

INTERNATIONAL

FAO COMMISSION URGES PROTECTION OF INDIAN OCEAN TUNAS

International action to prevent depletion of large tunas in the Indian Ocean was recommended in Oct. 1970 by UN commission meeting in Rome. The commission recommended development of the Ocean's vast fishery resources by scientific planning and cooperation.

The 28-nation group urged that "serious consideration" be given international measures to manage heavily exploited large-tuna species caught by longline.

The commission recommended that its 8-nation tuna committee be reconvened promptly with participation of all nations that fish tuna actively in the Indian Ocean.

Shrimp in Iran-Arabian Gulf

The commission also warned of the "urgent need" to manage the shrimp fisheries in the gulf between Iran and Arabian peninsula. Because these fisheries lie in waters under national jurisdiction, FAO was asked to notify the governments concerned and to promote

international action. A group will assess shrimp stocks in the gulf and elsewhere in the Indian Ocean.

Indian Ocean Commission

The Indian Ocean Fishery Commission is one of 6 FAO regional fishery bodies. It was established in 1967 to develop fishery resources to help meet increasing world demands for rich protein food.

The Indian Ocean covers almost one-fifth the earth's marine area. In 1968, it yielded 2,400,000 metric tons of fish of the world catch of 64,000,000 tons. Roy I. Jackson, FAO Assistant Director-General for Fisheries, has said the Indian Ocean's annual yield might be increased five times.

FAO operates many field projects in the Indian Ocean region under the UN Development Programme and the Freedom-from-Hunger Campaign. These include preinvestment surveys of fishing harbors in India and fishery surveys in Somalia.





A Korean child enjoys seafood meal. (FAO)

FAO STUDIES DISTRIBUTION OF PROTEIN-RICH FOODS

Methods of promoting distribution of new, protein-rich baby foods to millions of malnourished children were studied in Rome in Nov. 1970 by the Protein Advisory Group of FAO, UNICEF, & the World Health Organization. The group discussed current and future marketing operations for these foods in more than 10 countries and ways to expand their use in other parts of the world. A major obstacle is family resistance to unfamiliar foods.

Launching new foods is complex problem. The operation must consider local preferences and habits. Market and consumer research is necessary to collect information needed to establish new products.

Current Emphasis on Children

The current FAO study emphasizes provision of protein-rich foods for children because of grave effects of protein deficiency on mental and physical growth. However, the complete program seeks also to close the "protein gap" for millions of adults.

Unless major new sources of protein are developed, it is estimated that, by 1985, the shortage of protein in developing countries will amount to 3.6 million tons annually. This is equal to amount now consumed by the 6 Common Market countries.

'Superamine'

A successful program has been operational in Algeria since 1966. There, a protein-rich infant food, 'Superamine', was developed and marketed.

Superamine is a low-cost protein formula based on local raw materials: hard wheat, 28%, chick pea, 38%, and lentil flour, 19%. The formula is processed to form a pre-cooked mixture to which are added dried skimmed milk, 10%, sugar, 5%, vitamins, calcium, and vanilla flavoring.

N.A. Wilkie, FAO Food Promotion Officer, has reported: "According to the National 4-year Plan, Algeria will be producing 8,000 tons a year of Superamine by 1974.

"The Algerian government's confidence in the results of this program can be measured by its investment plans. Government funds have been allocated to finance 3 additional production plants in the period 1971/74. Its objective is to meet the annual dietary needs of between 200,000 and 300,000 infants, approximately all those suffering from acute or mild conditions of protein deficiency. It is an ambitious and challenging plan."

Nations Interested

Algeria already has shipped Superamine to help Nigeria, the United Arab Republic, and Tunisia. Recent test marketing of Superamine in the UAR showed that ready commercial market could be created for 1,000 tons a year, even without subsidized distribution. The UN is working with governments in North Africa, the Near East, and other regions to develop and market their own protein-rich infant food.

Similar projects are operational in Turkey, UAR and Yugoslavia. Tunisia, Cuba, Iran, Morocco, and Madagascar also are interested.

OIL POLLUTION HARMS MARINE LIFE, FAO CONFERENCE TOLD

Up to 10,000,000 tons of oil are spilled each year into the oceans. The oil has a toxic effect on all marine animals--and there is no effective method to neutralize it. The only way to prevent more pollution and preserve the ocean's protein-rich food is to prevent spillages. This was the theme of a paper presented by Max Blumer, Woods Hole Oceanographic Institute, Mass., to FAO's Technical Conference on Marine Pollution and its Effects on Living Resources and Fishing, in Rome, Dec. 9-18, 1970.

The conference attracted hundreds of marine biologists, oceanographers, and pollution experts from many nations to discuss the scientific basis and to recommend remedial action.

A prospectus prepared for conference warned that pollution is a spreading international problem, and that it is time for necessary countermeasures.

Oil is $\frac{3}{4}$ Pollution Incidents

Blumer estimated that oil pollution involves one to ten million metric tons of crude oil and oil products a year. In the U.S. alone, oil accounts for three-fourths of about 10,000 pollution incidents reported annually.

Countermeasures are effective "only if all the oil is recovered immediately after the spill," he said. However, no existing technology can do it. All proposals to clean away oil, such as dispersing it or sinking it, are inefficient because the oil continues to poison the marine environment in one form or another. Detergents and dispersants, supposedly nontoxic, are harmful to environment. This was shown in aftermath of Torrey Canyon disaster.

Oil Harms All Marine Organisms

Blumer challenged claims that oil pollution is not necessarily harmful to all marine organisms:

"All crude oils are poisons for all marine organisms. Many crude oil distillates are more severely poisonous because they contain higher proportions of the immediately toxic compounds. Long-term toxicity may harm marine life that is not immediately killed by spills, and oil can be incorporated into the meat of marine animals, making it unfit for human consumption. Crude oil and oil products may cause cancer in marine organisms. Even at very low concentrations oil may interfere with processes which are vital for the propagation of marine species."

He added that the most toxic oil compounds are water soluble. This makes recovery of oil slicks futile, except for esthetic improvement. "Treatment with detergents, even the 'nontoxic' ones, is dangerous because it exposes marine organisms to higher concentrations of soluble and toxic hydrocarbons and because it disperses oil into droplets that can be ingested and retained by many organisms."

Danger to Whole Ocean

Eventually, natural bacterial action decomposes spilled oil. But the most toxic oils disappear much more slowly than less harmful ones. The possibility exists that products of bacterial oil degradation may be more toxic than oil itself.

Blumer denied that marine animals will naturally avoid oil spills. Lobsters, for example, are attracted to crude oil distillates. This leads to severe contamination or death. It was also "highly improbable" that "tainted" fish and shellfish become edible again in time.

Blumer noted the damage done to Lake Erie and warned it could happen to the ocean over a longer period. "A polluted small lake can be reclaimed within a few years. Lake Erie may or may not be restored within fifty years, but a polluted ocean will remain irreversibly damaged for many generations."



EUROPE

NORWAY

CAPELIN FISHERY LOOKS GOOD AT LEAST UNTIL 1973

The Norwegian capelin fishery looks favorable until at least 1973, unless the greatly increased catch overtakes the resource. The 1970 catch exceeded 1,300,000 metric tons, about double 1969, and a record. Capelin became the main source of supply for fish meal when herring began to decline in 1968.

Problem Ahead

Recent investigations of the capelin resource indicate the 1970 recruitment was somewhat poorer than expected. The fishery seems to develop into an all-year operation with more units participating. So research scientists say it is questionable whether the stock can withstand continuous fishing. According to T. Monstad, there is danger of overexploitation and a shift in natural foundation if two or more years indicate continuous poor survival.

Questions Remain

Despite studies in recent years there are insufficient data to ascertain whether regulation should be started. It has been established that capelin grow during summer up to Oct.-Nov. Researchers feel that there should be no fishing during growth period to maintain foundation of stock. It is questionable whether minimum mesh size would maintain stock.

Optimism until 1973

Most recent investigations in the Barents Sea show evidence of capelin from 1967, 1968, and 1969 year-classes. The 1967 year-class was unusually good and is expected to spawn in 1971. Good year-classes also were found during 1968 and 1969. This indicates possibility of a useful capelin fishery at least until 1973. (Reg. Fish. Attache, U.S. Embassy, Copenhagen, Oct. 27, 1970.)



USSR

SOVIETS TRAIN WOMEN AQUANAUTS

Three women aquanauts are being trained for marine research in the Chernomor Underwater Laboratory on the Black Sea. The first part of their training included pressure-chamber work at depths of 12, 30, 60, and 100 meters. After they complete a course in aqualung diving, they will be ready to join the Chernomor team. ('Moscow News', Oct. 13, 1970.)

Tektite II Girls First

[Ed. Note: The Soviets are claiming a "first": "until now there have been no women aquanauts either in the Soviet Union or abroad." Actually, in summer 1970, 4 U.S. women scientists participated in "Tektite II" in the Virgin Islands.]

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SOVIETS BEGIN ANTARCTIC WHALING SEASON

Three Soviet whaling factoryships have sailed for Antarctica: 'Sovetskaia Ukraina', Oct. 7, from Odessa; 'Iurii Dolgorukii', Oct. 11, from Leningrad; and 'Sovetskaia Rossiia', Oct. 15, from Vladivostok. These fleets participated in 1969 Antarctic season.

It is the 25th trip for the Sovetskaia Ukraina.



ASIA

JAPAN

TUNA ASSOC. PROPOSES REGULATING S. BLUEFIN TUNA FISHERY

The Federation of Japan Tuna Fishery Co-operative Associations (NIKKATSUREN) has proposed a preliminary plan to regulate the Japanese southern bluefin tuna fishery. Its purpose is to set up voluntary restrictions on longline fishing to protect declining resource.

Areas To Be Affected

The proposal would restrict entry of Japanese vessels in these areas during specified periods: (1) Great Australian Bight--Oct. to Mar.; (2) off Sydney--Mar. to July; (3) off South Africa--Oct. to Mar.; and (4) west of Australia in "Okiku" ground--Dec. to Mar. The "Okiku" grounds are bluefin spawning area.

The waters off Sydney are migrating route for young bluefin. The other two areas are where percentage of small fish in catch markedly increases seasonally. At present, about 250 Japanese longliners are fishing areas to be restricted.

What NIKKATSUREN Foresees

The Japanese longline catch of southern bluefin off Australia and South Africa has decreased in recent years: from record 70,000 metric tons in 1960 to 44,000 tons in 1968. This indicates bluefin resource is in danger without controls.

If its proposal is implemented, NIKKATSUREN explained, the average age of southern bluefin taken will increase from present 6 years to 6.5 years; as a result, the fish would be larger.

While total catch during first year of the regulatory program would decrease, the previous catch level (as in 1960) would be restored and surpassed after several years. Also, the spawning rate would increase by 20%; at present, it is estimated to be less than one-tenth of that under natural conditions (when there is no fishing). ('Minato Shimbun', Oct. 16, 1970.)

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OCEAN DEVELOPMENT CENTER PLANNED

The Japanese plan to build a semi-governmental development center on a 66,000-sq.-meter plot at Oppama, Yokosuka, Kanagawa Prefecture. Patterned on a French center, it will be the first in Japan.

The Center's Facilities

The center will have sea labs (completed by spring 1971) a deep-sea diving simulator, diving training pool, water tanks, and multi-purpose labs with a staff of 229.

Also, a 4-man undersea habitat will be built at 100 meters in Sagami Bay near Yokosuka.

Private industry, universities, and government agencies will be allowed to use center for research in oceanography, ocean engineering, diving, geology, and fishery studies.

The center will serve as base port for the 'Shinkai', a deep-sea research vessel owned by STA.

How Financed

The center will be financed by KEIDANREN (Federation of Economic Organizations) and Science and Technology Agency (STA). The first 5-year program will begin in fiscal year 1971 (starts Apr. 1971) and cost 6,500 million yen (US\$18,055,000). Projects for first year are expected to cost KEIDANREN 2,000 million yen (\$5,555,555) and government (STA) 150 million yen (\$416,666). The government will send necessary bill to the Diet. ('Japan Times', Sept. 29, 1970.)

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NEW PRESERVATIVE FOR MEAT & FISH DEVELOPED

A synthetic liquid preservative has been developed in Gumma Prefecture. When sprayed on meat or fish, it will keep them fresh 4 to 5 times longer than an untreated product.

The major ingredients are pyroligneous acid (charcoal byproduct), lactic acid, sodium chloride, and lemon essence. It is said the

JAPAN (Contd.):

new preservative is free from such poisonous substances as formalin and methyl alcohol.

Useful in Major Items

A recent test proved that meat sprayed with new preservative remained fresh for 4 days; unsprayed meat spoiled after only 1 day. The preservative is supposed to be especially useful for meats and chicken, which are highly perishable. Fish and shellfish also can be treated effectively.

One liter of the preservative (enough to treat 1,000 chickens) costs 400-500 yen (\$1.11-1.39). Patent rights are being applied for. ('Mainichi Shimbun', Oct. 10, 1970.)

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SCIENTISTS OBTAIN LIQUID PROTEIN FROM KRILL

Japanese scientists have succeeded in producing liquid protein from euphausia, a shrimp only 3 to 4 centimeters long caught by Kyokuyo Hoge Co. during past Antarctic whaling season. The work was done in the Tokai Regional Fisheries Research Laboratory of the Japanese Fisheries Agency on an FY 1970 budget of 400,000 yen (\$1,111).

The laboratory researchers believe that this liquid protein, when commercially produced, can be used in manufacture of soup flavors, pet foods, and snack foods. The shells will be used to produce feed.

Heated With Enzymes

When Antarctic euphausia is heated with enzymes at 20^o-30^o C. for 4-5 hours, it is reduced to a mash (42% water, 42% protein, 0.1% fat, 7.2% ash, and 8.7% sugar).

The laboratory plans to begin commercial production in 1971. If successful, it will go on to study products from mackerel and jack mackerel. ('Shin Suisan Sokuho')

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BRISTOL BAY CRAB FLEETS REACH QUOTA

The 2 Japanese crab fleets accompanied by factoryships 'Keiko Maru' (7,536 gross tons) and 'Koyo Maru' (7,658 gross tons) attained their goals by late Sept. 1970: tanner

crab catch quota and combined production goal of 85,000 cases ($\frac{1}{2}$ -lb. 48s) of king crab. The fleets had been operating in Bristol Bay crab fishery since March.

Keiko Maru returned home on Sept. 26, and Koyo Maru on Oct. 8.

Commander's Evaluation

The Koyo Maru fleet commander said condition of king-crab resource has not changed much and present catch allocation is good. He noted that the size of king and tanner crabs in 1970 was same as in 1969--but somewhat smaller than 7 or 8 years ago.

The king-crab catch rate per "tan" in 1970 by Koyo Maru fleet was slightly higher than 1969 average of 6.9 crabs. ('Suisan Keizai Shimbun', Oct. 19, 1970.)

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JAPANESE TRAWL FISHING IN NORTHWEST ATLANTIC

In mid-Oct. 1970, four Japanese stern factory trawlers (2,500-gross-ton class) were fishing in northwest Atlantic area of International Convention for the Northwest Atlantic Fisheries (ICNAF). These were: 'Zao Maru' (2,530 gross tons), 'Shirane Maru' (2,528 GT), 'Tokachi Maru' (2,501 GT), and 'Suzuka Maru' (2,500 GT), all owned by Nihon Suisan. These trawlers were dispersed over wide area to conduct detailed ground-fish survey.

Fishing Egg-Bearing Herring

But in Oct., fishing was concentrated on egg-bearing herring; ocean perch and argentinies also were caught. Fishing in 1969 showed egg-bearing herring abundant in ICNAF area during October-early November.

Squid Fishing in December

From December 1970, when squid fishing begins to pick up, stern trawlers will start concentrating on squid. These vessels are likely to be joined by about 10 other trawlers from squid and octopus fisheries off Spanish Sahara and Mauritania. Thus, as in 1969, about 14-15 Japanese trawlers are likely to fish in ICNAF area during coming squid season. ('Suisan Tsushin', Oct. 12, 1970.)

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JAPAN (Contd.):

SKIPJACK-TUNA FISHING IS GOOD
IN SOUTHWEST PACIFIC

A Japanese-Australian joint company (Gollin Kyokuyo), exploring pole-and-line skipjack fishing off New Ireland (east of New Guinea), reports good fishing. Seven 40-gross-ton wooden vessels are active. Catch per vessel averages 5 metric tons a day. Most landings were frozen and shipped to Japan, where they sold for 120 yen a kilogram (US\$302 a short ton).

Commercial Fishing Feasible

Survey off New Guinea began in Mar. 1970. It has found skipjack and baitfish abundant. Indications are that the area definitely can support full-scale commercial fishing.

A company official explained that he would like the line-and-pole operations mechanized, and the wooden vessels replaced with steel or fiberglass hulls (because of heavy infestation of wood borers). ('Suisan Keizai Shimbun', Oct. 13, 1970.)

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PURSE SEINERS EXPLORE FOR
TUNA IN SOUTHWEST PACIFIC

Two Government-subsidized purse seiners are exploring for tuna in the southwestern Pacific. The 'Taikei Maru No. 23' (210 gross tons) departed Japan Oct. 15, the 'Tokiwa Maru No. 58' (357 gross tons) Nov. 17, 1970.

The vessels are surveying two areas: (1) off Palau; and (2) off northern New Guinea. ('Minato Shimbun', Sept. 27, 1970.)

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FISH SPINY LOBSTER
OFF MOZAMBIQUE

In September 1970, a Nichiro Fishing Co. vessel landed 20 metric tons of spiny lobsters caught off Mozambique (southeast Africa). The average weight was 200 grams. Nichiro expects to find a good market in Japan. If sales are successful, lobster fishing may be expanded.

Nichiro estimates that a year of exploratory fishing is required before commercial fishing can be started.

Local Fishermen Use Pots

The lobster grounds are outside Mozambique's 12-mile fishery zone. Local fishermen are fishing lobsters with pots. More Japanese trawlers could arouse their protests.

Nichiro Experience

Several years ago, another Nichiro trawler took about 10 tons of lobsters in the same area. The lobsters were quick frozen and sold in Japan at US\$0.88-1.01 per lb. This year (1970), Nichiro is boiling, freezing, and packing the lobsters and expects to sell them at \$1.26-1.51 per lb.

The good catch has stimulated interest in other companies, which are watching Nichiro's sales. ('Minato Shimbun')

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BUILDS THIRD
5,000-GROSS-TON TRAWLER

The 5,000-gross-ton stern trawler 'Ohtori Maru' was scheduled to be launched Oct. 30, 1970, at the Maizuru Heavy Industries shipyard. The vessel was ordered by Ohtori Suisan Co., established jointly by Kyokuyo Hoge and Tokunaga Kabushiki Kaisha companies. It will be the third 5,000-ton trawler to be built in Japan. The other 2 are 'Yamato Maru' (Nihon Suisan Co.) and 'Rikuzen Maru' (Hokoku Suisan Co.).

Production Capacity

Ohtori Maru will be equipped with quick-freezing capacity of 70 metric tons; "surimi" (minced meat) production capacity of 40 tons a day; and a meal plant capable of processing daily 125 tons of fish. After completion in late Feb. 1971, the vessel will be sent to Bering Sea.

Its Dimensions

Main specifications: overall length 105 meters (344.4 feet); width 17.6 meters (57.7 feet); depth 11 meters (36.1 feet); and main engine 5,900 hp. ('Nihon Suisan Shimbun', Oct. 14, 1970.)

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JAPAN (Contd.):

EXPORTS USED FISHING VESSELS

The Japanese exported 54 used fishing vessels (including 23 tuna longliners) during April-Sept. 1970.

Of the 54, 24 (14 tuna longliners) went to S. Korea; 10 (6 trawlers, mostly shrimp) to Indonesia; 9 to Panama; 5 to the Philippines; and 6 to other countries.

S. Korea Receives Many

Exports to S. Korea included a 200-gross-ton refrigerated carrier and vessel parts for two 120-ton trawlers, three 100-ton trawlers, and over 600 small coastal fishing craft. The vessels were supplied in accordance with the fishery cooperation fund provided by Japan. ('Suisancho Nippo', Oct. 16, 1970.)

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SUCCESSFULLY RECRUIT
U.S. TUNA FISHERMEN

Susumu Sugano, president of the Japan Overseas Purse Seine Fishing Co., reportedly signed 7 U.S. tuna fishermen during a recent trip to San Diego. They will serve aboard 1,000-gross-ton Japanese purse seiner now being built in Japan. It's a 1-year contract beginning in Feb. 1971.

The 7

The 7 men are a fishing captain, deck boatswain, winch man, seine skiff operator, two speedboat operators, and a net man. They are scheduled to visit Japan twice during construction of the seiner to give technical advice. The ship's master and the chief engineer will be Japanese.

Plan for Vessel

The vessel is scheduled to be completed late Feb. 1971. It will fish in eastern Pacific yellowfin tuna regulatory area during open season. Then it will proceed to Atlantic fishing grounds. ('Suisan Keizai Shimbun', Oct. 15, 1970.)

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FROZEN ALBACORE TUNA EXPORT
PRICE TO U.S. HITS HIGH

In mid-Oct. 1970, the price for Japanese frozen round albacore exports to the U.S. reached a high of c. & f. US\$800 a short ton for delivery to California tuna packers. This is an increase of \$250 a ton in 1½ years.

U.S. Demand Rises

The price increase is attributed to rising U.S. demand for albacore. It has put that species in short supply because annual world catch for years has been around 200,000 metric tons. ('Suisan Tsushin', Oct. 14, 1970.)

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FISH FLOUNDER OFF WESTERN
KAMCHATKA & IN BERING SEA

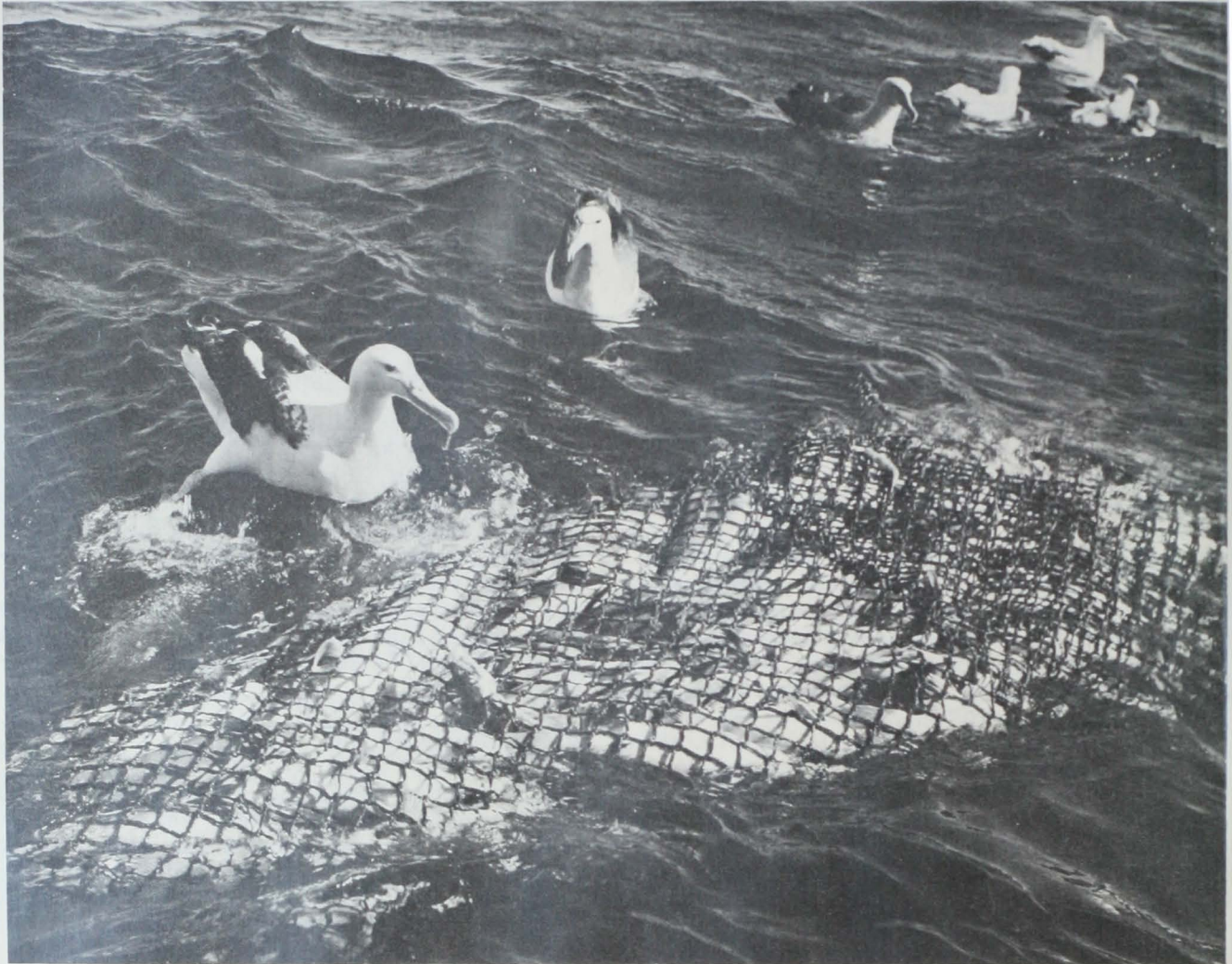
In 1968, a decline in flounder stocks off west Kamchatka forced 3 Japanese firms (Hokoku Suisan, Hoko Suisan, Hakodate Kokai Gyogyo) to suspend fishing. In 1969, only the 'Nojima Maru' fleet of Hokoku Suisan again fished flounder off western Kamchatka. Fishing was "reasonably good" because the flounder resource had recovered. Processing part of the catch into fillets resulted in a financial gain that was "better than keeping the mothership at dock."

Vessel Lengthened

To use the 'Kashima Maru' (about 7,000 gross tons), now a reefer, as a full-time mothership for year-round flounder fishing in Bering Sea, Nippon Suisan lengthened vessel by 10 meters in fall 1970. It replaced existing meal plant with a larger one to use more efficiently the waste from filleting.

The Kashima Maru fished during 3 winter seasons. In winter 1967/1968, for first time, it suffered a large deficit from fishing in Gulf of Alaska. Fishing the Bering Sea, however, for the 2 winter seasons 1968/1969 and 1969/1970 was better. The market for flounders processed in Bering Sea (Nov. to Mar.) was especially good. Nippon Suisan is confident that year-round fishing in Bering Sea will prove profitable. ('Minato Shimbun')





The cod bag breaks surface several yards from trawler, while hungry Royal Albatrosses and Yellow-browed Mollymawks cluster round and try vainly to take fish through mesh. (Royal Albatross extreme left and distant right.)

Sea birds are constant companions, day and night, of the trawler. Albatrosses may travel as much as 600 miles back to their young on the Campbell or Southern Islands of New Zealand with food. (FAO)

SOUTH PACIFIC

AUSTRALIA

REPORT ON FISHING VESSELS & PEOPLE

In 1968-69, there were 9,244 vessels and 16,460 persons in Australia's general fisheries. Value of vessels and equipment was US\$70,418,000. The data are incomplete because fishing is seasonal and many fishermen are part-timers.

Number & Value of Vessels

The highest number of vessels was registered in South Australia--2,591; then, New South Wales, 2,345; Western Australia, 1,412; Queensland, 1,349; Victoria 871; Tasmania, 566; and Northern Territory, 110.

Western Australia vessels and equipment were valued at \$16,065,000; Queensland \$14,597,000; South Australia \$11,024,000; N.S.W. \$8,905,000; Victoria \$7,051,000; Tasmania \$6,705,000, and Northern Territory \$6,135,000.

Value of Vessels Rises

There has been a gradual decline in vessels since 1964/65, when 9,426 were registered. In 1967/68, the total increased to 9,354; it dropped again to 9,244 in 1969.

However, the value of boats and equipment increased from \$40,041,000 in 1964/65 to \$56,601,000 in 1967/68; it reached US\$70,419,000 in 1968/69.

Thirty-three boats operated in the pearl shell and trochus shell fisheries. Three

whale chasers operated from one shore station in Western Australia.

Queensland was the only State with vessels listed at 100 ft. and over (9). The largest number was in 20-ft. and under 30-ft. bracket. In this category, South Australia had 1,851; New South Wales 1,690; Queensland 471; Victoria 252; Tasmania 99, and Northern Territory 37.

Western Australia registers its boats under different classifications. There were 50 boats 55 ft. and over; 205 35 to 55 ft.; and 346 over 25 ft. and under 35 ft.

People

In 1968-69, 16,460 persons worked in general fisheries, compared with 14,965 in 1967-68, and 11,414 in 1964-65.

In 1968-69, south Australia had highest number--4,361; New South Wales had 3,471; Western Australia 2,785; Queensland 2,539; Victoria 1,571; Tasmania 1,160; and Northern Territory 573.

In 1968-69, another 1,425 persons worked in edible oyster industry, compared with only 997 in 1964-65 season. In pearl and trochus shell fishery, there were 473 people, compared to 997 in 1964-65.

Whaling had changed only slightly: 48 working at sea in 1969, compared with 45 in 1964-65; 32 on shore against 38 for same periods. ('Australian Fisheries', Sept. 1970)

