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JAPANESE MOTHERSHIP-TYPE TUNA-FISHING OPERATIONS IN THE WESTERN EQUATORIAL PACIFIC, JUNE-OCTOBER 1951

(Report on the Seventh, Eighth, and Ninth Expeditions)

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INTRODUCTION

A directive (issued in May 1950) by the Supreme Commander for the Allied Powers (SCAP) authorized the Japanese to send fishing vessels as far south as the Equator in the waters of the U. S. Trust Territory of the Pacific Islands, provided that such vessels were organized into fleets based on motherships or tenders capable of exercising control and supervision over them. In all, nine such fleets, varying widely in scale and scope, had fished for tuna in the waters of the Trust Territory up to the end of 1951. A detailed report on the first expedition (Shimada 1951) and a comprehensive summary of the first six expeditions (Ego and Otsu 1952) have been published. The present paper aims to report the essential facts concerning the operations of the seventh, eighth, and ninth fleets, without unnecessarily repeating material covered in the two earlier reports.

ORGANIZATION

The seventh and eighth expeditions were very similar in composition and manner of operation, and compared closely with the first expedition of the series. Each consisted of about 25 fishing boats--tuna long-liners of 50 to 250 tons--tended by a 100,000-ton refrigerated cargo vessel primarily designed to carry whale meat from the Antarctic. The seventh fleet was organized around the mothership Settsu Maru, owned by the Nippon Suisan Company, one of Japan's two largest fishing concerns; the eighth expedition with its Tenyo Maru No. 2 (which had previously served as mothership of the first expedition) was operated by the Taiyo Gyogyo Company. The two fleets differed in that most of the fishing boats participating in the eighth expedition were owned by the company which operated the mothership, while the seventh fleet was composed mainly of independently-owned vessels.

The ninth expedition was on a much smaller scale, comparable to the third and sixth fleets, which had been organized by the same company, Nansei Fisheries, with the same mothership, the 577-ton trawler Tenryu Maru. Only three regular long-line vessels worked with this expedition.

In addition to the regular fishing vessels, all three motherships used small (about 30-foot) motor launches to fish long lines. The Settsu Maru had two such boats and the Tenyo Maru No. 2 had one, but as they were operated only part-time on an experimental basis, their contribution to the total catch of the expeditions was negligible. However, the two boats carried by the Tenryu Maru accounted for more than one-fourth of that expedition's catch.

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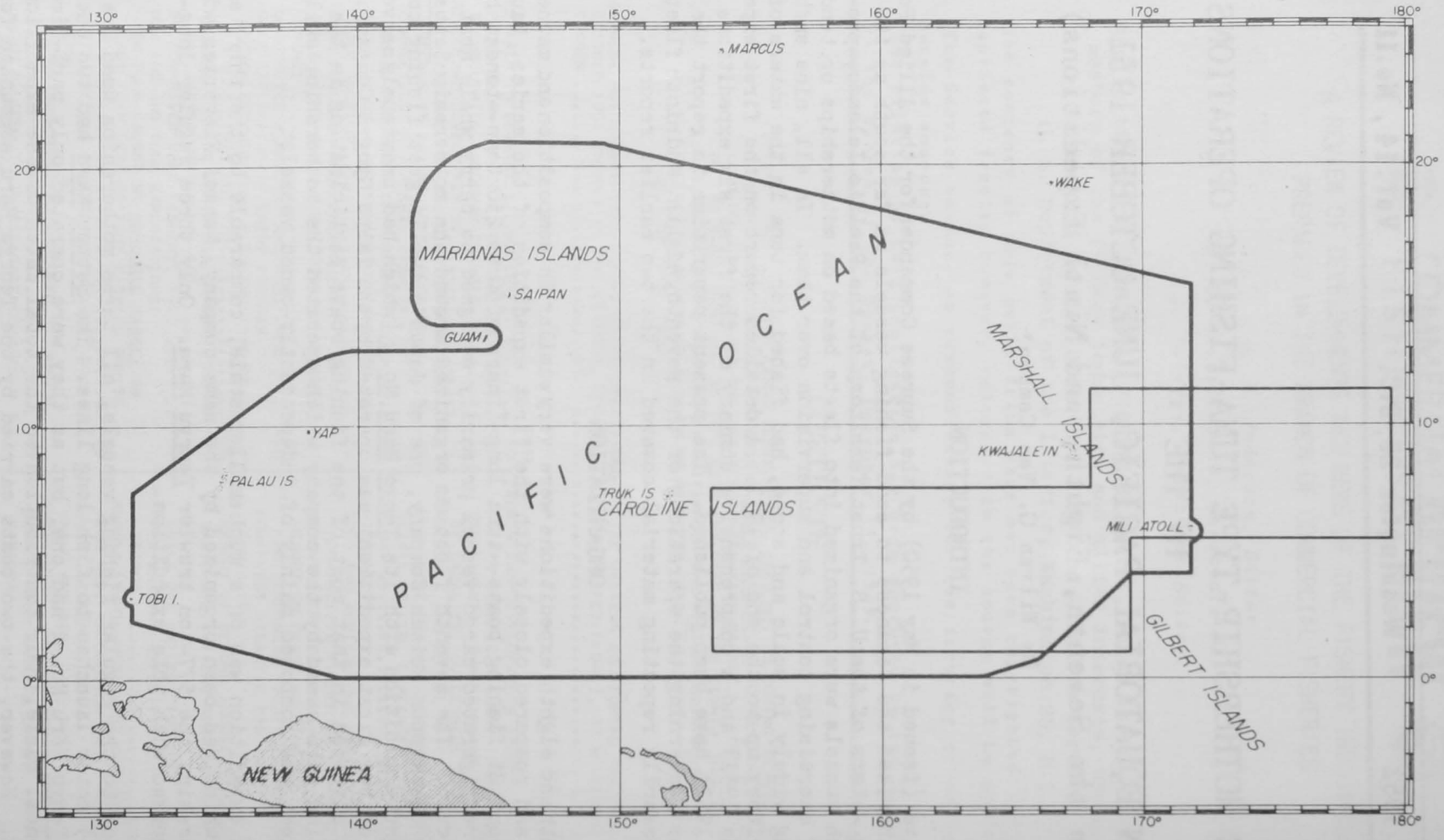

AREA FISHED BY THE SEVENTH, EIGHTH, AND NINTH JAPANESE MOTHERSHIP-TYPE TUNA FLEETS. THE LIGHTER LINE MARKS THE BOUNDARIES WITHIN WHICH ALL THREE EXPEDITIONS OPERATED; THE HEAVIER LINE INDICATES THE BOUNDARIES OF THE U. S. TRUST TERRITORY OF THE PACIFIC ISLANDS.

Table 1 - Essential Data on the Seventh, Eighth, and Ninth Japanese Tuna-Mothership Expeditions

	EXPEDITION		
	Seventh	Eighth	Ninth
Managing concern	Nippon Suisan K. K.	Taiyo Gyogyo K. K.	Nansei Suisan K. K.
Mothership	Settsu Maru (9,329 tons)	Tenyo Maru No. 2 (10,620 tons)	Tenryu Maru (577 tons)
Number of catchers	26 (and 2 boats)	25 (and 1 boat)	3 (and 2 boats)
Left port	May 31, 1951	July 30, 1951	September 3, 1951
Returned to port	September 5, 1951	November 4, 1951	November 1, 1951
Fishing began	June 5, 1951	August 2, 1951	September 17, 1951
Fishing ended	August 26, 1951	October 24, 1951	October 20, 1951
Area fished	1° - 13° N. lat. 153° - 179° E. long.	1° - 13° N. lat. 151° - 179° E. long.	1° - 10° N. lat. 162° - 179° E. long.
Tuna catch	6,228,286 lbs.	4,348,407 lbs.	326,276 lbs.
Spearfish catch	2,149,787 lbs.	1,526,229 lbs.	173,042 lbs.
Sharks and miscellaneous	854,341 lbs.	1,173,497 lbs.	23,404 lbs.
Total catch	9,232,414 lbs.	7,048,133 lbs.	522,722 lbs.
Total boat/days fished	1,312	1,219	126
Average catch rate (fish per 100 hooks per day)	4.47	4.04	3.55

AREA AND PERIOD OF OPERATION

Both the seventh and eighth expeditions fished over nearly the same area, and were on the grounds for about the same length of time. The Settsu Maru sailed from Osaka on May 31 and commenced receiving fish from her catchers on June 12 at 3°04' N. latitude, 155°56' E. longitude. The mothership gradually shifted eastward with its catchers, which were required by SCAP directives to keepwithin a 200-mile radius of the mothership. The last fish were taken aboard by the ship on August 26 to the east of the southern Marshall Islands at about 7° N. latitude, 179° E. longitude. The Tenyo Maru No. 2 commenced operations August 8 south of Ponape at 3°30' N. latitude, 158° E. longitude, and after moving west as far as 155° E. longitude, began drifting and running to the east and north, following much the same course and winding up its fleet's operations in much the same area as the Settsu Maru. The last fish were taken aboard on October 24.

The Tenryu Maru fleet fished from September 17 to October 20, remaining at all times in the vicinity of the Tenyo Maru fleet and under the control of the inspectors aboard the larger mothership.

OPERATING METHODS

The tuna-fishing vessels, called "catchers" by analogy with whaling fleet practice, fished from 200 to 400 baskets of long lines each day, setting them around dawn and hauling them from midafternoon to midnight. Each catcher came alongside the mothership once in every 10 to 20 days, depending on the success of its fishing and the state of preservation of its catch, to unload its fish and take on supplies. The catchers all used ice to preserve their fish, a few of them also having mechanical refrigeration equipment which was used, not to freeze

the catch, but only to keep the ice from melting too fast. The small motorboats fished about 75 to 150 baskets of gear, and returned to the mothership each evening.

The motherships' functions were to receive, freeze, and hold the catch of the fishing boats, and to supply the latter with fuel, crushed ice, bait (frozen sardines and saury), provisions, water, repair facilities, and medical attention. The Tenyo Maru No. 2 with the experience of two previous expeditions managed by the same company, performed these functions smoothly and efficiently, but the Settsu Maru, participating for the first time in an operation of this sort, had some minor difficulties at the beginning. It was found that the fenders with which the mothership was provided were too small, and trouble was experienced in bringing catchers alongside until more adequate fenders were sent down from Japan aboard one of the late-arriving fishing vessels. The second source of trouble was the failure of the catchers to take ice out of the mothership as fast as had been anticipated. This resulted in serious congestion in the holds of the Settsu Maru for a time, and on one occasion it was even found necessary to leave a considerable quantity of ice on the deck overnight with only a covering of straw mats to keep it from melting away.

FIGURE 2 - CREWS OF THE 30-FOOT KAWASAKI BOATS MAKING UP LONG-LINE LEADERS ABOARD THE MOTHERSHIP SETTSU MARU EN ROUTE TO THE FISHING GROUNDS.

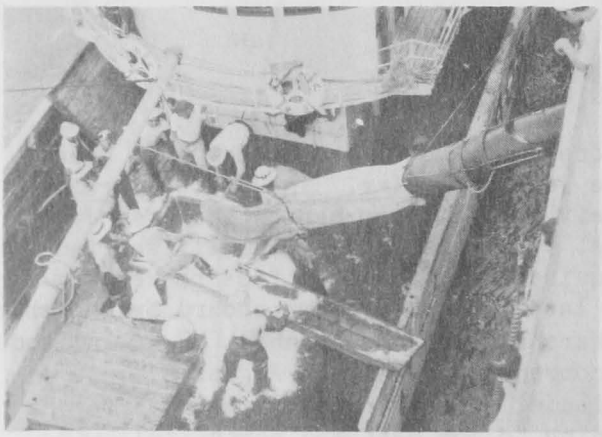

FIGURE 3 - ICING A CATCHER BOAT, THE ASAHI MARU NO. 1, ALONGSIDE THE MOTHERSHIP SETTSU MARU.

On the fishing grounds the motherships alternated periods of drifting with short runs to bring them close to the main concentrations of catchers. The degree of control which the fleet manager aboard the mothership had over the movements of the catchers was somewhat greater in the case of the eighth expedition, because of the higher percentage of company-owned vessels in the fleet, but on both major expeditions the fleet managers seemed unwilling or unable to assign catchers to particular fishing grounds against the will of the fishermen. The result was considerable pulling and hauling between the management and the fleet over the direction in which the whole operation was to move. The companies were primarily interested in getting yellowfin tuna which could be exported to the United States at a good profit, while the fishermen wanted to make weight, regardless of whether the catch was composed of yellowfin, big-eyed tuna, marlin, or shark. It was generally believed that yellowfin were more abundant in the southern and western portions of the authorized area, and big-eyed tuna and marlin more numerous to the north and east. Thus, the course of operations was a series of concentrations by the catcher fleet along the northeastern boundary of the 200-mile operating radius, followed by runs by the mothership to close with the fleet, and subsequent shifts of the operating radius to the northeastward. Another factor in this pattern was the desire of the catchers to

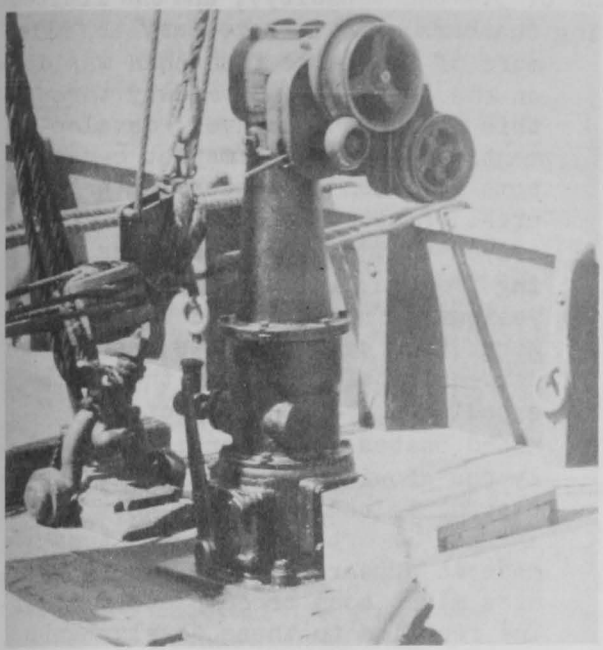

FIGURE 4 - LONG-LINE HAULER INSTALLED IN A 30-FOOT KAWASAKI BOAT.

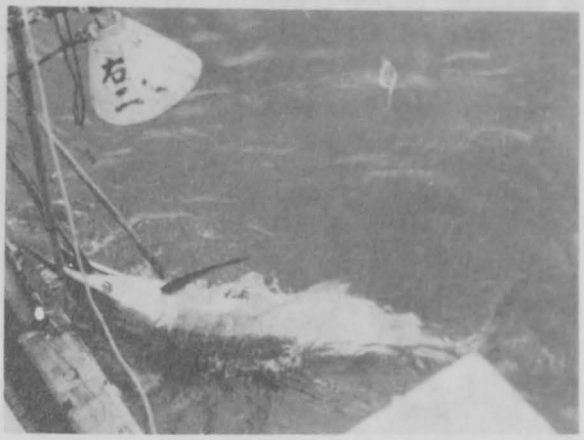

FIGURE 5 - A SMALL MARLIN BROUGHT TO GAFF ALONGSIDE A LONG-LINE BOAT.

be on big-eyed tuna and marlin grounds at the close of the operation in order to take aboard a big load of high-priced fish for sale in the Japanese fresh-fish markets.

PROCESSING PROCEDURES

The seventh expedition had as its prime objective the production of as much frozen round yellowfin as possible. Four brine tanks, with a total capacity of approximately 30 tons of fish, were used to freeze all first-quality yellowfin and also considerable quantities of big-eyed tuna, albacore, and miscellaneous species. Marlin, shark, broadbill swordfish, large big-eyed tuna, and yellowfin unfit for export were filleted and dry-frozen for the domestic market. About 90 tons of iced fish, mostly large first-grade big-eyed tuna and marlin, were sent to Japan aboard the training ship Umitaka Maru midway through the operation in order to take advantage of good prices prevailing in the Japanese domestic fresh-fish market.

FIGURE 6 - THE TAIRYO MARU NO. 23 (55 GROSS TONS) COMING ALONGSIDE THE TENYO MARU NO. 2. THIS WAS THE SMALLEST REGULAR LONG-LINE VESSEL PARTICIPATING IN THE EXPEDITIONS.

The eighth expedition started out with the same objective, although with

a smaller brine-freezing capacity (one tank of 3.7 ton capacity), and the limited clearance of the racks in the quick-freezing chambers made it necessary to fillet more of the large fish than was done on the Settsu Maru. Midway through this operation, however, developments in the export market caused some revision of processing procedures. First of all, word was received that Nippon Suisan was having trouble finding buyers for the yellowfin frozen aboard the Settsu Maru; then came the news that a high percentage of fish from the fifth expedition had been rejected by United States inspectors; and finally the growing and apparently successful agitation on the West Coast against imports of Japanese tuna made it appear that the export business might soon be completely gone. The reaction to these developments was the dispatch of three cargo vessels (the Banshu Maru No. 22, Banshu Maru No. 32, and Banshu Maru No. 35) to carry over 700 tons of iced fish to Japan. Another 137 tons of iced fish was loaded aboard the mothership in the closing days of the operation, and strenuous efforts were made to salvage everything that could be sold in the Japanese market. Unlike the Settsu Maru, the Tenyo Maru No. 2 crew had from the start been recovering and saving all the scrap meat from the heads and skeletons of the filleted tunas and marlin. Towards the end of the operation even the heads and the scraped bones were saved to be carried back to Japan and sold to eel culturists as feed.

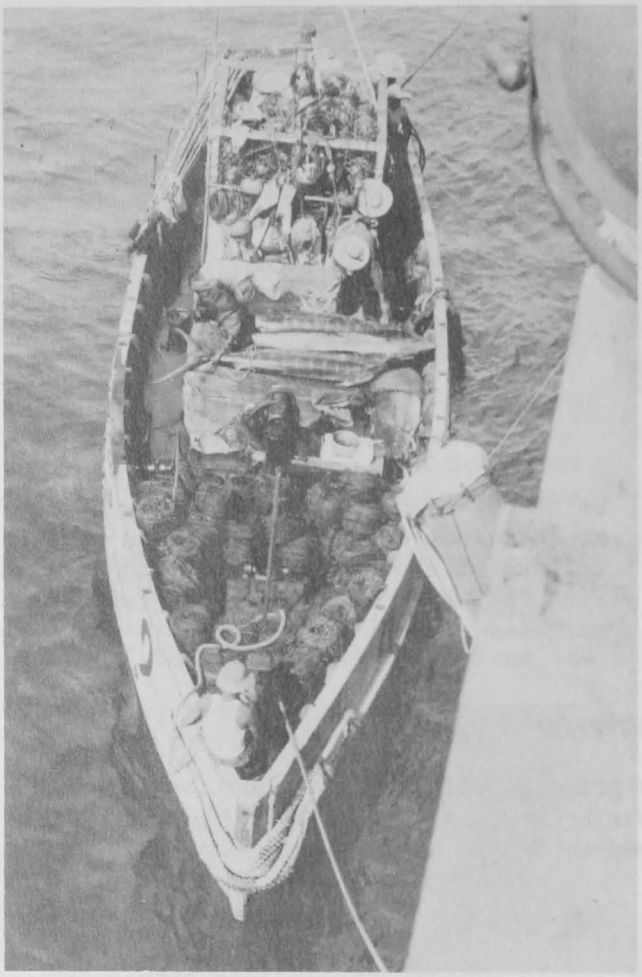

FIGURE 7 - A 30-FOOT KAWASAKI BOAT BRINGING A MORNING'S CATCH OF MARLIN AND TUNA TO THE MOTHERSHIP SETTSU MARU. NOTE SKATES OF LINE FORWARD, LINE HAULER AMIDSHIPS, GLASS FLOATS IN CORRAL ATOP THE ENGINEHOUSE, AND FLAG POLES IN RACK AFT.

No direct observations were made of the fish-processing techniques employed on the Tenryu Maru, mothership of the ninth expedition. It is known, however, that a failure of the refrigeration system of this vessel resulted in the loss of a large part of the catch and made the expedition quite profitless to the vessels that participated in it.

RESULTS OF THE EXPEDITIONS

The seventh expedition began its operations with a goal of approximately 8,270,000 pounds of fish, and this figure was exceeded with only a few extra days of operation over the originally-scheduled period. The over-all average catch rate (fish per 100 hooks

FIGURE 8 - WEIGHING BLACK MARLIN ABOARD THE MOTHERSHIP TENYO MARU NO. 2.

per day) for this expedition was 4.47, of which 2.09 were yellowfin tuna. The eighth expedition, operating almost exactly the same number of days and with the same number of catchers in its fleet, took about 7,048,130 pounds for an average catch rate of 4.04, of which 1.64 were yellowfin tuna. The report of the Taiyo Gyogyo Company on the eighth expedition blamed these rather poor results on the seventh expedition's having reduced the stocks of fish available for capture in the area, but the consensus of the fishermen seemed to be that the low catch rates were largely due to the poor quality of the bait supplied by the mothership. The much smaller ninth expedition made a total catch of 522,722 pounds with an even lower average catch rate of 3.55, of which 1.40 were yellowfin tuna. These results may be compared with the over-all average for the first nine expeditions, which caught 4.10 fish of all species per 100 hooks per day, of which 2.14 were yellowfin tuna. It is apparent that these last three expeditions found yellowfin tuna scarcer than their predecessors although, as indicated earlier, the fishermen concentrated in areas where they could make better weight on big-eyed tuna and marlin.

Table 2 - Catch Rates by the Seventh, Eighth, and Ninth Japanese Tuna-Mothership Expeditions

Species	Number of Fish Caught Per 100 Hooks Per Day Fished			
	Expedition			Average For Expeditions 1 Through 9
	7th	8th	9th	
Yellowfin tuna ..	2.09	1.64	1.40	2.14
Big-eyed tuna ...	0.93	0.80	0.88	0.62
Albacore tuna ...	0.06	0.16	0.10	0.07
Black tuna	<0.01	<0.01	<0.01	<0.01
Skipjack tuna ...	0.07	0.06	0.08	0.05
Black marlin	0.60	0.48	0.75	0.53
White marlin	<0.01	<0.01	<0.01	<0.01
Sailfish and short-nosed spearfish	0.04	0.04	0.03	0.04
Broadbill swordfish	<0.01	<0.01	<0.01	<0.01
Striped marlin ..	<0.01	<0.01	<0.01	<0.01
Sharks	0.57	0.75	0.14	0.54
Others	0.09	0.10	0.16	0.08
Total	4.47	4.04	3.55	4.10

< LESS THAN.

CONCLUSIONS

The postwar Japanese mothership-type tuna expeditions to Trust Territory waters were a response to a peculiar set of conditions existing at the time, and it appeared doubtful that any similar large-scale operations would be undertaken after the ratification of the Peace Treaty had removed the restrictions upon the free movement of Japanese fishing vessels. Independent boat owners and fishermen prefer to operate singly rather than with a fleet because of the greater freedom of action, the shorter duration of the voyages, and the generally higher prices re-

Table 3 - Prices Paid to Catchers of the Seventh Japanese Tuna-Mothership Expedition

Species	Grade	Price Per Pound 1/	Remarks
		U.S. Cents	
Yellowfin and Albacore Tuna	A	6.7	Round fish
	B	6.0	
	C	5.0	
Big-eyed Tuna	A	5.4	Gutted
	B	5.0	
	C	4.4	
Marlin and others	A	4.7	Marlin gutted, small miscellaneous fish round
	B	3.7	
Shark	-	2.0	Gutted and beheaded

NOTE: VALUES CONVERTED AT THE RATE OF 360 YEN PER US$1, AND WEIGHT ON THE BASIS OF 8.27 POUNDS PER KAN.

Table 4 - Prices Paid to Catchers of the Eighth Japanese Tuna-Mothership Expedition

Species	Grade	Price Per Pound 1/ U.S. Cents	Remarks
Yellowfin and Albacore tuna	A	7.0	Albacore round; yellowfin gutted during latter part of operation
	B	5.7	
	C	4.4	
	D	2.0	
Big-eyed tuna and Spearfish	A	5.4	Gutted
	B	4.0	
	C	2.0	
Small Yellowfin tuna	A	5.4	Round fish
	B	2.0	
Small Big-eyed tuna	A	4.4	Round fish
	B	2.0	
Wahoo	-	5.0	Round fish
Barracuda, dolphin, and sailfish	-	2.7	
Skipjack tuna	-	4.4	
Shark	-	2.0	Gutted

1/ VALUES CONVERTED AT THE RATE OF 360 YEN PER US$1, AND WEIGHT ON THE BASIS OF 8.27 POUNDS PER KAN.

ceived when fish are delivered directly to Japanese homeland markets. On the other hand, the big fishing companies seek employment for their idle freezerships between Antarctic whaling seasons, and there are many smaller long-liners which, lacking land bases at which to obtain fuel and ice, cannot fish the distant tropical tuna grounds without the support of a mothership.

Opinion among the supervisory personnel on the seventh and eighth expeditions concerning the future of Japanese tuna fishing in southern Pacific waters ran mainly along two lines. Men experienced in the prewar floating crab-cannery fishery in northern Pacific waters felt that similar shipboard canning of tuna could be carried on successfully and that it would result in a more efficient utilization of both fish and cargo space than the present freezing operations. There is little demand for canned fish in Japan, however, so the practicability of such a development would hinge upon the condition of the export market. Another school of thought held that the solution to the problem lay in building 300- or 400-ton long-liners with greater cruising range, better refrigeration facilities, and more adequate crew accommodations than the present boats. Such vessels would be capable of operating independently all over the South Seas and could bring back big fares of high-quality, high-priced fresh fish for the Japanese domestic market.

FIGURE 9 - SQUARING AWAY THE DECK OF THE MOTHERSHIP TENYO MARU NO. 2 PREPARATORY TO LEAVING THE FISHING GROUNDS. FILLET FREEZING PANS IN THE FOREGROUND.

Recent reports from Japan indicate that there is, in fact, a trend toward the construction of larger long-line boats equipped with brine tanks for the precooling of their catch. At the same time, the Japanese Government has shown a desire to reserve for single-vessel operations the area fished by mothership fleets under

SCAP regulations, forcing the motherships and their catcher boats out into more distant and less thoroughly-explored grounds. This policy would seem likely to have a discouraging effect on small-scale mothership enterprises like the ninth expedition, but it does not appear to have held back the big operators, as is evidenced by the fact that in the first summer season after the ratification of the Peace Treaty both the Nippon Suisan and the Taiyo Gyogyo companies sent large fleets into Southeast Asian waters. This region--the Celebes, Banada, and Flores Seas and the eastern Indian Ocean--proved to have rich tuna grounds as was shown by Japanese explorations before and during World War II. It will be interesting to see whether the results of this latest expansion of the high seas tuna fishery will be sufficiently rewarding to make mothership-type operations a permanent feature of the Japanese tuna industry.

LITERATURE CITED

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SHIMADA, BELL M.
1951. JAPANESE TUNA-MOTHERSHIP OPERATIONS IN THE WESTERN EQUATORIAL PACIFIC OCEAN. U.S. FISH AND WILDLIFE SERVICE, COMMERCIAL FISHERIES REVIEW, VOL. 13, NO. 6 (JUNE 1951), PP. 1-26 (ALSO AVAILABLE AS SEPARATE NO. 284).

PARTIAL LIST OF MANUFACTURERS OF FISHING GEAR AND ACCESSORIES

A Partial List of Manufacturers of Fishing Gear and Accessories, Fishery Leaflet 195, was recently revised by the Service's Branch of Commercial Fisheries. This list gives the names and addresses of sources of supply of automatic steering devices, baskets, oiled or rubber clothing, depth sounders, direction finders, diving equipment, oyster and scallop dredges, floats, gill-net lifters, hooks, hydraulic accessories, knives, leads, long-line gear, long-line haulers, navigational equipment, net-making supplies, net preservatives, nets, netting and twine, otter boards or doors, unloading pumps, radar equipment, radio-telephones, rakes and tongs, mechanical and electrical reels, vessel refrigeration, fiber rope, shark repellents, trawl makers, trolling equipment, winches, wire netting, and wire rope.

Free copies of Fishery Leaflet 195 are available from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

--Fishery Leaflet 195