbs.
1965	223,248	7.3
1964	122,848	8.3
1963	100,728	7.7
1962	10,346	10.0
1961	61,528	10.0
1960	87,730	7.8

<sup>1/</sup>Includes catches in territorial waters (within 3 miles of shore) because these crab are undoubtedly part of the eastern Bering Sea stock.

fluctuations in average weight of crabs have occurred.



## California

### ABALONE OBSERVATIONS AND GROWTH STUDIES CONTINUED:

M/V "Mollusk" Cruise 65-M-3-Abalone (December 6-18, 1965): To determine the red abalone (Haliotis rufescens) population by random sampling methods for comparison with commercial harvest data, and to determine the distribution of various sizes of abalones was the purpose of this cruise by the California Department of Fish and Game research vessel Mollusk. The vessel operated in the coastal area from Point Estero to Cambria.

Thirty randomly-selected diving stations were visited. Station depths ranged from 20-66 feet. At each station a 290° transit line, 100-foot long and 15-foot wide, was covered by two divers. All removable abalones encountered were measured; if they could not be removed, size was estimated.

Big swells and tides caused turbidity which greatly restricted visibility in shallow water. At some stations, several dives were made before counts could be completed. In all, 337 abalones were observed: 79 legals (more than 7<sup>3</sup>/<sub>4</sub> inches); 209, 4-7<sup>3</sup>/<sub>4</sub> inches; and 49, smaller than 4 inches. No abalones were seen during five dives because they were at stations with sandy or barren rock bottom in water over 60 feet deep.

Actively feeding abalones were noted at several locations. As much as 50 millimeters (1.96 inches) new shell growth was recorded on some individuals. Other shellfish, including H. kamschatkana, H. walallensis, H. assimilis, Calliostoma, Tegula and several limpet species, also showed evidence of good growing

conditions by recent shell deposits. Kelp growth was good, but some winter sloughing was occurring.

Abalone distribution by depth was fairly uniform both by size and by numbers. The northern portion of the area surveyed produced the greatest number of abalones and the most of legal size.

Note: See Commercial Fisheries Review, Feb. 1966 p. 14.

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#### NOTES ON MARINE RESOURCES FOR 1965:

Population surveys during the year disclosed about 500 sea otters between Carmel Bay and Point Conception; 3,563 elephant seals, which is the highest count on record; 22,167 sea lions, and 1,063 harbor seals. Although all these resources are in good condition, protection of the sea otter will continue to receive priority attention.



Sea Lion

Preseason surveys indicate crab fishing will be good in the Eureka area but poor in the San Francisco area. Shrimp are plentiful in the Crescent City-Eureka area, promising a good year there in 1966.

During the year, 2 bluefin tuna tagged in California in 1962 were caught near Japan, bringing to 5 the number of trans-Pacific migrants tagged off California and caught off Japan. This demonstrates conclusively that fishermen on both sides of the Pacific harvest the same stock.

Shrimp were reared through 11 larval stages at the Redwood City temporary laboratory, the first time this species has been reared from the egg to the postlarval state. This study may enable identification of

shrimp in the larval stage and it is hoped will lead to more efficient techniques for sampling populations.

It is thought the heavy king salmon losses which occurred annually on Butte Creek have been eliminated. Those losses resulted from brief high flows which left many thousands of salmon stranded when the high flows subsided. A newly installed barrier has kept salmon from the upper reaches of Butte Creek and eliminated the losses. (California Department of Fish and Game, January 15, 1966.)

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#### MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA:

Airplane Survey Flight 65-M-3 (December 6 and December 28, 1965): Two one-day surveys were made to count poles and fishermen along the coastline. For this purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the aircraft Cessna "182" N9042T of the California Department of Fish and Game. The counts provide data for an independent estimate of total effort and the calculation of a conversion factor to be used for estimates of effort in those areas not covered by the ground crews.

Note: See Commercial Fisheries Review, February 1966 p. 15.



#### Central Pacific Fisheries Investigations

#### TUNA BIOLOGICAL STUDIES CONTINUED

M/V "Charles H. Gilbert" Cruise 85 (July 23-September 7, 1965): Collection of whole blood samples from all skipjack tuna caught for subpopulation evaluation was the main objective of this cruise by the research vessel Charles H. Gilbert, operated by the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area covered was the west coast of Baja California, the Gulf of California, and the Revillagigedo Islands.

Other objectives of the cruise were to collect and freeze whole blood samples for use in immunities; obtain length and sex data from tuna sampled for blood; collect and preserve any unusual specimens and take color photographs when practical; and collect samples for electrophoretic analysis.

A total of 406 skipjack tuna and 178 yellowfin were caught during the cruise and sampled, 3 large turtles were caught and measured, and 76 bird flocks were observed.

Blood samples were obtained as planned, biological data was gathered, and the usual watch for fish, birds, and aquatic mammals maintained.

M/V "Charles H. Gilbert" Cruise 86 (October 19-26, 1965): The collection of live mackerel-like (scombrids) species for behavior studies was one of the main objectives of this cruise. The area covered was south of Oahu between Mokumanu and Brown Camp and not more than 20 miles from shore.

Other objectives of the cruise were to collect tuna specimens for density determinations; determine weight lost from small skipjack after removal of the head, viscera, and red muscle; and collect skipjack brains and eye lenses. A total of 161 skipjack and 9 little tunny were returned live to Kewalo Basin.

A standard watch for fish, birds, and aquatic mammals was maintained. Oxygen concentration of water in the transfer tanks were sampled. Troll lines were out continuously between Kewalo Basin and each fishing station. Two mahimahi (*Coryphaena hippurus*) were caught.

M/V "Charles H. Gilbert" Cruise 87 (November 9-16, 1965): Obtaining fresh samples

of surface-caught yellowfin tuna for density determinations and photographs was the main objective of this cruise. The waters within 100 miles of Oahu and Kauai were covered.

Other objectives were to collect and preserve blood samples from skipjack tuna and other scombrids and to collect and return live scombrids to behavior tanks at Kewalo Basin.

In all, 22 yellowfin tuna and 57 wavyback skipjack tuna were returned alive to the Bureau's facility at Kewalo. A total of 25 wahoo were also caught.

A standard weather watch was maintained except during fishing operations; recording thermograph was maintained while at sea; and other oceanographic observations were made.

Note: See *Commercial Fisheries Review*, Oct. 1965 p. 26.



### Federal Purchases of Fishery Products

#### DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1965:

Fresh and Frozen: Purchases of fresh and frozen fishery products in December 1965 for the use of the Armed Forces were down considerably in quantity and value from the previous month. Average prices for most fishery products were slightly higher.

Table 1 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Personnel Support Center, December 1965 with Comparisons

Products	December				January-December	
	1965		1964		1965	1964
	Quantity	Avg. Cost	Quantity	Avg. Cost	Quantity	
	Pounds	Cents/Pound	Pounds	Cents/Pound	..... (Pounds) .....	
<b>Shrimp:</b>						
Raw headless . . . . .	30,350	100	33,650	98	1,150,650	1,234,200
Peeled and deveined . . . . .	103,200	135	104,980	134	1,953,510	1,664,304
Breaded . . . . .	285,300	87	385,000	87	4,973,274	4,245,770
Stuffed and breaded . . . . .	42,092	68	49,000	64	707,160	496,620
<b>Total shrimp . . . . .</b>	<b>460,942</b>	<b>97</b>	<b>572,630</b>	<b>94</b>	<b>8,784,594</b>	<b>7,640,894</b>
<b>Callops . . . . .</b>	<b>54,250</b>	<b>60</b>	<b>189,936</b>	<b>77</b>	<b>1,933,674</b>	<b>2,777,486</b>
<b>Oysters:</b>						
Eastern . . . . .	125,932	130	72,926	108	744,621	843,807
Pacific . . . . .	10,100	88	22,836	77	272,814	341,914
<b>Total oysters . . . . .</b>	<b>136,032</b>	<b>127</b>	<b>95,762</b>	<b>101</b>	<b>1,017,435</b>	<b>1,185,721</b>
<b>Filets:</b>						
Cod . . . . .	20,900	48	20,300	32	504,690	496,916
Flounder . . . . .	101,500	37	204,000	31	2,909,600	3,062,452
Ocean perch . . . . .	99,000	36	203,000	30	3,619,060	3,522,970
Haddock . . . . .	53,550	38	131,752	37	1,544,455	1,898,066
<b>Haddock portions . . . . .</b>	<b>140,800</b>	<b>51</b>	<b>202,750</b>	<b>46</b>	<b>1,855,834</b>	<b>774,072</b>
<b>Steaks:</b>						
Halibut . . . . .	75,000	61	71,867	49	1,373,760	1,278,144
Salmon . . . . .	7,240	67	11,270	68	168,640	260,825
Swordfish . . . . .	200	75	2,090	70	5,030	17,261

Compared with the same month in the previous year, purchases in December 1965 were down 25.7 percent in quantity and 7.6 percent in value. The decline was due mainly to lower purchases of shrimp, scallops, fish fillets, haddock portions, and salmon and swordfish steaks.

Total purchases of fresh and frozen fishery products for 1965 were up 5.2 percent in quantity and 24.2 percent in value as compared with the previous year. Larger purchases of shrimp and haddock portions were greatly responsible for the increase in 1965.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, December 1965 with Comparisons

QUANTITY				VALUE			
Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
1965	1964	1965	1964	1965	1964	1965	1964
. . . . . (1,000 Lbs.) . . . . .				. . . . . (\$1,000) . . . . .			
1,517	2,041	27,712	26,341	1,227	1,328	18,685	15,040

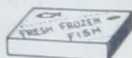
**Canned:** Total purchases of the three principal canned fishery products (tuna, salmon, and sardines) in 1965 were up 61.2 percent in quantity and 65.2 percent in value from those in 1964.

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

Product	QUANTITY				VALUE			
	Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
	1965	1964	1965	1964	1965	1964	1965	1964
	. . . (1,000 Lbs.) . . . . .				. . . (\$1,000) . . . . .			
Tuna . .	1/	645	8,998	5,714	1/	269	4,063	2,513
Salmon .	3	1	4,166	2,751	2	1	2,671	1,632
Sardines .	28	11	981	312	15	7	412	181

1/Not available.

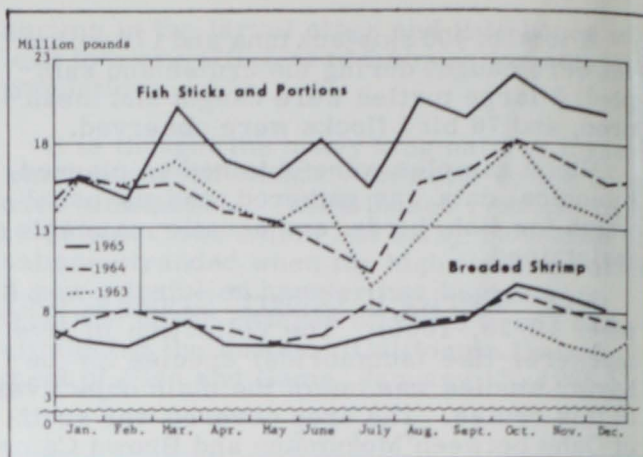
Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.



### Fish Sticks and Portions

#### U. S. PRODUCTION, OCT.-DEC. 1965:

United States production of fish sticks and fish portions amounted to 61.8 million pounds during the fourth quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 10.8 million pounds or 21.2 percent. Fish portions (39.0 million pounds) were up 8.1 million pounds or 25.6 percent, and fish sticks (22.8 million pounds) were up 2.9 million pounds or 14.3 percent.



U. S. production, Oct.-Dec. 1965.

Cooked fish sticks (21.3 million pounds) made up 93.3 percent of the October-December 1965 fish stick total. There were 38.2 million pounds of breaded fish portions produced, of which 28.3 million pounds were raw. Unbreaded fish portions amounted to 784,000 pounds.

Table 1 - U. S. Production of Fish Sticks by Months and Type, October-December 1965 1/

Month	Cooked		Raw	Total
	. . . (1,000 Lbs.) . . .			
October . . . . .	7,373	482	7,855	
November . . . . .	7,078	525	7,603	
December . . . . .	6,844	511	7,355	
Total 4th Qtr. 1965 1/ . . . . .	21,295	1,518	22,813	
Total 4th Qtr. 1964 . . . . .	18,653	1,308	19,961	
Total 1965 1/ . . . . .	77,230	4,849	82,079	
Total 1964 . . . . .	67,810	5,764	73,574	

1/Preliminary.

Table 2 - U. S. Production of Fish Portions by Months and Type, October-December 1965 1/

Month	Breaded			Un-breaded	Total
	Cooked	Raw	Total		
	. . . . . (1,000 Lbs.) . . . . .				
October . . . . .	3,795	9,925	13,720	342	14,062
November . . . . .	2,920	9,547	12,467	152	12,619
December . . . . .	3,194	8,849	12,043	290	12,333
Total 4th Qtr. 1965 1/ . . . . .	9,909	28,321	38,230	784	39,014
Total 4th Qtr. 1964 . . . . .	5,643	24,652	30,295	747	31,042
Total 1965 1/ . . . . .	30,485	106,355	136,840	2,598	139,438
Total 1964 . . . . .	20,956	82,816	103,772	2,541	106,313

1/Preliminary.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 18.3 and 24.2 million pounds, respectively. The Pacific States

ranked second with 2.3 million pounds of fish sticks, but the Gulf States ranked second in production of fish portions with 14.0 million pounds.



**Florida**

**EDA GRANT TO PROVIDE NEW WATER LINES TO FISHERY PLANTS:**

Approval of a \$19,000 grant to the City of Apalachicola, Florida, to help finance the extension of water and sewer facilities to three fishery industrial plants was announced on February 18, 1966, by the Assistant Secretary of Commerce for Economic Development.

The lines will serve the new plant of a seafood-canning company and two other small seafood-processing companies. The project will cost \$38,000 with Apalachicola matching the public works grant by the Economic Development Administration (EDA), U. S. Department of Commerce.

The seafood-canning company is ready to begin operations when the water and sewer project is completed, which should be in about four months.

Apalachicola is in Franklin County, a West Florida County which borders on the Gulf of Mexico to the south. The area has been plagued by high unemployment. The unemployment rate for 1964 was 9.5 percent. The new seafood-processing plants are part of the county's overall plan for stabilizing the economy.



**Great Lakes**

**MICHIGAN CONSERVATION COMMISSION PROPOSES NEW REGULATION ON YELLOW PERCH AND NORTHERN PIKE FISHING:**

Proposals aimed at liberalizing the catch of yellow perch and banning the take of northern pike by Great Lakes commercial fishermen were to come up for consideration along with important land matters when the Michigan Conservation Commission met February 10-11 in Lansing.

In a move to improve perch populations in the Great Lakes, the Conservation Depart-

ment was recommending removal of size limits for processed and "in the round" perch and, with one exception, an end to closed commercial seasons on those fish.

The lone exception, involving about a 50-mile stretch of Saginaw Bay and Lake Huron waters, is designed to eliminate conflicts between commercial and sport fishermen during the peak of the tourist season. It calls for a June 10-September 10 shutdown on commercial perch fishing in waters shallower than 18 feet between Point AuGres and Harrisville.

Another change recommended by the Department will, if approved by the Commission, put northern pike off limits to Michigan's Great Lakes commercial fishermen.

Protection of northern pike from commercial fishing is recommended because they are of major interest to anglers and of only incidental importance to commercial operators. The proposed step is in keeping with Department efforts to improve and encourage sport fishing in the Great Lakes.



**Great Lakes Fishery Investigations**

**SEA LAMPREY CONTROL RESEARCH, DECEMBER 1965:**

Winter conditions confined field work of the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during December 1965, to the operation of the all-weather screen and trap on the Big Garlic River, fyke-net fishing in the Ocqueoc River, and tagging of adult sea lampreys. A record downstream migration of recently transformed sea lampreys occurred in the Ocqueoc River. The total number reached 9,000 lampreys by December 19, 1965. A large portion of them has been retained at the Hammond Bay laboratory for use in



Mouth of Sea Lamprey

Sea Lamprey (*Petromyzon marinus*)

developing marking techniques. Seven groups of 100 have been marked using fluorescent dyes, nonfluorescent dyes, tail-clip marks, and a herring loop tag. Although the tagging of adult sea lampreys in the upper three lakes declined in December, the operation resulted in 1,669 individuals tagged to December 13. A total of 121 marked animals had been recovered to mid-December.



## Great Lakes Fisheries Explorations and Gear Development

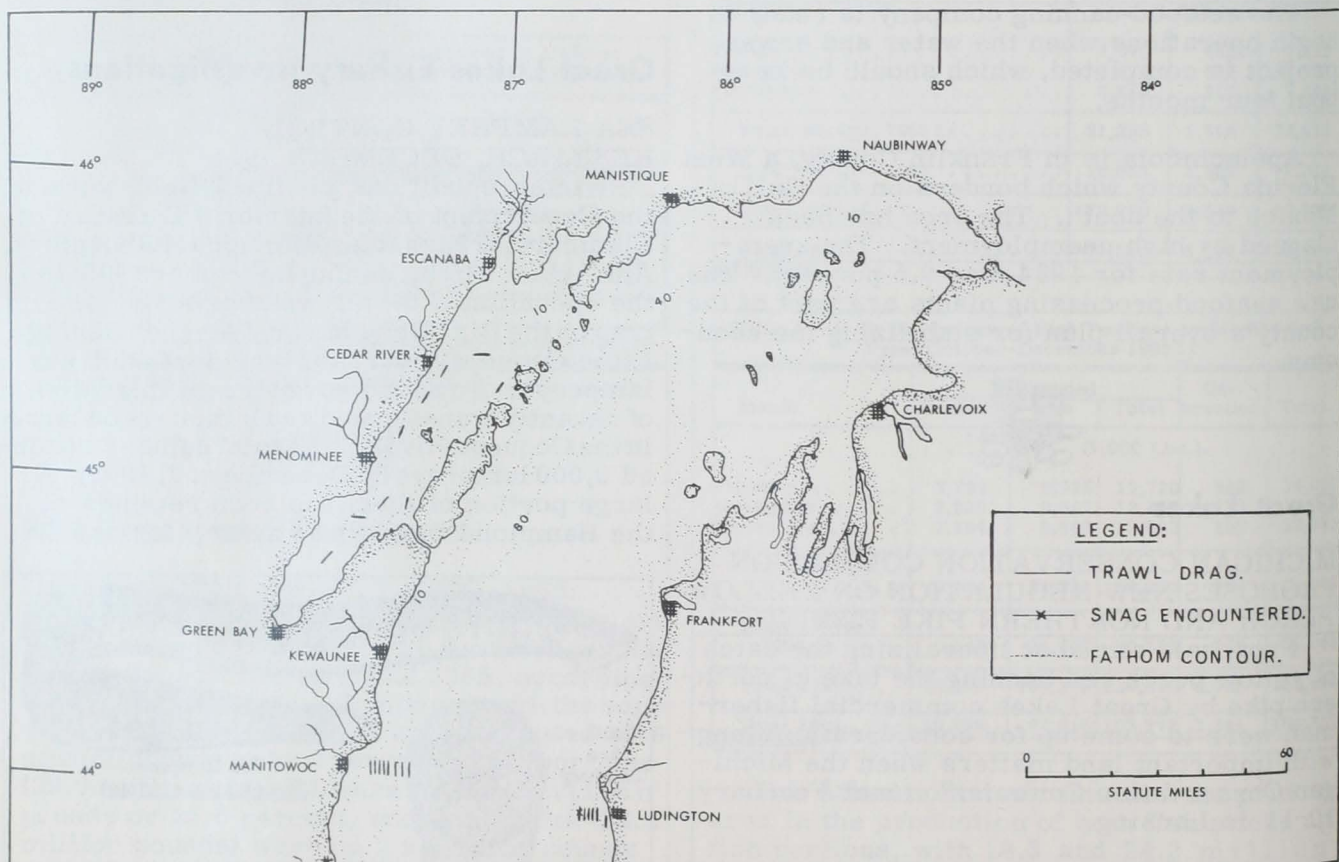
### LAKE MICHIGAN TRAWLING STUDIES:

M/V "Cisco" Cruise 30 (December 1-19, 1965): A 19-day exploratory fishing cruise in Northern Lake Michigan and Green Bay was completed December 19, 1965. The primary objective was to extend knowledge regarding the seasonal and bathymetric distribution, abundance, and availability of alewife, chub, smelt, and yellow perch stocks. Other objectives were to: (1) collect fish, water and bottom samples for botulism studies, (2) obtain length-frequency data and scale

samples from chubs, alewife, and yellow perch to supplement biological studies, (3) collect plankton samples for limnological observations, (4) collect alewife, chubs, sculpins, trout perch, and shiners for food habits studies, (5) collect sculpins and smelt for technological studies, (6) collect various fish for radioactivity observations, (7) collect various fish for pesticide studies, (8) collect and preserve lake trout for rehabilitation evaluations, and (9) train personnel in trawling operations.

Commercially significant catches of alewife (up to 2,000 lbs. per half-hour drag) were caught in both Lake Michigan and in Green Bay areas. Commercially significant catches of chubs (up to 300 lbs.) were caught on both sides of Lake Michigan and significant catches of smelt were landed throughout Green Bay. A highlight of the cruise was the recovery of 9 lake trout in Lake Michigan and 4 in Green Bay. The trout, which were planted this spring, are showing a good growth rate with the largest specimen 11.1 inches long.

**FISHING OPERATIONS:** A total of 23 drags were completed with a 52-foot (headrope) fish



Area of operation during M/V Cisco Cruise 30 (Dec. 1-Dec. 19, 1965).

rawl, 14 in the open lake and 9 in Green Bay. All drags were 30 minutes each, except 2 which were ended early due to encounters with snags and the presence of set fishing gear. Bottom topography and vertical distribution of fish were continuously monitored and recorded with a high resolution echounder.

**FISHING RESULTS:** Lake Michigan: Off Washington commercially significant catches of alewives were landed at all depths from 10 to 30 fathoms with the best landing of 1,300 lbs. taken at 20 fathoms. A commercially significant landing of 300 lbs. of chubs in 25 minutes was made at 30 fathoms. Off Manitowoc commercially significant catches of alewives (750 and 1,000 lbs.) were made at 10 and 25 fathoms, respectively, and significant chub catches (250 to 300 lbs.) were made at 35, 40, and 45 fathoms. Catches of smelt, yellow perch, and whitefish were light off both stations. Eight of the 13 lake trout recovered during the cruise were taken off Manitowoc.

**Green Bay:** Alewife were gone from the shallow waters of Green Bay by December 15. The deep waters near Washington Island yielded 450 and 2,000 lbs. from 17 and 19 fathoms, respectively. Jumbo size smelt were located throughout the bay and 4 drags produced 100 to 250 lbs. Yellow perch were landed in good amounts in the southern portion of the bay. Four fin-clipped lake trout were recovered near Washington Island.

**HYDROGRAPHIC DATA:** Surface and fishing (bottom) temperatures were the same in Green Bay and Lake Michigan and ranged from 32° to 39° F.

Note: See Commercial Fisheries Review, Jan. 1966 p. 33.



**Industrial Fishery Products**

**U. S. FISH MEAL AND SOLUBLES:**

Production and Imports, 1964-1965: Based on domestic production and imports, the United States available supply of fish meal for 1965 amounted to 500,646 short tons--173,749 tons (or 25.8 percent) less than during 1964. Domestic production was 5,272 tons (or 2.2 percent) less, and imports were 168,477 tons (or 38.4 percent) lower than in 1964. Peru continued to lead other countries with shipments of 209,801 tons.

U. S. Supply of Fish Meal and Solubles, 1964-1965		
Item	Total	
	1965	1964
. . . (Short Tons) . . .		
<b>Fish Meal and Scrap:</b>		
<b>Domestic production:</b>		
Menhaden . . . . .	172,158	160,349
Tuna and mackerel . . . . .	26,423	21,113
Herring . . . . .	12,050	8,881
Other . . . . .	19,349	44,909
<b>Total production . . . . .</b>	<b>229,980</b>	<b>235,252</b>
<b>Imports:</b>		
Canada . . . . .	43,830	54,769
Peru . . . . .	209,801	348,025
Chile . . . . .	5,651	12,942
Norway . . . . .	78	-
So. Africa Rep. . . . .	5,100	18,581
Other countries . . . . .	6,206	4,826
<b>Total imports . . . . .</b>	<b>270,666</b>	<b>439,143</b>
<b>Available fish meal supply . . . . .</b>	<b>500,646</b>	<b>674,395</b>
<b>Fish Solubles:</b>		
<b>Domestic production . . . . .</b>		
	93,853	93,296
<b>Imports:</b>		
Canada . . . . .	1,488	1,632
So. Africa Rep. . . . .	-	987
Other countries . . . . .	3,650	1,886
<b>Total imports . . . . .</b>	<b>5,138</b>	<b>4,505</b>
<b>Available fish solubles supply . . . . .</b>	<b>98,991</b>	<b>97,801</b>

The United States supply of fish solubles during 1965 amounted to 98,991 tons--an increase of 1.2 percent as compared with 1964. Domestic production and imports of fish solubles increased 0.6 percent and 14.1 percent, respectively.

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

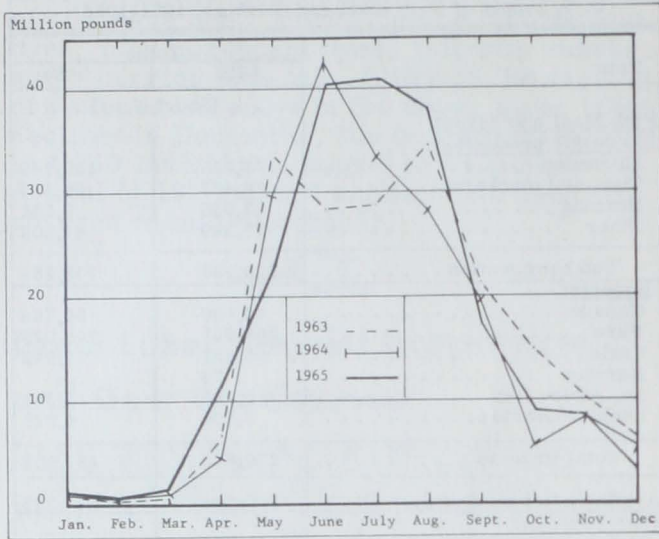
Production by Areas, January 1966: Preliminary data as collected by the Department of the Interior's Bureau of Commercial Fisheries:

U. S. Production <sup>1/</sup> of Fish Meal, Oil, and Solubles, January 1966 (Preliminary) with Comparisons			
Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
January 1966:			
East & Gulf Coasts . . . . .	1,113	247	490
West Coast <sup>2/</sup> . . . . .	1,664	211	682
<b>Total . . . . .</b>	<b>2,777</b>	<b>458</b>	<b>1,172</b>
January 1965 total . . . . .	2,770	573	907

<sup>1/</sup>Does not include crab meal, shrimp meal, and liver oils.  
<sup>2/</sup>Includes American Samoa and Puerto Rico.

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Production, December 1965: During December 1965, a total of 9,245 tons of fish meal and 3.1 million pounds of marine-animal oil was produced in the United States. Com-



U. S. production of marine-animal oils.

U. S. Production of Fish Meal, Oil, and Solubles, December 1965 <sup>1</sup> with Comparisons				
Product	Dec.		Jan.-Dec.	
	1/1965	1964	1/1965	1964
	. . . . .(Short Tons). . . . .			
<b>Fish Meal and Scrap:</b>				
Herring. . . . .	2/	100	12,050	8,881
Menhaden 3/. . . . .	6,383	5,047	172,158	160,349
Tuna and mackerel	1,769	1,874	26,423	21,113
Unclassified. . . . .	993	643	19,349	34,809
<b>Total<sup>4</sup>. . . . .</b>	<b>9,245</b>	<b>7,664</b>	<b>229,980</b>	<b>225,152</b>
<b>Fish Solubles:</b>				
Menhaden . . . . .	1,373	1,693	72,948	68,738
Other . . . . .	1,461	1,046	20,905	24,558
<b>Total . . . . .</b>	<b>2,834</b>	<b>2,739</b>	<b>93,853</b>	<b>93,296</b>
	. . . . .(1,000 Pounds) . . . . .			
<b>Oil, body:</b>				
Herring . . . . .	240	93	7,767	10,354
Menhaden 3/. . . . .	2,357	5,293	172,037	157,730
Tuna and mackerel	365	218	5,458	4,816
Other (inc. whale)	105	138	5,402	7,298
<b>Total oil. . . . .</b>	<b>3,067</b>	<b>5,742</b>	<b>190,664</b>	<b>180,198</b>

<sup>1</sup>Preliminary data.  
<sup>2</sup>Included in "unclassified."  
<sup>3</sup>Includes a small quantity of thread herring.  
<sup>4</sup>Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

pared with December 1964 this was an increase of 1,581 tons of fish meal but a decrease of about 2.7 million pounds of marine-animal oil. Fish solubles production amounted to 2,834 tons--an increase of 95 tons as compared with December 1964.



**Maine Sardines**

**CANNED STOCKS, JANUARY 1, 1966:**

Canners' stocks of Maine sardines on January 1, 1966, were down 18,000 cases from those of the same date in 1965, and down 572,000 cases from stocks on hand 3 years ago.

The new Maine sardine canning season opened on the traditional date of April 15, 1965, and the pack to December 31, 1965, totaled 1,236,000 standard cases, as compared with the pack of 851,000 cases during the same period of 1964.

The new law legalizing year-round canning of Maine sardines, in effect for the first time in 1966, removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring. None of the Maine sardine canneries have been in operation since early December due to rough seas and few fish, but several were in readiness for production.

The 1966 pack of canned Maine sardines through March 1 totaled 26,000 standard cases (100 3<sup>3</sup>/<sub>4</sub>-oz. cans), according to the Maine Sardine Council. This is the first January-February pack under the revised Maine law which permits year-round canning. About six plants operated during the period. Fishing has been limited due to adverse weather conditions.

Note: See Commercial Fisheries Review, February 1966 p. 23.

Canned Maine Sardines--Wholesale Distributors <sup>1</sup> and Canners' Stocks, January 1, 1966, with Comparisons <sup>1</sup>													
Type	Unit	1965/66 Season			1964/65 Season				1963/64				
		1/1/66	11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64	11/1/63
Distributors	1,000 actual cases	267	289	194	198	236	238	291	234	254	291	261	308
Canners	1,000 std. cases <sup>2</sup>	520	689	295	203	314	538	629	514	499	658	1,063	1,255

<sup>1</sup>Table represents marketing season from November 1-October 31.

<sup>2</sup>100 3<sup>3</sup>/<sub>4</sub>-oz. cans equal one standard case.

Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.

Source: U. S. Bureau of the Census, Canned Food Report, January 1, 1966.



## North Atlantic Fisheries Investigations

### DISTRIBUTION OF ZOOPLANKTON STUDIED:

M/V "Rorqual" Cruise 1-66 (January 5-February 6, 1966): To determine the inshore-offshore and vertical distribution of zooplankton with regard to hydrographic conditions in the Gulf of Maine from Cape Ann to Machias Bay were the objectives of this cruise by the Interior's Bureau of Commercial Fisheries research vessel Rorqual.

The Gulf of Maine zooplankton population was at the annual minimum. Zooplankton volumes along the coast were approximately three times lower than values obtained during the winter of 1965, but were similar to the 1964 winter coastal volumes.

Eleven invertebrate taxa were represented in the samples. Of this number, copepods were the dominant forms constituting 97 percent of the taxa collected. The most numerous copepod species was Calanus finmarchicus. Little areal differences were found in the abundance of C. finmarchicus. Of the remaining eleven copepod species in the samples, only Pseudocalanus minutus was found in significant numbers.

Herring larvae were present at four of the coastal continuity stations in the western and central Gulf coast. A total of 15 larvae were collected, ranging from 26.8 mm. to 35.2 mm. (about 1.06 to 1.37 inches) in length.

Source: See Commercial Fisheries Review, January 1966 p. 42.



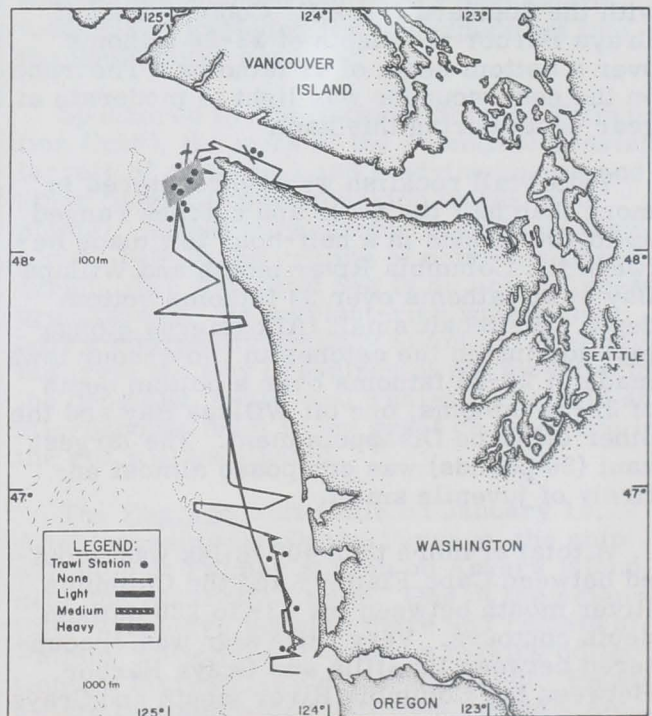
## North Pacific Fisheries Explorations and Gear Development

### LAKE AND ANCHOVY POPULATION SURVEY CONTINUED:

M/V "John N. Cobb," Cruise 75 (January 20-28, 1966): The primary objectives of this cruise by the Department of the Interior's Bureau of Commercial Fisheries research vessel John N. Cobb were to (1) obtain data on the geographic and bathymetric distribution of anchovies (Engraulis mordax) during the month of January; (2) determine if the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch mesh version of the Mark II "Cobb" pelagic trawl is capable of catching northern anchovies in commercial quantities; and (3) obtain biological information on north-

ern anchovy. Secondary objectives were to (1) evaluate the fishing configuration of the  $\frac{2}{3}$ -scale anchovy net using SCUBA-equipped divers; (2) survey selected areas of Puget Sound for Pacific hake (Merluccius productus); (3) obtain samples of northern anchovy for proximate composition analysis by the Bureau's Seattle Technology Laboratory; and (4) obtain bathythermograph data for the U. S. Navy ASWEPS program. Area of operation was in Puget Sound, Strait of Juan de Fuca, and off Washington coast.

The following two midwater trawls were fished during this survey: (1) Standard Mark II "Cobb" pelagic trawl constructed of 3-inch mesh multifilament webbing with a 25-foot  $\frac{1}{2}$ -inch liner inserted in the cod end, and (2)  $\frac{2}{3}$ -scale version of the Standard Mark II "Cobb" pelagic trawl, constructed of  $\frac{3}{4}$ -inch mesh multifilament webbing. Both trawls were fished with the standard two aluminum hydro-foil-type otter boards and 30-fathom bridles. A high-resolution, low-frequency echo-sounder was used to locate fish, and a dual electric depth-telemetering system, with the depth-sensing units at the ends of the bottom wings of the trawl, was used to monitor the fishing depth of the net.



Midwater trawling stations and sounding transects conducted in the Strait of Juan de Fuca and off the Washington coast during M/V John N. Cobb Cruise 75. Shading of transects depicts the relative strength of midwater echo-sounding traces.

Onshore-offshore sounding transects were made at oblique angles to shore between the 15- and 220-fathom depth contours (see chart). When fish schools were located with the sounder, they were fished to ascertain their species composition. The geographic size of anchovy schools was determined by closely spacing sounding transects in the area of the school. Length measurements were made on the major species in all hauls. A bathythermograph cast was made after each haul.

Nineteen drags, 9 with the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch mesh trawl and 10 with the Standard Mark II "Cobb" trawl, were made during the cruise. Anchovy was the dominant species taken followed by herring (*Clupea pallasii*), yellowtail rockfish (*Sebastes flavidus*), pollock (*Theragra chalcogrammus*), and dogfish (*Squalus acanthias*).

WASHINGTON COAST: Twelve hauls, 6 with the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch trawl and 6 with the Standard Mark II "Cobb" trawl, were made along the Washington coast from off Mukkaw Bay to the Columbia River mouth at depths from 16 to 88 fathoms. Anchovy was the dominant species encountered in all hauls except two, with catches ranging from a trace to 1,000 pounds. This latter haul was made with the Standard Mark II "Cobb" trawl off Grays Harbor at a depth of 23-26 fathoms over a bottom depth of 41 fathoms. The trace on the echo-sounder was light to moderate at gear depth during this haul.

Yellowtail rockfish were encountered in more than half the hauls and catches ranged up to 400 pounds in a half-hour tow made between the Columbia River mouth and Willapa Bay at 26 fathoms over 33 fathoms bottom depth. Whitebait smelt (*Allosmerus elongatus*) dominated the catches in two  $\frac{1}{2}$ -hour tows made at 20-28 fathoms over a bottom depth of 30-35 fathoms; one off Willapa Bay and the other off Cape Disappointment. The largest haul (30 pounds) was composed almost entirely of juvenile smelt.

A total of more than 400 miles was scouted between Cape Flattery and the Columbia River mouth between the 13- to 220-fathom depth contours. Very little sign was encountered between Umatilla and Grays Harbor. Between the Columbia River mouth and Grays Harbor, light to moderate signs were found between the 20- and 50-fathom depth contours. Smelt, anchovy, and yellowtail rockfish were dominant in the catches made in this sign.

Between Umatilla and Tatoosh moderate to heavy sign was encountered at depths from 60-80 fathoms over a bottom depth of 60-120 fathoms. In the area southwest of Mukkaw Bay this sign was extremely heavy, and was located at an average depth of 70 fathoms over an average bottom depth of 90 fathoms. Two hauls made in this sign with the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch mesh trawl yielded predominantly anchovy, with the largest tow producing 400 pounds in one-half hour. The fish ranged from 10 to 18 cm. (3.9-7.1 inches) and averaged 14.2 cm. (5.6 in.) in length. Sounding transects showed this school to be approximately 5 miles long by 2 miles wide and from 10 to 20 fathoms in thickness. This sign was observed to rise to within 18 fathoms of the surface after sundown, at which time a one-half hour tow in this echo-sounding trace also produced predominantly anchovy (50 pounds). These fish were smaller than those taken during the day, averaging 10.6 cm. (4.17 inches) in length with a range of 9-12 cm. (3.5 to 4.7 inches). Four hours of surface nightlighting over this strong sign failed to produce any sign of anchovy at the surface.

No hake were encountered off the Washington coast during the survey.

STRAIT OF JUAN DE FUCA: More than 200 miles were echo-sounded in the Strait over depths from 15 to 140 fathoms. An intensive echo-sounding survey was made in Discovery Bay where a heavy echo trace, 10 fathoms thick, was recorded at the entrance in 41 fathoms over a bottom depth of 55 fathoms. A 25-minute tow with the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch mesh trawl caught mainly herring (250 pounds) and pollock (35 pounds). The herring ranged in size from 11 to 24 cm. (4.3 to 11.5 in.) and averaged 18.4 cm. (7.2 in.) in length. Three other tows made in the Strait on light sign did not yield any significant fish catches, although 25 pounds of a mysid (*Neomysis rayi*) were taken off Wada Island. No hake and only a trace of anchovy were encountered in these hauls.

PUGET SOUND: Four days at the beginning of the cruise and two at the end were spent in Puget Sound. Echo-sounding surveys were conducted in various localities in the Sound, especially in Saratoga Passage and Holmes Harbor in northern Sound and Case and Carr Inlets in southern Sound. Light to moderate sign was found over the central part of Saratoga Pass-

age mainly between the 25- and 50-fathom depth contours. Unfortunately winds in excess of 50 knots prevented this trace from being evaluated. In Carr and Case Inlets, moderate to heavy echo traces 3-5 fathoms thick were recorded at a depth of 35 fathoms over most of both inlets. Two 15-minute tows with the Standard Mark II "Cobb" trawl in the echo trace in Carr Inlet produced mainly herring, pollock, and dogfish with the larger tow yielding 200, 100, and 30 pounds of those species respectively. The herring ranged in size from 10 to 25 cm. (3.9 to 9.8 in.) in length, averaging 13.0 cm. (5.1 in.). Thirty-four hake, ranging in length from 14-21 cm. (5.5 to 8.3 in.) and averaging 18.2 cm. (7.2 in.) were also taken in this tow. The single 15-minute tow in Case Inlet yielded a higher percentage of dogfish (60 pounds), 30 pounds of herring, and only 5 small hake. The herring in this tow ranged from 10 to 23 cm. (3.9 to 9.0 in.), averaging 17.1 cm. (6.7 in.) in length.

A 15-minute gear trial at 70-100 fathoms over an average bottom depth of 121 fathoms off Golden Gardens produced several hake of various sizes.

**GEAR EVALUATION:** With the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch mesh version of the Standard Mark II "Cobb" trawl fishing at 12 fathoms, SCUBA-equipped divers dived on the net to evaluate its fishing configuration. The mouth opening was approximately 35 feet wide (measured) by 25 feet deep (estimated). These figures are not maximal as excessive amounts of "hang-in" on the crisscross rib lines prevented the trawl from operating optimally. Towing speeds recorded during actual fishing trials with this gear ranged from 2.4 to 2.9 knots at engine speeds of 260 to 330 r.p.m. (full speed), respectively. Those towing speeds are slightly greater than those experienced with the Standard Mark II "Cobb" trawl at similar engine speeds.

It is not possible to accurately evaluate the catching efficiency of the  $\frac{2}{3}$ -scale  $\frac{3}{4}$ -inch trawl for catching anchovy from our limited data. The largest catch was only 400 pounds of anchovy in a one-half-hour tow. This haul was less than the largest catch (1,000 pounds) made with the Standard Mark II "Cobb" trawl. But this latter haul, which was slightly less than one hour in duration, was made at sundown at full speed on a slowly ascending, moderate trace. Therefore, it is not known to what extent increased towing speed, fish

abundance, fishing after sundown, and/or other variables might have increased the catching efficiency of the trawl for anchovy.

**OTHER ACTIVITIES:** Samples of anchovy were retained and frozen from most hauls for proximate composition studies by the Seattle Technology Laboratory. All hake were also saved for aging by the Seattle Biological Laboratory.

A bathythermograph cast was made after each haul and ten additional casts were made for the Navy. Three bathythermograph casts and four plankton tows were taken in Saratoga Passage.

Note: See Commercial Fisheries Review, February 1966 p. 26.

## Oceanography

### ANTARCTIC OCEAN BIOLOGICAL STUDY:

Three marine scientists from the Institute of Marine Science, University of Miami, are participating in the first phase of a new intensive study of the Antarctic Ocean. They left Miami on January 12 for Punta Arenas, Chile, where they boarded the U. S. Coast Guard icebreaker Eastwind for the expedition into the south polar seas.

Sponsored by the National Science Foundation (NSF), the work of the scientists consists largely of collecting and studying yeasts and other fungi and phytoplankton (planktonic plants). These microscopic organisms play a vital role in the cycling of nutrients in the ocean. The Antarctic Sea is an area of great productivity. Its nutrient-rich waters support a prodigious quantity of animal life ranging from the tiny creatures of the plankton to the penguins, seals, and whales. The role of microscopic fungi in the great chain of life in the sea will be studied.

The Eastwind left Chile on January 16. After crossing the Drake Passage, the ship will stop at Palmer Station on Anvers Island, near the Antarctic Circle. One of the scientists will leave the ship there and remain at Palmer Station for five weeks making collections of terrestrial and inshore fungi. He will utilize the laboratory facilities recently set up by the U. S. Antarctic Research Program.

In the meantime, the other two scientists will collect fungi and phytoplankton from the

waters off the Palmer Peninsula, which juts out from the continent of Antarctica in the direction of South America, 700 miles away. They will be accompanied by scientists from NSF, the Smithsonian Institution, Florida State University, and the University of Hawaii, who will study deep-water corals, birds, insects, bacteria, and bottom sediments.

The cruise was scheduled to end in early March. Later that month, 2 of the scientists were to join the NSF's research vessel the USNS Eltanin for a second cruise in Antarctic waters from Chile to New Zealand.

\* \* \* \* \*

#### MARINE SCIENTIST STUDIES ANTARCTIC OCEAN SQUID AND OCTOPOD:

A scientist of the Institute of Marine Science, University of Miami, left south Florida early in January 1966 for the frigid south polar seas. He joined the National Science Foundation's Antarctic research ship USNS Eltanin for a two-month cruise in the Drake Passage, Scotia Sea, and the waters surrounding South Georgia, South Sandwich Islands, South Orkneys, the Falkland Islands, and the Palmer Peninsula. He is the sixth scientist from the Institute to do field work in the Southern Ocean in an investigation of the occurrence, distribution, and biology of the squid and octopod in a program directed by the Institute's Division of Biological Sciences.

Supported by the Office of Antarctic Programs under the National Science Foundation, earlier Eltanin cruises with Institute scientists aboard have been from Valparaiso, Chile, to New Zealand and return, working as far south as the pack ice permitted operations. Previous cruises have been made during the Antarctic winter when the Southern Ocean is at its worst. This cruise will be the first made during the Antarctic summer.

Studies have revealed large numbers of squid and bottom-dwelling octopod in the waters surrounding the Antarctic continent and several scientific papers are now ready on various species taken on the cruises. Squid in Antarctica form a large part of the diet of the sperm whale, various seals, and numerous sea birds. With the exception of fish, they constitute the largest food source in the oceans and their study is of importance to many nations.

\* \* \* \* \*

#### UNIVERSITY OF MIAMI'S RESEARCH VESSEL "JOHN ELLIOTT PILLSBURY" BEGINS 9-WEEK SURVEY:

A 9-week oceanographic survey of the Straits of Yucatan, the Bartlett Deep, the Brownson Deep, and the area along the coast of South America from the Guianas to the Amazon River by the research vessel John Elliott Pillsbury began on January 28, 1966. The 176-foot vessel is operated by the Institute of Marine Science, University of Miami, Miami, Fla.

Chief Scientist for the first half of the cruise (from Miami to Brazil and back to Trinidad) will be an oceanographic chemist. A total of 13 marine scientists and technicians comprised the scientific party. Temperature measurements and water samples will be taken at each of 48 different locations, or stations. Water samples will be analyzed to determine their content of oxygen, salts and trace elements. Studies will also be made of the chlorophyll content of water and of the abundance of living planktonic organisms.

After working in the Straits of Yucatan, between the western tip of Cuba and Mexico, research vessel John Elliott Pillsbury will proceed south to the coast of Honduras, then north and east to the Bartlett Deep (depth: 20,568 feet), near Jamaica; then east to the Brownson Deep (depth: 28,680 feet), off Puerto Rico. Profiles of the bottom of those great deeps--the deepest spots in all the Atlantic--will be made with a precision depth recorder.

After leaving the Brownson Deep, the scientists will proceed south to Venezuela and around the northeastern coast of South America to the mouth of the Amazon River. In the Amazon basin and off Surinam, they will investigate areas of upwellings.

On this survey, for the first time, the Institute's scientists will utilize each day the computer facilities at the Institute's campus on Virginia Key, near Miami. Data from the various samples will be sent by radio to Miami and run through a computer. Within 48 hours, the scientists aboard the research vessel will have results that ordinarily would take a much longer period of time. This system will speed up the work at sea considerably.

The first half of the cruise will end at Trinidad on March 2, at which time a new group of scientists headed by a marine geolo-

gist will take over. For the next four weeks, deep-coring operations will be conducted in the Caribbean, the Bahamas, and on the Blake Plateau, east of Florida. (News of Institute of Marine Science, Miami, Fla., January 27, 1966.)

\* \* \* \* \*

**STUDY SHEDS NEW LIGHT ON GULF STREAM:**

A study of the Gulf Stream now under way by U. S. oceanographers is shedding new light on this mysterious "ocean river." Data obtained during the first quarter of a scheduled year-long investigation, the most intensive of its kind ever attempted, are providing scientists with material upon which more definite conclusions regarding the nature of the Gulf Stream may ultimately be reached.

The undertaking, in which 15 governmental and private groups are participating, is being coordinated by the Institute for Oceanography, a component of the U. S. Department of Commerce's Environmental Science Services Administration (ESSA).

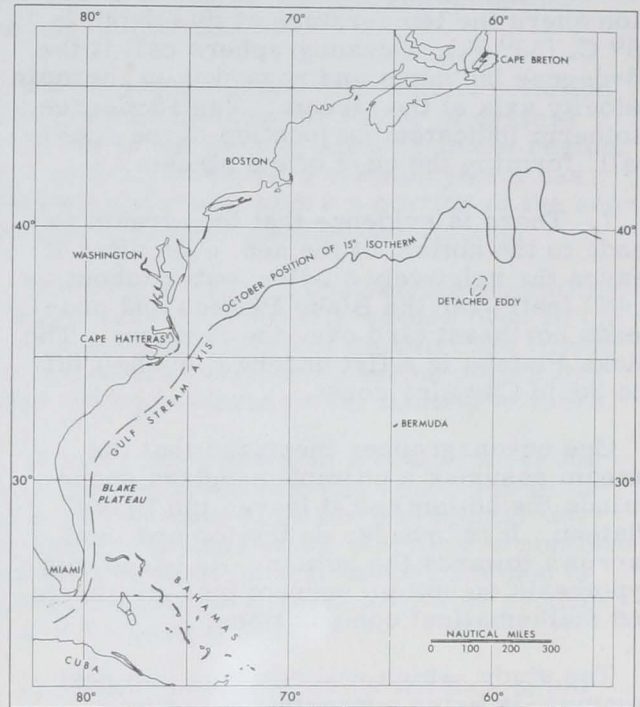
Participants include ships, planes, and scientists of ESSA's Institute for Oceanography, Coast & Geodetic Survey, and Weather Bureau; Naval Oceanographic Office; Office of Naval Research; Coast Guard; Interior Department's Bureau of Sport Fisheries and Wildlife; University of Miami; Duke University; Columbia University's Lamont Geological Observatory; University of Rhode Island; Massachusetts Institute of Technology; Woods Hole (Mass.) Oceanographic Institution; New York University; and Lerner Marine Laboratory, Bimini, Bahamas.

Although no formal reports have yet been made, preliminary findings disclosed the following:

1. The Gulf Stream expands and contracts like a living thing, but with an apparent irregularity that so far defies prediction.
2. The stream fluctuates like an undulating body. During the initial three-month period of the study (September through November), the position of the stream fluctuated as much as 250 miles, changing at times 15 to 20 miles a day. From September to October, a fluctuation of 200 miles was measured; from October to November, about 100 miles. The studies revealed that the stream's

course varied more and more the farther it went from the North American coast.

This extensive fluctuation was observed about 800 miles out to sea from Cape Hatteras, N.C., where the giant stream veers northeast toward Europe after flowing up the U.S. coast from the Straits of Florida.



Gulf stream position in October 1965.

3. In that area, the stream was found to migrate in northerly and southerly directions. After leaving Cape Hatteras, the stream proceeded north to about the same latitude as New York City, then veered south about 150 miles to the latitude of Washington, D. C., then north again some 210 miles to the latitude of Boston, then south once more approximately 150 miles to the latitude of Philadelphia.

4. These sharp fluctuations in the stream's course are known as meanders. The meander which fluctuated between Washington and Boston was observed in October. By November, the stream had apparently straightened out considerably, for the October meander was no longer so pronounced.

5. From time to time, part of a meander will break off, forming an eddy. The eddies remain unconnected with the stream until they disappear. One eddy 60 miles in diameter was discovered in September south of the stream (none has yet been found to the north).

It whirled counterclockwise around its 180-mile circumference at a speed of about one-third revolution per day.

6. The stream is detected most readily after it leaves Cape Hatteras at a depth of about 600 feet, where the temperature changes rapidly across the stream. The maximum surface current appears to lie above the region where the temperature at this depth is 15° C. (59° F.). Oceanographers call it the 15-degree isotherm and regard it as the main velocity axis of the stream. The 15-degree isotherm indicates the location of the "cold wall" forming the edge of the stream.

7. There is evidence that the stream extends to the bottom of the sea, even after it leaves the relatively shallow water (about 2,400 feet) over the Blake Plateau and proceeds northeastward over the deep sea. The Blake Plateau is a flat underwater shelf off the South Carolina coast.

One oceanographer theorized that the stream assumes a champagne-glass shape (minus the bottom) as it leaves the Blake Plateau. It is broader on the top and then narrows towards the bottom. He based this hypothesis on bottom current measurements and mathematical computations.

The study, which will continue into next summer, is being concentrated in these areas: Off Miami, Fla.; between the Straits of Florida and Cape Hatteras off Charleston, S. C.; and in the North Atlantic from Cape Hatteras out into the ocean to the area south of Nova Scotia.

When the study is completed, scientists will have a much better understanding of the great stream which, when it leaves the Straits of Florida, is like a mighty river discharging one hundred billion tons of water each hour. It has been calculated that the Gulf Stream flow is 22 times as large as all the rivers of the world.



## Oregon

### CHANGES IN FISHERY REGULATIONS CONSIDERED:

Changes in a number of regulations and clarification of others concerned with commercial trolling and shellfish (with the ex-

ception of crabs) were proposed for the February 1966 meeting of the Oregon Fish Commission.

The West Coast Trollers Association has requested a regulation hearing and has proposed an earlier opening of the chinook trolling season, at present set for April 15. The matter was to be considered at the meeting. The troll fishing area boundary at the mouth of the Columbia River and clarification of minimum size limits of commercial troll-caught coho salmon were also to be considered.

The staff has recommended action be taken to head-off potential problems that could arise from importation of uninspected seed oysters from other countries following a greatly reduced oyster "set" in Japanese waters where nearly all of the seed oysters imported to the Pacific coast have been obtained in the past.

Among the other matters scheduled for consideration was a proposal that the present 4¼-inch minimum possession limit on razor clams handled by Oregon shellfish buyers be applied only to Oregon-harvested razor clams. This would allow Oregon dealers to handle razor clams brought in from Washington where there is no minimum size restriction. (Oregon Fish Commission, February 2, 1966.)

\* \* \* \* \*

### WILLAMETTE FALLS FISHWAY CONSTRUCTION CONTRACT AWARDED:

Award of the contract for construction of Phase A of the long-awaited Willamette Falls fishway was made when the Oregon Fish Commission formally accepted the \$705,338 bid submitted by a Portland firm.

Phase A of the project includes construction of an 800-foot section of ladder leading from the cul-de-sac on the west side of the falls to the forebay of the dam. The cul-de-sac has long been a problem since fish bound for the upstream spawning grounds are frequently attracted into the pocket by a heavy flow of water passing through 2 plants. Although dead-ended in this cove, the fish are reluctant to leave the area to seek other means of upstream passage because of the strong water flow here. In years past, industry has been most cooperative in closing down for a period of hours each spring to eliminate this water flow attraction thus encouraging

bring chinook to leave the trap. The new fishway will eliminate the necessity of this measure and will allow free upstream passage of fish from the cul-de-sac at nearly all water stages.

Funds for the undertaking are being provided by the Department of the Interior's Bureau of Commercial Fisheries through the Columbia River Fishery Development Program, and by a Portland company in the proportion of 83.7 and 16.3 percent, respectively.

If the work proceeds as expected, the Phase A section will be ready to accommodate the spring chinook run in 1967. Later that year, fall chinook and increased numbers of coho, resulting from heavy plantings of young fish made in the system in anticipation of completion of the fishway, will return in their spawning run. Many adult coho surplus to hatchery needs also have been transplanted to the upper Willamette during the past two years in a cooperative project with the Oregon Game Commission, assisted by the Department of Interior's Fish and Wildlife Service and the Washington Department of Fisheries.

With assurance that the initial phase will soon be underway, the Commission emphasized the importance of giving attention to Phase B of the project. This includes construction of a two-entrance section which will lead from the main portion of the falls to join the common exit to the forebay with the cul-de-sac leg, replacing the present inefficient ladder. The Commission has made application to the Department of the Interior's Bureau of Commercial Fisheries for funds for Phase B work. In addition, the Governor of Oregon has requested the assistance of the State's congressional delegation in efforts to obtain Federal financial support for the project. Oregon's entire congressional delegation has indicated support of this facility. (Oregon Fish Commission, February 4, 1966.)



Oysters

EDA APPROVES PROJECT TO STUDY SEEDING BEDS IN CHESAPEAKE BAY:

A study to determine the feasibility of establishing commercial oyster hatcheries in the lower Chesapeake Bay area of Virginia

was approved Feb. 11, 1966, by the Assistant Secretary of Commerce for Economic Development.

Approximately \$38,050 in Federal funds for the project will come from the Economic Development Administration (EDA), U. S. Department of Commerce. In addition, an oyster company will contribute \$11,950 for a total project cost of \$50,000.

During recent years disease and pollution have reduced the natural supply of oysters available to the fishing industry in the region. As a result, widespread unemployment has developed in areas where a portion of the economy is dependent upon oyster fishing.

The EDA study will analyze the possibility of establishing artificially-seeded beds in the area, thus creating a new commercial industry that would assist in relieving unemployment among oystermen and seafood workers.

Preliminary testing of a new process for producing seed oysters was conducted in the lower Chesapeake area for five months during 1965. The EDA funds will help to continue research to determine if the new method is suitable for large-scale seed oyster production in Virginia waters.

Currently seeded oysters for the region are supplied primarily by beds in the James River. However, in the past several years such production has decreased by more than 50 percent, causing further decline of the Chesapeake area industry.



Rhode Island

FISHERMEN'S FORUM HELD:

Some 200 fishermen from New York to Maine met with experts on March 5, 1966, at the University of Rhode Island to learn about innovations and developments in the industry. The fishermen's forum was the fifth in a series that began in 1961.

An associate professor of food and resource economics at the University said the day-long program in the Memorial Union was planned in cooperation with a committee of local fishermen to provide information on such topics as aluminum fishing vessels, mid-water trawl methods, life saving equipment, and lobster-conservation programs.

Sponsored by the University of Rhode Island Marine Resources Program in cooperation with the Point Judith Fishermen's Cooperative, the Forum included several speakers and a series of question-and-answer periods. Mr. Donald L. McKernan, Director of the Department of the Interior's Bureau of Commercial Fisheries chose as his topic "The Fisherman: His Future in American Fisheries."

A marine industry marketing manager for a large aluminum and chemical corporation had as his subject "Can Trawlers be Built of Aluminum?" A staff member of the Vessel and Gear Section, Industrial Development Service, Canadian Department of Fisheries, described "The British Columbia Midwater Trawl." One of the special requests of fishermen was answered when the chief of the Search and Rescue Branch, Testing and De-

### Salmon

#### U. S. PACIFIC COAST CANNED STOCKS, JANUARY 1, 1966:

On January 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 2,259,875 standard

Table 1 - Total Canners' Stocks of Pacific Canned Salmon January 1, 1966

Species	Jan. 1, 1966	Dec. 1, 1965	Nov. 1, 1965
	. . . . .(No. of Actual Cases). . . . .		
King	109,284	123,126	140,743
Red	1,801,354	1,902,932	1,983,736
Coho	173,560	193,729	232,458
Pink	651,279	767,120	793,674
Chum	263,268	305,471	328,219
Total	2,998,745	3,292,378	3,478,830

Table 2 - Total Canners' Stocks on Hand January 1, 1966 (Sold and Unsold), by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	. . . . .(Actual Cases). . . . .					
48/1/4-lb. . . . .	5,810	226,454	64,637	4,056	66	301,023
48/1/2-lb. . . . .	90,795	629,660	67,809	187,399	50,543	1,026,206
48/1-lb. . . . .	12,382	940,201	32,725	441,651	204,449	1,631,408
12/4-lb. . . . .	297	5,039	8,389	18,173	8,210	40,108
Total . . . . .	109,284	1,801,354	173,560	651,279	263,268	2,998,745

Table 3 - Canners' Shipments from July 1, 1965, to January 1, 1966, by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	. . . . .(Actual Cases). . . . .					
48 1/4-lb. . . . .	8,390	198,594	60,201	4,437	1	271,623
48 1/2-lb. . . . .	78,057	353,355	64,739	224,941	43,549	764,641
48 1-lb. . . . .	8,349	520,422	75,375	607,986	294,094	1,506,226
12 4-lb. . . . .	-42	4,420	5,880	39,766	8,411	58,435
Total . . . . .	94,754	1,076,791	206,195	877,130	346,055	2,600,925

velopment Division, U. S. Coast Guard, discussed "New Developments in Life Saving Equipment." An associate professor of oceanography at the University discussed "What Is Good and Bad with the Present Lobster Conservation Program?" The final speaker was the executive secretary of the Congress of American Fishermen, Seattle, Washington. His subject was "What Is the Congress of American Fishermen?" (University of Rhode Island, February 11, 1966.)



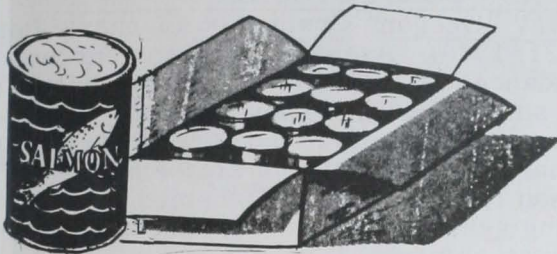
cases (48 1-lb. cans)--589,979 cases less than on January 1, 1965, when stocks totaled 2,849,854 standard cases.

On the basis of total stocks of 2,998,745 actual cases (consisting of cans of 1/4-lb., 1/2-lb., 1-lb., etc.), red salmon accounted for 1,801,354 cases (mostly 1-lb. and 1/2-lb. cans) or 60.1 percent of the total canners' stocks on January 1, 1966; pink salmon accounted for 651,279 cases or only 21.7 percent (441,651 cases were 1-lb. talls). Next came chum (263,268 cases, mostly 1-lb. talls), followed by coho or silver (173,560 cases), and king salmon (109,284 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965.



Approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

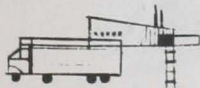


Shipments at the canners' level of all salmon species from July 1 to January 1, 1966, totaled 2,014,887 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); humpback, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); and chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners and are based on salmon packed over 95 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, February 1966.)

See Commercial Fisheries Review, February 1966 p. 35.



**Shellfish**

**NATIONAL CONFERENCE ON DEPURATION:**

A National Conference on Depuration of Shellfish will be held on the campus of the University of Rhode Island, July 19-22, 1966. The conference is sponsored by the Shellfish Station Branch, Public Health Service, with the cooperation of the University of Rhode Island. The purpose is to assemble and exchange current expert knowledge of all

aspects of the subject. Subsequently, the information obtained and discussed will be published. All who are interested are welcome to attend. For advance reservations and further information, contact Dr. Carl N. Shuster, Director, Northeast Shellfish Sanitation Research Center, U. S. Public Health Service, DHEW, South Ferry Road, Narragansett, Rhode Island, 02882.



**Shrimp**

**MORE SHRIMP EATEN BY AMERICANS:**

Americans are eating more shrimp than ever before, reports the Department of the Interior's Bureau of Commercial Fisheries. Total consumption in 1965 is estimated at 323 million pounds, compared with 299 million pounds in 1964.



On a per capita basis, the Bureau reports, Americans are eating about 75 percent more shrimp than in the years immediately following World War II.

The Bureau says there appears to be no single answer to why Americans are consuming more shrimp, but rising purchasing power, growing consumer preference, development of new products, wider distribution, improvement in quality, and increased product promotion have all been contributing factors.

The domestic shrimp industry is primarily in the Gulf States. The United States also imports large quantities of shrimp. Mexico and other Latin American countries, along with India, have been supplying increasing quantities in recent years.

\*\*\*\*\*

**BREADED PRODUCTION,  
OCTOBER-DECEMBER 1965:**

United States production of breaded shrimp during the fourth quarter of 1965 amounted to about 26.5 million pounds--an increase of about 1.8 million pounds or 7.4 percent as compared with the same period in 1964.



Breaded shrimp on conveyor belt moving to weighing and packaging line

Table 1 - U. S. Production of Breaded Shrimp by Areas, October-December 1965

Area	Oct.-Dec. 1965 <sup>1/</sup>		Oct.-Dec. 1964	
	Number Plants	Quantity 1,000 Lbs.	Number Plants	Quantity 1,000 Lbs.
Atlantic & Gulf	42	24,544	34	23,096
Pacific . . . . .	7	1,938	8	1,551
Total . . . . .	49	26,482	42	24,647

<sup>1/</sup>Preliminary.

Table 2-U. S. Production of Breaded Shrimp by Months, 1964-65

Month	<sup>1/</sup> 1965	1964
	. . (1,000 Lbs.). .	
January . . . . .	7,442	7,401
February . . . . .	7,117	8,100
March . . . . .	8,251	7,303
April . . . . .	7,366	7,081
May . . . . .	7,304	6,224
June . . . . .	7,371	6,641
July . . . . .	7,401	8,697
August . . . . .	9,040	7,354
September . . . . .	9,302	7,885
October . . . . .	9,475	9,225
November . . . . .	8,957	7,907
December . . . . .	8,050	7,515
Total . . . . .	97,076	91,333

<sup>1/</sup>Preliminary.

The Atlantic and Gulf States ranked first in the production of breaded shrimp with 24.5 million pounds, followed by the Pacific States with 1.9 million pounds.



**South Atlantic Fisheries  
Explorations and Gear Development**

**ABUNDANCE AND DISTRIBUTION OF  
BROWN AND PINK SHRIMP OFF  
FLORIDA COAST STUDIED:**

M/V "Oregon" Cruise 106 (January-January 21, 1966): Assessment of the current abundance and distribution of large brown and pink shrimp south of Cape Kennedy, located during explorations in January 1965, was the primary objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon. For areas explored, see map on page 39.

**SHRIMP:** Sixty 1- to 2-hour drags were made with 40- and 65-foot flat trawls fished on 6- and 8-foot chain doors in depths ranging from 8 to 38 fathoms. Only scattered individual brown and pink shrimp (26-30 and 31-36 heads-off count, respectively) were caught in areas where commercial concentrations were located one year ago. Rock shrimp (*Sicyonia brevirostris*) were taken in catches of up to 60 pounds per 1-hour drag in 26 to 27 fathoms at 28°07' N. latitude and 80°03' W. longitude. Catches of 21-25 heads-off count white shrimp inside the 15-fathom curve ranged up to 48 pounds per 2-hour drag.

**FOOD FISH:** Fish catches in the area ranged from 0 to 1,900 pounds per hour drag. The largest catches of individual species were: spots (*Leiostomus xanthurus*)--1,800 lbs. (avg. 4 lbs.), croakers (*Micropogon undulatus*)--231 lbs. (avg. 5 lbs.), black sea bass (*Centropristes striatus*)--87 lbs. (avg. 3 lbs.), and flounder (*Paralichthys dentatus*)--32 lbs. (avg. 1½ lb. each).

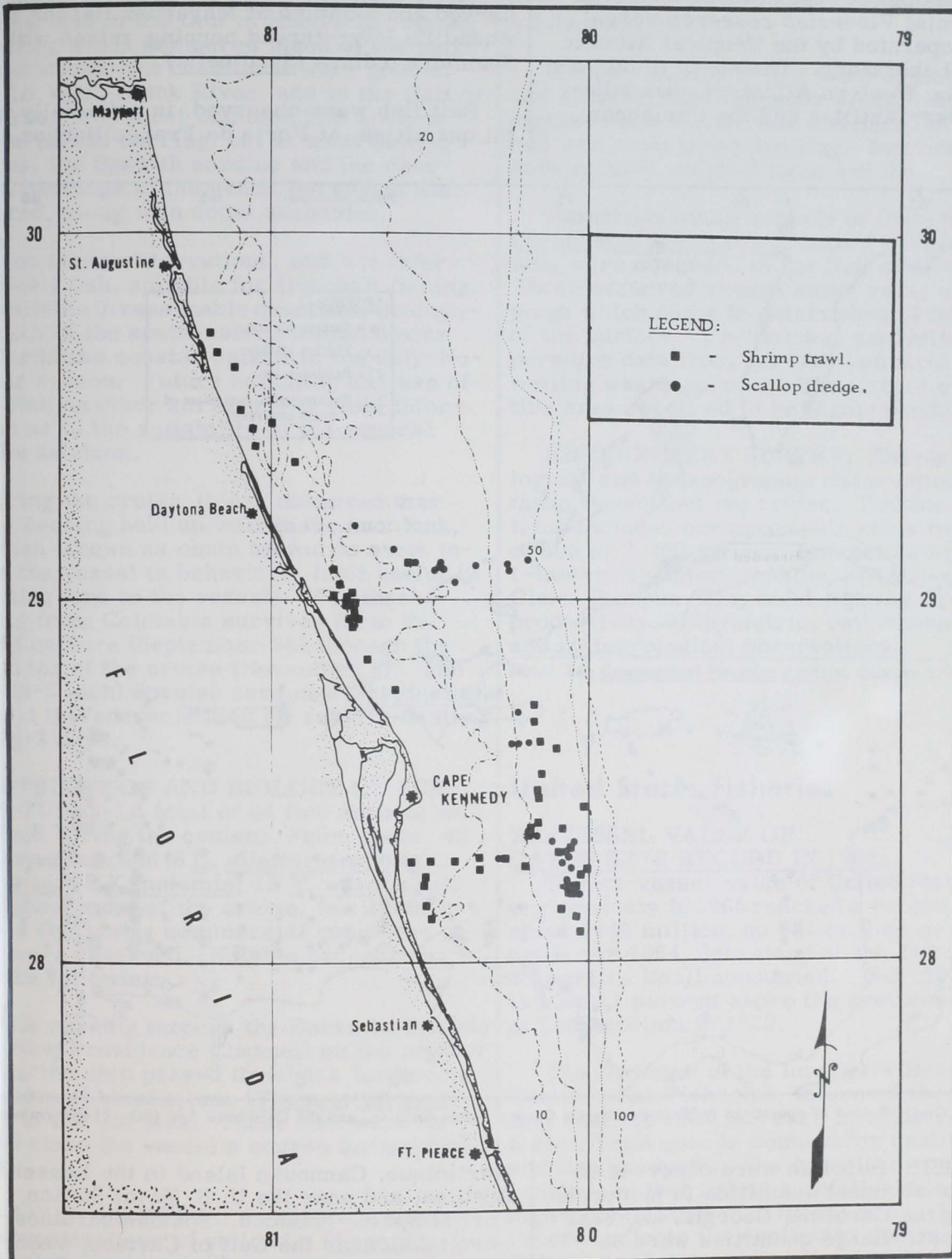
Note: See Commercial Fisheries Review, January 1965 p. 36.



**Tropical Atlantic Fisheries  
Investigations**

**LIVE BAIT DISTRIBUTION  
AND TUNA STUDIES:**

M/V "Geronimo" Cruise 5 (July 21-November 4, 1965): To investigate the distribution and biology of (1) fish suitable for use as live bait for tuna fishing and (2) surface tunas and other pelagic predators (together with measurements of the physical and biological environment) were the main purposes of this cruise

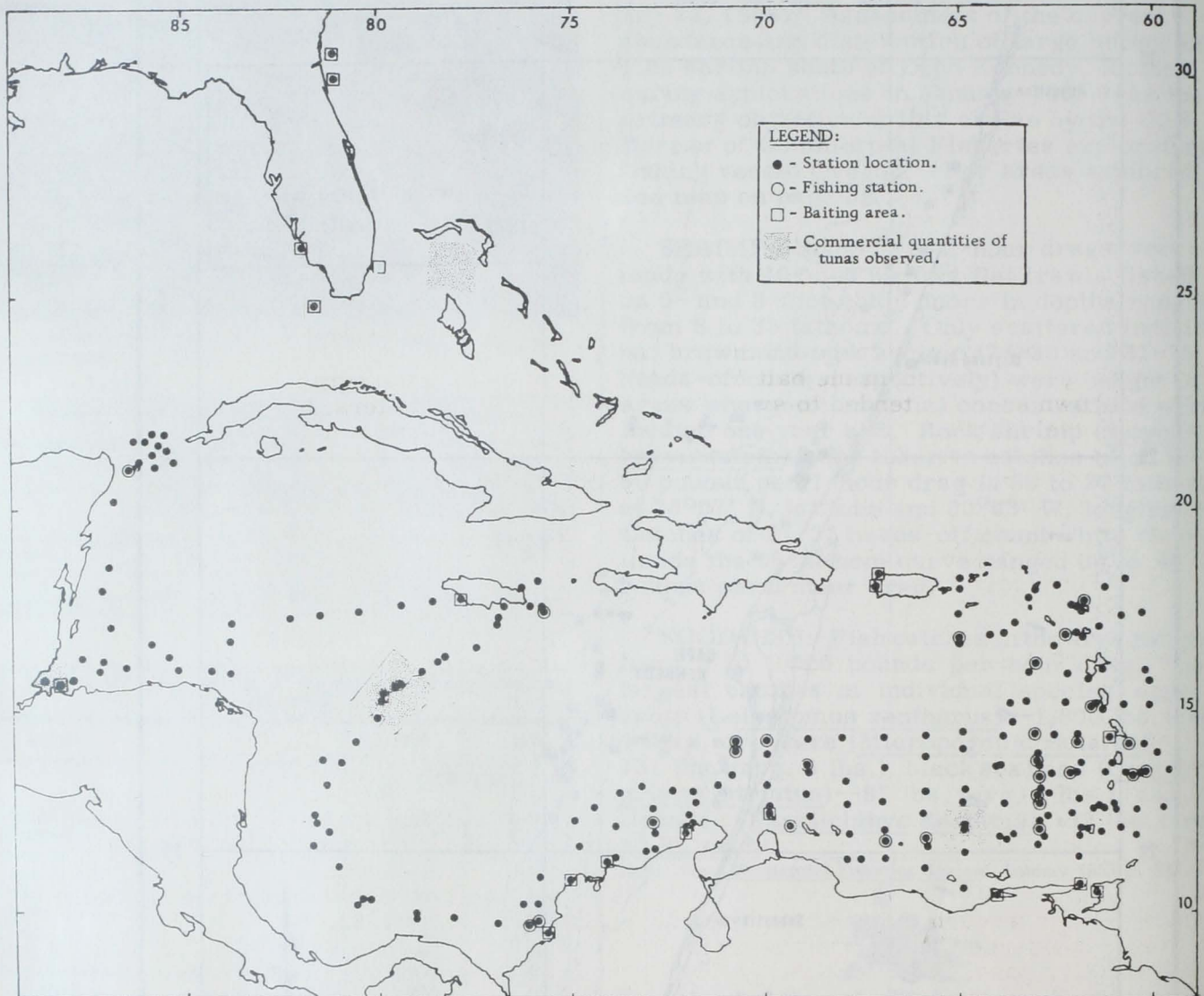


Areas explored by M/V Oregon Cruise 106 (January 12-21, 1966).

by the Department of the Interior's Bureau of Commercial Fisheries research vessel Geronimo operated by the Tropical Atlantic Biological Laboratory. The areas of operation were the Western Atlantic Ocean adjacent to Lesser Antilles and the Caribbean Sea.

In Puerto Rican waters, bait fish were observed and sampled at Mayaguez Harbor and Aquadilla Bay--thread herring, mixed with Spanish sardines (Sardinella).

Bait fish were observed, in potentially useful quantities, at Forte de France Harbor,



M/V Geronimo Cruise 6 area of operations in Western Atlantic Ocean, Lesser Antilles, and the Caribbean Sea (July 21-November 4, 1965).

**BAIT FISH:** Bait fish were observed in moderate to abundant quantities in numerous areas along the Carolina, Georgia, and east Florida coast. Large quantities were observed off the Florida west coast between Cape Romano and Fort Myers Beach in the 4- to 5-fathom depth range. Thread herring (Opisthonema) appeared to be the most abundant species in these locations, except for Pensacola herring (Harengula) at Miami Beach.

Martinique, Cannouan Island in the Lesser Antilles, and near the U. S. Naval Station, Port of Spain, Trinidad. Spanish sardines were taken near the Gulf of Cariaco, Venezuela. Particular locations here at which sardines and anchovies are harvested commercially are at Pt. Araya, Isla Lobos, and Picuda Island.

Abundant bait was found on the northwest coast of Aruba; along the Colombian coast,

particularly at Cape La Vela; off Black River, Jamaica; and in the Gulf of Honduras. Strong prevailing winds hampered much of the baiting operations, but conditions were good at Cape La Vela, Black River, and in the Gulf of Honduras. The most common bait species was the thread herring, but at most baiting stations, the Spanish sardine and the deep-bodied herrings of the genus Harengula also occurred, along with some anchovies.

From these observations, one can infer that small fish, suitable for live-bait fishing, are available in reasonable quantities throughout much of the southeastern United States and Caribbean coastal waters in the July-November season. Future sampling and use of these fish on other surveys will yield information as to the suitability of the several species as chum.

During the cruise it was observed that thread herring held up well in the bait tank, but when thrown as chum tended to swim towards the vessel (a behavioral trait useful in attracting tuna to the vessel). The thread herring from Colombia survived from the time of capture (September 28) through the remainder of the cruise (November 4). The large (6-8 inch) Spanish sardines (Sardinella) obtained in Venezuela died off rapidly, lasting only 2½-3 days.

**DISTRIBUTION AND BIOLOGY OF SURFACE TUNAS:** A total of 44 fish schools was observed during the cruise. From these, 48 schools were sampled (6 E. alletteratus; 14 T. albacares; 15 K. pelamis; 13 T. atlanticus). Throughout most of the cruise, few surface schools containing commercial quantities of tunas were observed. Notable exceptions were the following:

While running through the Bahamas Islands (New Providence Channel) on the night of October 30, the ship passed through a large concentration of bluefin tuna (Thunnus thynnus) of 10- to 150-lb. size. These fish were observed along the vessel's course for over 2½ hours.

At 12° N. and 65° W., an area of commercial concentrations of yellowfin (Thunnus albacares) and skipjack (Katsuwonis pelamis) was encountered. These fish were in compact schools and were in a feeding frenzy. The yellowfin ranged in size from 15-30 lbs.; the skipjack, 3-6 lbs. It was estimated that there were about 80-100 tons of fish in the

area, and these could have been captured by a tuna seiner.

A small school (1 to 2 tons) of skipjack and blackfin tuna (Thunnus atlanticus) was sighted between Serrana and Serranilla Banks and was sampled by trolling. Individuals of both species weighed from 4-8 lbs.

Numerous small schools of little tuna (Euthynnus alletteratus) mixed with blackfin tuna were observed in the Gulf of Honduras. These occurred around small coral outcroppings which came to within about 4 fathoms of the surface. Preliminary analysis of temperature data from the Gulf indicates that upwelling was occurring. The waters of the entire area appeared to be highly productive.

**ENVIRONMENT SURVEY:** Extensive biological and oceanographic observations were made throughout the cruise. Routine observations included oceanographic casts to depths of 500 or 1,000 meters, tow-net sampling with 1-meter, 2-meter, neuston, and enlarged Clark-Bumpus nets, night lighting, primary productivity, bathymetric, bathythermometric, and meteorological observations.

Note: See Commercial Fisheries Review, October 1965 p. 54.



## United States Fisheries

### EX-VESSEL VALUE OF CATCH SETS RECORD IN 1965:

The ex-vessel value of United States fishery products in 1965 reached a record high of about \$440 million, up \$51 million or 13 percent over 1964, Secretary of the Interior Stewart L. Udall announced. The 1965 record is also 11 percent above the previous record of \$396 million in 1962.

The Director of the Interior's Bureau of Commercial Fisheries, informed the Secretary that the 1965 increase in value reflects a significant gain in demand for quality fish and fish products. The American consumer recognizes that fish is a relatively low-cost, high-protein food with little waste. The 1965 record reflects the continuing desirability of fishery products, adding that improvements in processing, packaging, freezing, and transportation all played parts in creating the record year.

For individual commodities, the shrimp industry led the parade of new records. The



Heading shrimp aboard a fishing vessel.

value of the United States shrimp catch in 1965 was estimated at \$82.6 million, up 17 percent from 1964 and 8 percent above the previous record value of \$70.4 million in 1953. Other fisheries that set new records in 1965 were northern lobsters, sea scallops, yellowtail flounder, haddock, Pacific halibut, and Alaska salmon.



**U. S. Fishing Vessels**

**DOCUMENTATIONS ISSUED AND CANCELLED, OCTOBER 1965:**

During October 1965, a total of 54 vessels of 5 net tons and over was issued first docu-

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, October 1965 with Comparisons				
Area (Home Port)	Oct.		Jan.-Oct.	
	1965	1964	1965	1964
. . . . .(Number). . . . .				
<b>Issued first documents 2/:</b>				
New England . . . . .	2	3	32	29
Middle Atlantic . . . . .	4	1	13	9
Chesapeake . . . . .	4	9	38	36
South Atlantic . . . . .	8	3	60	39
Gulf . . . . .	27	11	253	194
Pacific . . . . .	8	7	157	130
Great Lakes . . . . .	1	1	2	2
Hawaii . . . . .	-	-	-	1
Puerto Rico . . . . .	-	1	1	2
<b>Total . . . . .</b>	<b>54</b>	<b>36</b>	<b>556</b>	<b>442</b>
<b>Removed from documentation 3/:</b>				
New England . . . . .	-	7	27	42
Middle Atlantic . . . . .	2	5	17	24
Chesapeake . . . . .	2	4	29	28
South Atlantic . . . . .	10	12	74	49
Gulf . . . . .	7	6	106	82
Pacific . . . . .	9	5	80	127

(Table continued in next column.)

**U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, October 1965 with Comparisons (Contd.)**

Area (Home Port)	Oct.		Jan.-Oct.	
	1965	1964	1965	1964
. . . . .(Number). . . . .				
Great Lakes . . . . .	-	-	19	12
Hawaii . . . . .	-	-	2	-
Puerto Rico . . . . .	-	-	1	-
<b>Total . . . . .</b>	<b>30</b>	<b>39</b>	<b>355</b>	<b>364</b>

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.  
 2/There was 1 redocumented vessel in October 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 38 in 1965; 1 in 1960; 1 in 1954; 2 in 1951; 10 prior to 1949; and 2 unknown.  
 3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.  
 Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

ments as fishing craft as compared with 36 in October 1964. There were 30 documents cancelled for fishing vessels in October 1965 as compared with 39 in October 1964.



**U. S. Foreign Trade**

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

United States imports of tuna canned in brine during January 1-29, 1966, amounted to 5,629,133 pounds (about 268,054 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 59 percent from the 3,540,035 pounds (about 168,573 standard cases) imported during January 1-30, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty has not been announced; however, in 1965 the quota was 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota were dutiable at 25 percent ad valorem, but total imports were below the quota in 1965.



**Virginia**

**INDUSTRIAL FISH INVESTIGATIONS COMMENCED:**

Scientists at the Virginia Institute of Marine Science are undertaking a fishery research project that may add a new dimension to commercial fishing in Virginia, and to the associated fishery industries based there, according to its Director.

The project concerns use of industrial fish, species ordinarily discarded in food-fish catches but which can be processed into high-protein meal or flour for domestic consumption.

According to the head of finfish research at the Institute and director of the industrial fish project, an estimated three-fourths of the species available in Chesapeake Bay and along the mid-Atlantic region of the continental shelf are among those which fishermen normally discard.

Seventy five percent of the funds for the year project will come from the Federal Government under the Commercial Fisheries Research and Development Act, Public Law 85-309, which provides up to 3 to 1 matching funds to states for worthwhile fishery research.

"If adequate state support is provided to match the Federal funds already approved, the program will continue for three years or longer," reported the director of the laboratory. "This long-range aspect will assure the accuracy of our data, upon which fishermen and manufacturers may consider large investments to develop what now appears an untapped economic potential."

The program's first expedition went to sea recently. Aboard the 90-ft. trawler Sea-Geese, chartered from its Hampton, Virginia, waters for a month, were four Institute scientific personnel. They sampled for industrial fish along the continental shelf from the May to Cape Hatteras.

The marine biologists are primarily interested in two species of sea robins, three species of hakes, spiny dogfish, and other kinds of sharks and rays. Trawl samples will be taken at 46 stations charted along the shelf waters ranging from 30 to 100 fathoms. Additional stations will be worked if time and weather permit.

The program's primary objective is to determine if species not now being taken occur in sufficient quantities to support an industrial fishery.

"We expect to sample the quantities and distribution of these fish in each season of the year," said the biologists. "When we have reached a certain stage in the program, manufacturers interested in developing the industry will have an idea of its potential."

Information gathered from the program may indicate that a new industry can be formed in Virginia, and close proximity to the raw product will favor its development.

Trawl fishermen already engaged in the seafood industry along Virginia's shores could receive additional income from this industry as it develops. They may return to port fully loaded with industrial species during seasons when food fishes are in short supply.

The month-long expedition will remain at sea for seven days each cruise, with two days in port for resupply and unloading of samples collected. The project now underway will ascertain the suitability of unused species to the industrial fishery, and it will determine the magnitude of supply and of sustained catch.



## Washington

### WIND RIVER CHINOOK SALMON FISHWAY IMPROVED:

The Engineering and Construction division of the Washington Department of Fisheries has completed improvements in the large fishway on the Wind River that bypasses Shipperd Falls on that Columbia tributary in Skamania County.

The improvements were installed to aid the escapement of fall chinook salmon past the falls. The run of chinook above the falls dates from 1955 and during the past few years substantial numbers of chinook have escaped to spawn in the upper river.

The fishway improvements include water intakes, piping and jet outlets to make the fishway more efficient and attractive to fall chinook salmon. A series of five surface and subsurface jet outlets were installed at the fish entrance. The increased water flow is continued in the first 3 bays of the fishway by water jets in diminishing proportions to lead the fish securely into the ladder. The water supply for these salmon attractions is brought through the fishway in a 30-inch pipe by siphon from an intake box near the upper end of the fishway.

The fishway was built in 1955 in an attempt to open up the stream for fall chinook utilization and to create an annual run. Since that time substantial numbers of fall chinook,

spring chinook, and coho or silver salmon have used the facility to reach the spawning grounds. Fall chinook escapements have totaled 4,173 in 1962; 1,916 in 1963; 2,391 in 1964; and 2,300 in 1965.

The returning salmon are adults from releases of young salmon in the river from the Federally operated Carson National salmon hatchery upstream from the fishway.

During the past two years, observation of the fishway had revealed that many adult fall chinook bypassed the entrance of the fishway and were trapped in the series of falls about half way up the ladder. To make the entrance of the fishway more attractive to salmon and to prevent their being trapped in the falls area, Washington Department of Fisheries engineers, working with biologists, designed the water jets to increase the flow at the entrance. Salmon are attracted by a vigorous horizontal current as well as an obvious flow of water. The jet outlets, placed just within and in front of the entrance, gives a strong flow at all water levels and by increasing the flow inside the first 3 bays in a diminishing proportion, it is believed that salmon entering the ladder will stay in it and completely bypass the falls.

In addition to the fishway improvements, some flood damage repair work was done down stream from the fishway entrance to make it easier for salmon to reach the entrance.

The fishway improvements were accomplished by the use of Federal funds, at a total cost of around \$80,000. (State of Washington Department of Fisheries, December 17, 1965.)



## Wholesale Prices

### EDIBLE FISH AND SHELLFISH, FEBRUARY 1966:

The February 1966 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) was at 123.2 percent of the 1957-59 average, a drop of only one percent from the previous month but 12.3 percent above February 1965. In spite of the small overall decrease from January, there was a mixed trend in the individual products with some sharp increases and decreases.

February 1966 prices for all items in the drawn, dressed, or whole finfish subgroup were down 10.6 percent from January due principally to a 41.7 percent drop in large fresh haddock prices at Boston. The haddock landings at that port increased sharply in February. There was practically no change in prices for halibut and salmon at New York City, while there were sharp increases in prices for the fresh-water items--whitefish at Chicago (up 15.9 percent) and yellow pike at New York (up 13.3 percent). The February index for this subgroup was 9.1 percent higher than the previous year.



Shucking oysters in a New Orleans oyster-shucking plant.

Fresh processed fish and shellfish prices were up slightly as an increase in prices for shucked oysters more than offset declines in prices for haddock fillets and fresh shrimp. However, the February index was 13.4 percent above the February 1965 index.

Prices for frozen flounder fillets and shrimp were up in February 1966, while prices for fillets of haddock and ocean perch were unchanged from January. The subgroup index for frozen processed fish and shellfish was 3.7 percent above the previous month and 6.1 percent higher than the previous year.

The only change in canned fish prices during February was an increase in pink salmon prices at Seattle. Tuna, mackerel, and Mait sardine prices were all unchanged from the



Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)						
			Feb. 1966	Jan. 1966	Feb. 1966	Jan. 1966	Dec. 1965	Feb. 1965			
			ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .								123.2
<b>Fresh &amp; Frozen Fishery Products:</b> . . . . .					124.9	127.7	120.6	114.5			
<b>Drawn, Dressed, or Whole Finfish:</b> . . . . .					123.7	138.3	123.4	115.1			
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.14	.24	111.3	187.4	119.6	99.2			
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.47	.48	139.0	141.0	141.0	117.3			
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	122.3	113.3			
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.73	.63	108.2	93.3	93.3	96.3			
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.85	.75	139.1	122.3	116.2	131.0			
<b>Processed, Fresh (Fish &amp; Shellfish):</b> . . . . .					130.5	128.3	123.5	115.1			
Fillets, haddock, sml., skins on, 20-lb. tins . . .	Boston	lb.	.45	.44	109.3	105.7	105.7	105.6			
Shrimp, lge. (26-30 count), headless, fresh . . .	New York	lb.	1.05	.99	123.0	116.0	106.6	113.7			
Oysters, shucked, standards . . . . .	Norfolk	gal.	8.50	8.75	143.3	147.6	147.6	118.0			
<b>Processed, Frozen (Fish &amp; Shellfish):</b> . . . . .					116.0	111.9	110.6	108.6			
Fillets: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.42	.40	106.4	101.4	101.4	88.7			
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.40	.40	117.3	115.8	115.8	114.3			
Ocean perch, lge., skins on 1-lb. pkg. . . . .	Boston	lb.	.32	.32	112.2	112.2	112.2	108.7			
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.98	.93	115.6	110.3	107.9	107.9			
<b>Canned Fishery Products:</b> . . . . .					120.7	119.3	117.5	101.8			
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.00	124.2	122.0	119.8	91.5			
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	12.63	12.50	112.1	111.0	108.8	102.6			
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9			
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3			

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.

previous month, and the overall index for the subgroup was up 1.2 percent. Compared with February 1965, all canned fishery products

prices were much higher and the subgroup index was up 18.6 percent.



**MOST ABUNDANT FISH ISN'T EATEN**

Paradoxically, the most abundant fish along the Atlantic and Gulf Coasts never graces the dinner table. Menhaden, a boney fish too oily to eat, accounts for about 40 percent of the total catch of commercial fish and is the principal source in the United States for marine oils used as drying agents in paints and varnishes. The fish meal produced along with fish oils from menhaden is widely used in livestock and poultry feeds, and as a fertilizer.

## AMBERGRIS PRIZED BUT HARD TO SELL

Ambergris is a wax-like substance from sperm whales, once highly valued as an odor fixative in perfume.

In earlier days ambergris was worth its weight in gold, but the introduction of synthetic substances caused prices to tumble. Even so the world market price is still believed to be about £40 (US\$112) a pound, but the demand is not great and is restricted to a few high-quality perfume manufacturers.

Of hundreds of samples submitted for testing only one or two prove to be real ambergris.

All this stems from the most common origin of ambergris, flotsam and jetsam on the beach where it may be found by anyone. Interest in the search is sustained by an occasional find of ambergris, either in a large chunk or in a multitude of small particles. True ambergris may also be found floating on the surface of the open ocean or lodged in the lower intestines of a dead sperm whale where it originated.

Ambergris may be soft and waxy to touch or rather hard and friable, depending on its age and dryness. It usually can be kneaded in the fingers, and has the consistency of pitch, but is not sticky. In color it is black, grey-white, mottled grey, and black, or brown and yellow, or any combination. It sometimes has an internal structure of concentric layers like an onion, and often has fragments of squid beaks or squid "bone." Its odor is fetid when fresh and dark-colored and musky in a sweet, earthy way when older, drier, and lighter in color.

Tests for ambergris are: melting point, burning properties, fluorescent properties of alcohol solution, hot wire test, and microscopic examination which should reveal fragments of the chitinous beak of squid, and perhaps fragments of the calcareous "pen bone" or internal skeleton of certain species.

One of the biggest pieces of ambergris found in recent years weighed 918 pounds. It was removed from a sperm whale aboard the British whaling ship, Southern Harvester, in 1953.

When the Russian Antarctic whaling fleet called at Melbourne in 1964, several hundred pounds of ambergris was reported to be among whale products aboard the factoryships, including one piece weighing 180 kilos (about 397 pounds). It was stated that the price paid in Russia for ambergris was £A400 a kilo (US\$407 a pound).

The West came to know of ambergris through an Arabian merchant who ventured forth to the islands of the Indian Ocean. On the Andaman Islands he traded iron against ambergris, a product that Orientals had long prized as an aphrodisiac. By the Middle Ages, Europeans, too, had begun to use it in love philtres and also as a cure for dropsy and other diseases. As the demand rose while the supply (whose source remained a mystery) lagged behind, prices rose to giddy heights.

Marco Polo, who knew that Oriental sailors hunted sperm whales for their ambergris, thought that these animals simply swallowed this substance with the rest of their food. It was not until 1724 that Dudley showed that ambergris is formed inside the sperm whale, and as late as 1791 the House of Commons in England was so puzzled by this mysterious substance that they summoned Capt. Coffin, the master of a whaler, to explain exactly what ambergris was.

It formerly was believed that ambergris was the result of disease or malnutrition but Robert Clark, who was present when the enormous piece of ambergris was found in the sperm whale caught by the Southern Harvester, reported that the animal was extremely healthy and well fed.

Actually, ambergris may well be comparable to the intestinal stones of otherwise healthy terrestrial mammals. Cows, for instance, often have stones or big hair balls in their intestines, and the well-known Dutch expert on stranded whales, Dr. A. B. van Deirse, examining a stranded porpoise in 1935, discovered no less than 20 glittering white stones in its intestine, the largest of which measured 1 inch x 4/5 inch x 3/5 inch. The stones consisted of calcium phosphate and many organic compounds.

Ambergris may, therefore, be the pathological product of an otherwise normal intestine, its basis being intestinal matter. In fact, a product resembling ambergris has been made experimentally from the feces of a sperm whale. (Australian Fisheries Newsletter, August 1964.)