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Fisheries of Japan and its Lessons to India

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Excitement like most emotions is unpredictable in the nature and degree of its manifestation. It may be just a piece of less known art, but yet excite a few into as much of rapture as a renowned canvas of a da Vinci or a Monet or a Van Gogh would. What to some may be just random splashes of grays, blues, reds, browns and greens of a setting sun, may yet evoke sublime emotions in others. Emotional perceptions excited, a few may discover music in brooks, derive sermons from stones and the very air they breathe might hold for them an inexplicable something. But the most exciting of all is the prospect of a journey and anticipation, knows no age, clime or time. And when it is a long awaited journey, the heat of excitement it generates reaches its height as the day of journey arrives. My trip to Japan was one such and I was as excited as a five year old on that sultry March morning when I boarded the A I Flight No. 406 on the first lap of my journey to that fabulous, fantastic and elegant country.

Who does not know Japan — the land of the Cherry Blossom ('Sakura' to the Japanese)? Consisting before the war, of about thousand small islands, Japan to-day is reduced to the four large islands (Fig. 1) : *Hokkaido*, the most

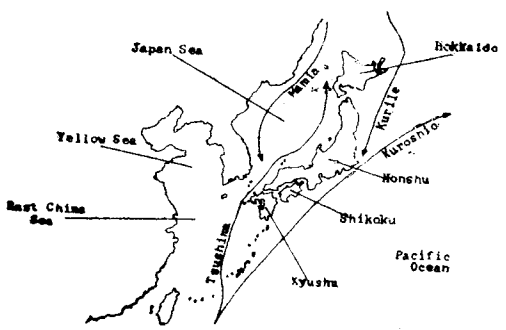

Fig. 1. Map of Japan

northerly, is a little smaller than Ireland; *Honshu* or Mainland is approximately equal in area to Great Britain; *Shikoku*, lying south of the Inland Seto Sea, is about as large as Wales; and *Kyushu* is almost half the size of Ireland. Stretching from north to south between the latitudes of 24°N and 46°N, over a

thousand miles and separated from China by the shallow Sea of Japan, this chain of thousands of small islands gives the appearance of a 'necklace of pearls' with the four large islands representing the big centrally placed pearls in the string. Off Japan's east coast, the Pacific Ocean is its deepset. With an area of about 3,69,000 sq. km. she is 20% larger than Maharashtra (Table I) the largest

TABLE I.

Name of State	Area in sq. Km.	Name of State	Area in sq. Km.
Maharashtra	3,07,500	Orissa	1,55,800
Andhra	2,74,700	Tamil Nadu	1,20,800
Mysore	1,92,200	West Bengal	87,900
Gujarat	1,87,100	Kerala	38,900

maritime state of India, and about as much smaller than the largest state of India (Madhya Pradesh : 4,42,841 sq. km.). Also given in the table are the areas of the other maritime states of India to facilitate comparison. The table helps also to emphasise how small Japan is if the area of entire India is taken into consideration. But to-day she is next only to the United States in her economic prosperity and it is now common knowledge that she has achieved this pinnacle within a short span of 25 years starting from scratch in 1947 soon after the last world war. It seems beyond doubt that establishment of many industries both big and small has been the major contributory factor towards this extraordinary economic progress and prosperity of the country. Among the less acknowledged, nevertheless equally important activity has been the establishment of the fishing industry based on sound knowledge gathered with meticulous care on the fish and fisheries of the country which is concern of this article. Table II shows position of the fishing industry in the nati economy in 1965.

TEBLE II

	All industries (1)	Fishing Industry (2)	2/1
National income (million dollar)	62,400	1,160	1.9
Exports (million dollar)	8,452	330	3.9
Imports (million dollar)	8,169	104	1.3
Workers engaged (x 1000)	47,480	612	1.3

Source . Japanese Fisheries 1967 : Overseas Te nical Cooperation Agency, Tokyo, Japan

1. Fish and Fisheries

To understand the supremacy of th fisheries wealth of Japan, no approach is bett than to compare it with the fisheries wealth o other countries. Before World War II, th highest fish catch including fish farming amounted to only 4,330 thousand metric ton in 1936. The fishery production was severel hit by the War resulting in a reduction by hal Reaching the pre-war highest level of 4,82 thousand metric tons in 1952, it continued t increase favourably so that in 1962 it recorde a catch of 6,864 thousand metric tons. There was a momentary fall during 1963 and 1964 It started to go up from 1965 onwards. During 1966 to 1971, a steady increase was recorde and a catch of 9,895 thousand metric ton of fish was landed in 1971 (Table III)

TABLE III

Catches in thousand metric tons, landed by eleven leading countries of the World during the years from 1966 to 1971.

(Source: Year Book of Fishery Statistics, FAO, Vol. 32, 1972, F. W. Fresh Water; D: Diadromous; M. Marine).

Country		1966	1967	1968	1969	1970	1971	Name of Continent	Rank in Continent	Rank in World
J. S. A.	F. W.	49.8	48.4	35.9	37.5	37.1	34.7			
	D.	238.0	162.8	225.2	177.8	236.2	183.8	North	1	5
	M.	2235.5	2199.9	2176.2	2248.6	2441.0	2548.3	America		
	Total	2523.3	2411.1	2437.3	2463.9	2714.3	2766.8			
	F. W.	29.5	25.9	28.7	29.3	22.7	17.5			
ıada	D.	116.0	96.8	117.5	73.0	108.7	97.8	North	2	8
	M.	1200.5	1173.0	1352.5	1302.5	1246.1	1173.9	America		
	Total	1346.0	1295.7	1498.7	1404.8	1377.5	1289.2			
	F. W.	80.0	80.0	80.0	80.0	80.0	80.0			
u	D.	0.0	0.0	0.0	0.0	0.0	0.0	South	1	1
	M.	8764.5	10118.6	10475.5	9163.6	12532.8	10531.4	America		
	Total	8844.5	10198.6	10555.5	9243.6	12612.8	10611.4			
	F. W.	43.4	47.2	56.4	56.7	58.5	75.6			
an	D.	182.1	209.3	178.3	205.1	181.0	194.9	Asia	1	2
	M.	6878.1	7595.4	8435.7	8351.6	9096.0	9624.0			
	Total	7103.6	7851.9	8670.4	8613.4	9308.5	9894.5			
	F. W.	477.5	536.8	621.7	693.2	670.5	690.2			
ia	D.	20.0	7.9	8.6	8.5	10.6	12.4	Asia	2	6
	M.	869.7	855.7	895.3	903.3	1064.8	1142.2			
	Total	1367.2	1400.4	1525.6	1605.0	1745.9	1845.0			
	F. W.	83.5	81.5	81.1	85.8	107.3	100.4			
land	D.	0.0	0.0	0.0	0.0	0.0	0.0	Asia	3	10
	M.	624.6	765.6	1007.7	1183.8	1487.8	1471.2			
	Total	708.1	847.1	1088.8	1269.6	1595.1	1571.6			

Country		1966	1967	1968	1969	1970	1971	Name of Continent	Rank in Continent	
U.S.S.R.	F. W.	410.1	444.8	396.5	387.4	410.1	467.8			
	D.	631.7	610.7	572.7	530.5	689.6	706.2	Europe	1	
	M.	4307.0	4712.7	5112.9	5580.5	6152.5	6162.7			
	Total	5348.8	5777.2	6082.1	6498.4	7252.2	7336.7			
Norway	F. W.	0.0	0.0	0.0	0.0	0.0	0.0			
	D.	381.9	405.1	524.5	680.9	1302.9	1373.2	Europe	2	
	M.	2483.1	2845.3	2279.6	1800.1	1677 3	1701.7			
	Total	2865.0	3250.4	2804.1	2481.0	2980.2	3074.9			
Spain	F. W.	9.0	9.0	9.0	9.0	9.0	Data			
	D.	3.7	3.6	3.7	4.3	4.8	Not	Europe	3	
	M.	1350.3	1429.2	1502.6	1482.7	1482.8	Available			
	Total	1363.0	1441.8	1515.3	1496.0	1496.6				
Denmark	F. W.	0.4	0.4	0.3	0.3	0.2	0.2			
	D.	20.5	22.5	25.9	18.0	14.9	17.9	Europe	4	9
	M.	829.9	1047.5	1440.6	1257.1	1211.4	1382.8			
	Total	850.8	1070.4	1466.8	1275.4	1226.5	1400.9			
U. K.	F. W.	0.0	0.0	0.0	0.0	0.0	0.0			
	D.	3.4	3.3	2.4	2.7	2.2	2.8	Europe	5	11
	M.	1065.4	1022.9	1037.8	1080.0	1096.8	1104.5			
	Total	1068.8	1026.2	1040.2	1083.0	1099.0	1107.3			
World		57500	61100	64300	62900	69300	69400			

The table shows also that during these years i.e., 1966-1971, Japan has been next only to Peru the leading country in World Fisheries. In Asia she has always held the top position. In common with the other leading fish producing countries, the Sea Fish Fisheries have been the major contributors to the fisheries wealth of the country, the average contribution of the Fresh Water Fisheries amounting hardly to 1% of the total catch and that of the Diadromous Fisheries to 2%.

2. Sea Fisheries

In view of the importance of the Sea Fish Fisheries to the fisheries wealth of the country, it merits a closer study by itself. The two main Fishery Types responsible for the prime position of the Sea Fisheries are: (1) the Distant Waters Type and (2) the Coastal and Offshore Waters Type (Table IV). Though Trawlers contribute the maximum catch followed by the Tuna long lines and the Skipjack pole-and-line. In the Coastal and Offshore Waters type, the Purse seines, Medium trawls, Squid angling and Gill nets, in that order of abundance, are the most important major contributors. Also the contribution of sea fisheries of coastal waters is very meagre

TABLE IV

Catch in quantity (metric tons) by fishery type, 1965—70.

Fishery type	1965	1966	1967	1968	1969	1970
ea Fisheries	6,381,629	6,557,646	7,241,370	7,993,048	7,975,928	8,597,761
istant Waters	1,733,169	1,912,336	2,402,582	2,830,343	3,165,260	3,429,038
arge trawls	1,089,703	1,276,906	1,839,530	2,266,292	2,594,189	2,883,058
una long lines	441,406	403,370	354,390	341,069	313,270	276,028
kipjack pole. and line	131,952	168,279	142,294	125,948	145,767	162,195
thers	70,108	63,781	66,368	97,034	112,034	107,757
oastal and Offshore Waters	4,648,460	4,645,310	4,838,791	5,162,704	4,810,668	5,168,723
edium trawls	574,290	528,531	583,417	572,391	607,918	765,490
rse seines	1,315,988	1,276,124	1,199,553	1,531,144	1,484,453	1,697,241
nets	270,380	303,589	363,527	365,414	358,253	384,386
id angling	386,955	378,502	471,958	649,056	467,491	403,692
ers	2,100,847	2,158,564	2,220,336	2,044,699	1,892,553	1,917,914

ce: Fisheries Statistics of Japan, 1970: Statistics and Information Department, Ministry of Agriculture and Forestry, Government of Japan, Tokyo, Japan.

ptible contributions are made by Sea urce and Whaling, the former registered a ly increase but the latter recorded a e. In the Distant Waters type, large when compared to the sea fisheries of offshore waters (Fig. 2). But together they are far more important than the distant waters type.

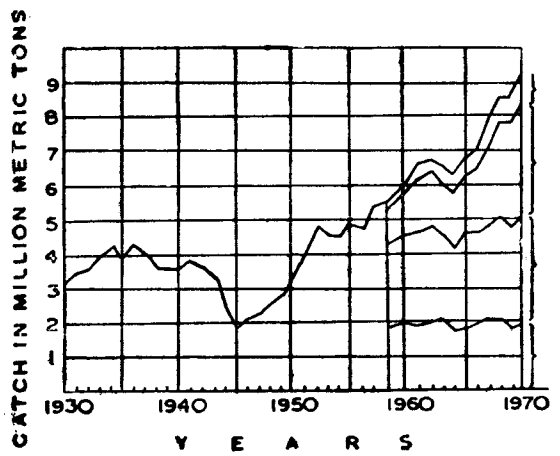

Fig. 2. Fishery Production of Japan, 1930–1970

3. Categories of Resources

Among the major six groups that comprise the Sea Fisheries, the Fishes account for 80% of the total catch (Table V). The Crustaceans to which belong the prawns, the lobsters, the crabs, etc.; the Molluscans comprising of the squids, cuttle fishes, octopuses, abalone, clams and scallops; the Echinoderms (sea urchins, the sea cucumbers etc.); the Mammals, excluding the whales; and the Sea Weeds, in the order of abundance mentioned, are the other groups of importance, Among the Fishes, the most important contributer is the Alaska pollack which starting with a contribution of only 775,000 metric tons in 1966 reached an awesome figure of 23,47,000 metric tons in 1970, registering a three fold increase. The next important contributor is the Mackerel which also registered a tremendous increase (about two times) during the corresponding period. The Anchovy, the Tunas, the Skipjack and Frigate mackerel, the Jack mackerel and scad, the flounders and halibut are the

TABLE V

Catch (excluding whaling) in quantity (metric tons) by species, 1965–70

Species	1965	1966	1967	1968	1969	1970
GRAND TOTAL	6,907,569	7,102,482	7,850,780	8,670,137	8,613,422	9,314,66
Sea Fisheries	6,381,629	6,557,646	7,241,370	7,993,048	7,975,928	8,597,76
Fishes	5,078,229	5,214,912	5,712,303	6,307,788	6,528,305	7,245,35
Albacore, tunas	430,290	398,330	367,324	352,887	332,749	291,01
Skipjack, frigate mackerel	166,802	258,816	211,202	191,439	209,378	231,90
Anchovy	405,906	407,665	365,240	357,668	376,801	365,47
Jack mackerel, scad	560,487	514,388	423,352	358,092	340,588	269,31
Mackerels	668,574	624,423	687,474	1,015,279	1,011,406	1,301,91
Flounders, Halibut	216,266	272,969	299,708	261,017	296,367	295,41
Alaska pollack	690,895	774,788	1,247,003	1,606,025	1,944,320	2,346,71
Others	1,939,009	1,963,533	2,111,000	2,165,381	2,016,694	2,413,61
Crustacea	131,431	141,632	148,296	185,440	152,753	145,50
'Kuruma' prawn	2,915	2,268	2,031	1,573	1,290	1,26
Other prawns and shrimps	63,374	66,227	58,599	64,440	56,593	52,88

Queen crab	16,380	19,487	31,864	61,679	52,311	53,265
Others	48,762	53,650	55,802	57,748	42,559	38,092
Mollusca	870,763	875,911	992,631	1,161,867	992,055	935,864
Common squid	396,902	382,899	477,012	668,364	478,160	412,240
Short necked clams	121,249	157,511	121,618	120,401	116,572	141,997
Others	352,612	335,501	394,001	373,102	397,323	381,627
Echinoderms	46,292	52,663	60,090	55,151	51,800	57,764
Marine mammals	2,277	2,374	1,033	1,288	1,026	1,512
Sea Weeds	252,637	270,152	318,017	281,513	249,991	211,760
Kelps	126,680	155,757	175,883	169,874	147,580	110,780
Others	125,957	114,395	142,134	111,639	102,411	100,980
Sea Cultures	379,696	405,195	470,137	521,941	473,293	549,082
Yellow Tail	14,799	16,875	21,169	31,777	32,722	43,300
Pearl	99	118	125	112	97	85
Oyster	210,603	221,139	232,200	267,388	245,458	190,799
'Nori' Sea Weed	140,753	128,440	157,550	144,969	134,320	231,464
Others	13,442	38,623	59,093	77,695	60,696	83,434
Inland Water Fisheries	113,148	103,266	97,421	103,212	112,157	119,364
Inland Water Cultures	33,096	36,375	41,852	51,936	52,044	48,455

Source : Fisheries Statistics of Japan, 1970; Statistics & Information Department, Ministry of Agriculture & Forestry, Government of Japan, Tokyo, Japan.

other important contributors. Among the crustaceans, the Queen crab contributes the most closely followed by the prawns and shrimp (excluding the 'Kuruma' prawn). The common squid is the most important contributor among the molluscs. With a fairly good contribution, the short necked clam is the next important contributor. Kelps are the important component of the Sea Weeds. In Sea Cultures, 'Nori' sea weed is the most important contributor closely followed by the Oyster. Although the contribution of Yellow tail is not impressive when compared with that of either 'Nori' or Oyster, an increase by two times is seen over the years from 1966 to 1970. The most significant feature of sea cultures is the considerable fall in pearl culture from 125 metric tons in 1967 to 85 metric tons in 1970. This fall, I was told, was not only due to a fall in the prices of pearls all the world over but also is a consequence perhaps of a change in fashions to one of mini-skirts. The reduction in the natural resources itself is the cause for the fall in whaling. According

to some authorities a few species are so abundantly exploited that extinction is imminant. Fig. 3 shows the contributions of the major species by value as realised in 1970 (Total Yield: 969, 156 million yens; From Sea Fisheries: 785,149 million yens).

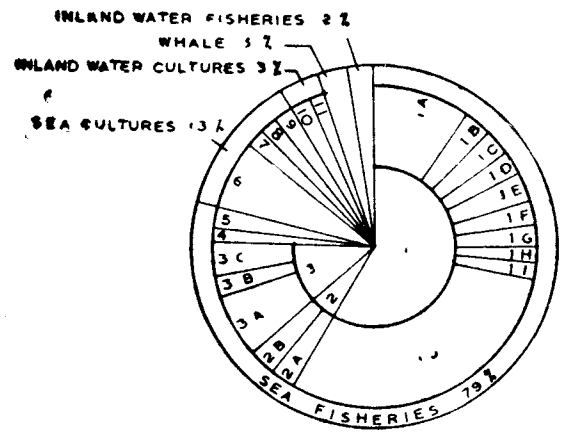

Fig. 3. Percentage by value of Major Species, 1970

1. Fishes - 59 per cent
   - 1A : Albacore, tunas - 10 per cent
   - 1B : Alaska pollack - 5 per cent
   - 1C : Salmons, trouts - 4 per cent
   - 1D : Makerels 4 per cent
   - 1E : Flounders, halibut - 3 per cent
   - 1F : Skip jack, etc. - 3 per cent
   - 1G : Jack mackerel, scad - 3 per cent
   - 1H : Sea breams - 2 per cent
   - 1 I : Marlins, etc. - 2 per cent
   - 1 J : Others - 23 per cent
2. Crustacea - 4 per cent
   - 2A : Crabs - 2 per cent
   - 2B : Prawn, shrimps - 2 per cent
3. Mollusca - 12 per cent
   - 3A : Squid, Cuttle-fishes - 7 percent
   - 3B : Octopuses - 2 per cent
   - 3C : Clams, Shell fishes - 3 per cent
4. Mammals, etc. - 1 per cent
5. Sea Weed - 2 per cent
6. "Nori" Sea Weed - 7 per cent
7. Yellow tail - 2 per cent
8. Pearl - 2 per cent
9. Others - 2 per cent
10. Eel - 2 per cent
11. Others - 1 per cent

4. Means of fisheries production

Associated with the phenomenal increa in the fisheries production, is the tremendo progress in the development of the means fisheries production. At the end of 1964, t fishing fleet composed of 392,000 vessels wi a gross tonnage (G. T.) of 2,179,00 When divided into two groups of boats vi those that were engaged in the sea and tho in inland waters i.e., fresh waters, the form was 371,000 while the latter was 21,000 number, and 55% of the sea going boats ar 18% of the boats operated in the inland wate were powered. The total percentage of powe ed boats was 53 while the rest were non-powe ed (47%) boats. The corresponding figur for 1970 being 391,789 vessels with a G. T. 2,531,317 tons (Table VI), it is obvious th while the number remained more or less t same over the years, there has been a defini tendency towards an increase in weightage i.e the vessels have become larger. Furthermor an additional increase in the total powered boats by 16% and a correspondin decrease in non-powered vessels are see Since the number and types of powered boat engaged in sea fishing are far greater tha those engaged in fresh waters, a deeper stud of the former would provide a truer reflectio of the development of the means of fisher production in Japan. The impressive increas except in respect of categories 3 and 4, in th number of powered vessels engaged in the se needs no emphasis (Table VII). Anothe significant feature is the notable increase i the powered boats belonging to the categorie 5, 6 and 8 whose percentage increase is cons derably higher than even those of category 1

TABLE VI

Number of fishing vessels; 1965–1970

Type	1965	1966	1967	1968	1969	1970	%
GRAND TOTAL	401,635	401,176	398,002	397,279	391,390	391,789	
Non-Powered	180,131	170.912	154,216	143,735	132,603	120,600	31
Powered	221,504	230.264	243,786	253,544	258,787	271,189	69
Marine	381,144	379.070	378,366	375,500	370,518	370,609	
Non-Powered	163,988	153.025	139,283	126,709	116,945	104,957	28
Powered	217,156	226,045	239,083	248,791	253,573	265,652	72
Fresh Water	20,491	22,106	19,636	21,779	20,872	21,180	
Non-Powered	16,143	17,887	14,933	17,026	15,658	15,643	74
Powered	4,348	4,219	4,703	4,753	5,214	5,537	26

Sources: Fisheries Statistics of Japan, 1970. Statistics & Information Department, Ministry of Agriculture & Forestry, Government of Japan, Tokyo, Japan.

TABLE VII.

Change in number of powered fishing boats in the sea by tonnage

Size	1964	1970	Increase or decrease		%
Total No. of Powered Boats.	203,718	265,652	61,934	+	23
1 Less than 5 G.T.	178,446	239,412	+ 60,966	+	25
2 5 - 9 ,,	8,127	8,923	+ 796	+	9
3 10 - 49 ,,	11,898	11,085	— 813	—	7
4 50 - 99 ,,	3,510	3,444	— 66	—	2
5 100 - 199 ,,	672	1,212	+ 540	+	45
6 200 - 499 ,,	805	1,251	+ 446	+	36
7 500 - 999 ,,	112	117	+ 5	+	4
8 1000 G.T. and over	148	208	+ 60	+	29

Source: Fisheries Statistics of Japan, 1970 : Statistics and Information Department, Ministry of Agriculture and Forestry, Govt. of Japan, Tokyo, Japan.

A corresponding change in the use of material for the nets is also noticed. Before World War II, fishing nets in Japan were all made of natural fibres such as cotton and hemp. Introduction of synthetic fibres such as nylon, vinylon, polyethyline, vinylidene and polyster, has revolutionised the use of natural fibres. To-day they have so completely replaced the natural fibres that they are being used not only in fishing nets but also in ropes, fishing lines and even in canvas. Together with the preceeding changes in fishing boats and nets, new production means have been introduced in the form of refrigerating

machines. Installation of refrigerating plants is almost a by-word in all large trawlers. The use of radars, direction finders, fish finders, wireless telephones, echo-sounders and various other electronic equipments on board the fishing vessels, has become so popular that they are no longer considered status symbols. In fact their usage in various fishing operations is as integral a part of the vessels as the fuel that drives them.

It is a recognised fact all over the world that Japan is the most enterprising nation. The Japanese fisherman is perhaps the most enterprising of all, for there is no ocean he does not fish or touch in his world wide ramblings. Although he continues to get the maximum catch from the Pacific Ocean adjacent to his country, his successful harvest in the North and the South Pacific Ocean, the Indian Ocean, the Atlantic Ocean and the Antartic Ocean is by no means meagre. The following table (Table VIII) based on fish catches of 1967, would clearly testify to the truth of the above statement :

TABLE VIII

Catch by the Japanese fishermen in 1967 (Fish: Thousand metric tons; Whale : Number of Whales).

	Name of Ocean	Fish	Whale (B.W.U.)
1	THE PACIFIC		
	i) Adjacent to Japan	5,837	140
	ii) South	262	—
	iii) North	1,305	1,001
2	The Indian	131	—
3	The Atlantic	315	—
4	The Antartic	—	1,633

Source : Fisheries of Japan, 1969: Japan Fisheries Association, Tokyo, Japan.

5. Distribution and Utilisation

Many questions come crowding as to ho this enormous quantity of fish landed utilised? Has the country reached sel sufficiency in regard to the production of foo from the seas? It is rather difficult to provid an answer to the latter question excepting t remark that consequent upon the recent rap economic growth, the demand for marin products has been increasing year by year. the volume of imports which amounted t 114,628 million yens worth of fishery product in 1970, is any indication there is reason to be lieve that the fisheries production is far fro self-sufficient. Apart from an increase in popu lation, two factors seem to have contribute towards this increase in the demand and the are viz., (1) Because of changing pattern i the national diet from one of grain consumpt ion to that of animal protein food, the rate i animal protein demand is increasing by a high as 5-6% per year and (2) the increase demand for fish meal by the live stock industr which has been expanding rapidly to compl with increased demand for live stock products

Before examining the utilisation of fisher products, it seems appropriate to consider how they are distributed. A typical distributio pattern is as follows: (1) each producer i.e. the fisherman, returns to the fishing por carrying his catches; (2) the fishing port ha a wholesale market where fish catches ar purchased by auction or tender by the middle man through the wholesale agent of th producing centre; (3) the middleman trans ports them to the market at the consumin centre; (4) the wholesale agent at th consuming centre in turn sells the catches b auction or tender to the middleman at th

market and (5) the middleman at the consuming centre sells them to the retailers by auction. In the process, therefore, the prices are sometimes as high as 30% when the catches reach the retailer, the penultimate stage in the link between the catch and the consumption.

There are a large number (250 according to the figures of 1964) of ports. Fig. 4 shows the location of the major landing ports and the 10 biggest wholesale markets in Japan. The fishing ports are invariably provided besides the markets, with refrigerators, processing plants, repair shops for fishing boats and gears, lodgings for the crew, radio communication systems etc. The fish markets not only play an important role in the landing, distribution and price determination of the fishery products, but also in granting credit to producers, distribution of the fishery products and in the smooth management of business.

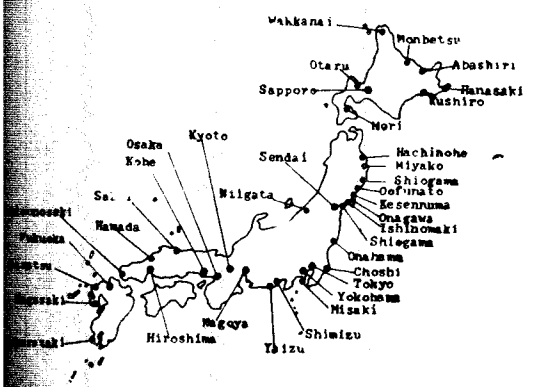

Fig. 4. Major Landing Ports (●) and the Biggest Wholesale Markets (●) in Japan.

The consumer utilises the fish in various forms. According to figures available upto the end of 1965 (Table IX), fishery products used in fresh form underwent a great decrease during the period from 1960 to 1965 so that in 1965 it amounted to only 9%. On the other hand the processed products increased during the corresponding period and by 1965 it reached as high as 91% which comprised of the frozen (26%), paste (24%) and salted, dried or smoked (24%) the most popular

TABLE IX

Domestic production and utilisation (in thousand metric tons)

	1960	1961	1962	1963	1964	1965	%
Total production	6,193	5,711	6,865	6,698	6,351	6,910	100.0
Fresh	1,319	1,277	1,144	1,170	754	655	9.0
Processed	4,873	5,434	5,721	5,528	5,596	6,254	91.0
Frozen	873	1,086	1,207	1,292	1,353	1,799	26.2
Canned	490	550	494	454	456	449	6.6
Paste	1,056	1,188	1,345	1,406	1,499	1,633	23.7
Salted, dried or smoked	1,602	1,669	1,720	1,732	1,562	1,665	24.2
Oils, fats, baits or feeds	769	843	851	579	669	664	9.4
Unedible weed dried	84	98	105	64	58	64	0.9

Source: Japanese Fisheries, 1967: Overseas Technical Cooperation Ageney, Tokyo, Japan.

ormsf in which they are consumed. The pattern was relatively the same during my visit in 1973.

6. Fishermen Cooperatives

Most fishermen in Japan, except a negligible number of fishing companies, are members of cooperatives which are more or less the social and economic foundations for the Japanese fishing industry. By the end of 1969, there were about 2,500 fisheries cooperatives with about 600,000 fishermen as members who are mostly engaged in fisheries by household management unit. In addition, fisheries cooperatives by type of fisheries such as tuna fisheries cooperatives, trawlers' cooperatives etc., had also been organised. The various types of cooperatives, their functions and their relations to each other are too many and complicated and forms a study by itself. The following flow diagram (Fig. 5) would, I hope, help in understanding the complicated nature of the problem. Briefly it may, however, be mentioned that these fisheries cooperatives by and large contribute directly to the welfare of the member fishermen through marketing their catches; purchasing gear and other fishing equipment in bulk at cheaper prices; ice making; refrigeration; operation of cold storages etc. Furthermore these cooperatives ensure order in fishing activities and conserving fisheries resources. Cooperatives by type of fisheries such as tuna, bottomfish, trawlers etc., contribute to an increase in catches and the economic stabilisation of its members. At the industries level, the Japan Fisheries Association is the sole private organisation which actively disseminates information on fishing techniques and enlightens the general public on the status and progress of the fishing

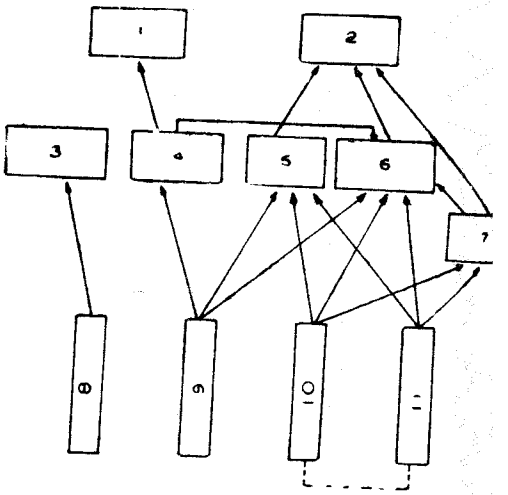

Fig. 5: Organisation of Fishermens' Cooperatives

1. National Federation of Fisheries Cooperati by Type of Fishery.
2. National Federation of Fishermens' Cooper tive Associations.
3. Federation of Aquatic Products Processing C operatives by Type of Fishery.
4. Federation of Fisheries Cooperatives by Typ of Fishery.
5. Federation of Credit Fishermen's Cooperative
6. Federation of Fishermens' Cooperatives.
7. Regional Federation of Fishermens' Cooper tives.
8. Aquatic Products Processing Cooperatives.
9. Fisheries Cooperatives by Type of Fishery.
10. Fishermens' Production Association.
11. Regional Fishermens' Cooperative.

industry. It also helps in the maintenance o a close contact or negotiation with foreig fisheries organisations.

7. Fisheries Education

Fishing is no longer a traditional occupa tion it once was. This change has been brough about by the establishment of a number o training centres, fisheries schools and Univer sities. In the first stage, technical trainin was conducted exclusively for those fishin technicians, captains and chief engineers wh were going on board pelagic fishing boats But with the introduction of large offshor

trawlers and coastal fishing boats, the coverage of training gradually expanded and began to include radio operators and technicians. Courses are now offered for extension officers, technical officers and home-life improvement extension officers. Similarly Senior High Schools and Fishermen's Cooperatives Association Schools have been established. In the former, students of 16 to 18 years old learn techniques of fishing, fish processing, engineering, fish culture, radio communication etc. In the latter, trainees as a rule are personnel who work in fishermens' cooperatives. There are fifteen Universities in Japan which give higher technical education relating to fisheries. Eleven of them are national institutions; one is prefectural and three are private. The courses in these Universities extend over four years, the first two devoted to general studies and the rest for technical education relating to fisheries. Graduates of these Universities find employment in fishing companies, Government offices and other businesses. A few pursue post-graduate courses.

The nature of my visit being different and the duration being very short, fisheries administration and fisheries finance were two other types of activities a study of which would have yielded as many fascinating lessons as the others have. Looking back it occurs to me that the greatest lesson one can perhaps learn is that the size of a country matters very little. What matters, however, is the inclination to learn and to translate them into realities which alone can lead a nation to the desired path of progress and prosperity. ●●