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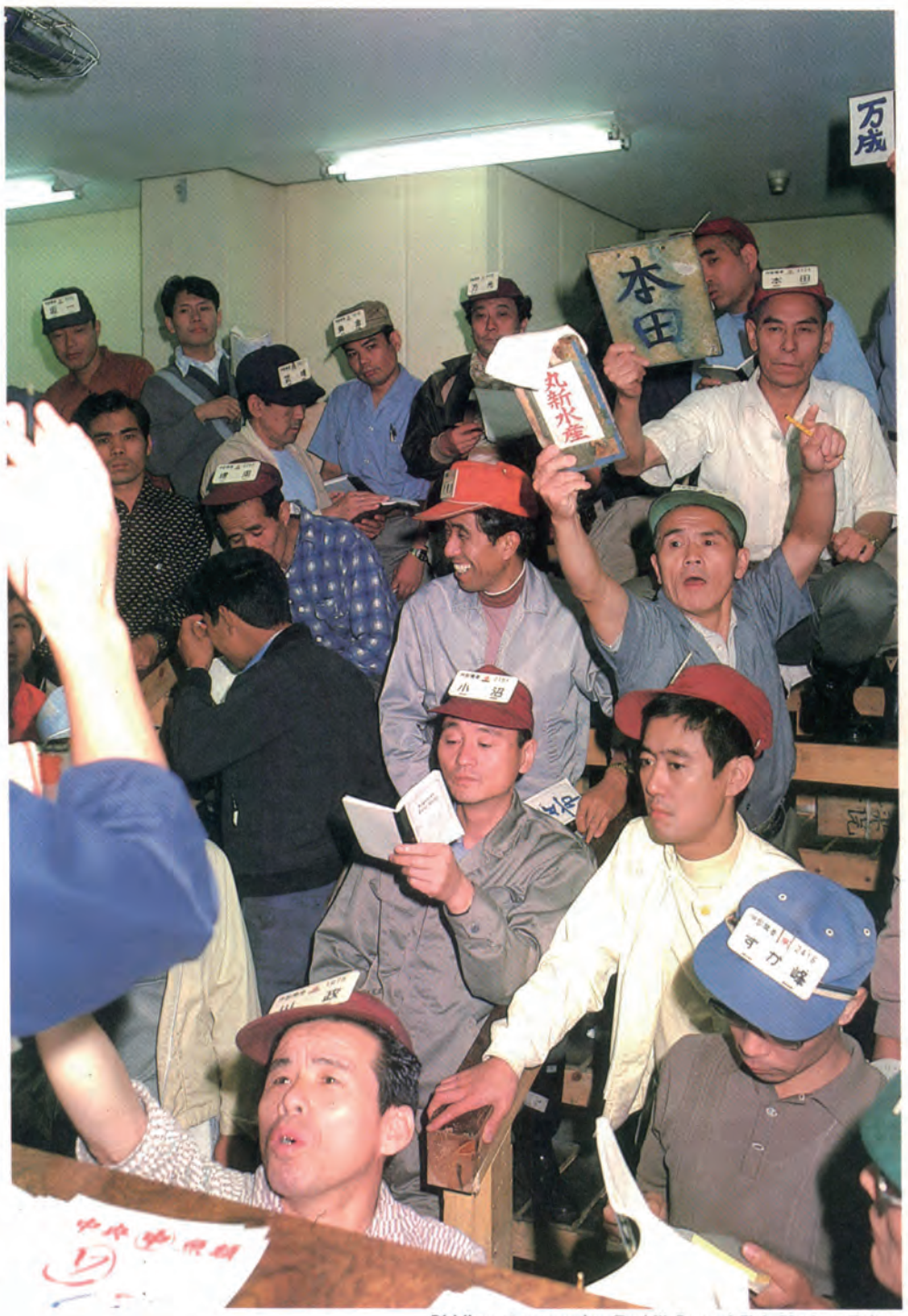
No.1

Crisp Voices; Decisive Gestures

Bidding at An Auction in the Fish Market

Auctioneers and middlemen set prices on fish simply by means of their crisp voices and decisive hand gestures. Hundreds of tons of fish disappear from the arena in a single hour!
Not long ago, a pushbutton type computerized auction machine was installed in a central wholesale fish market. As a result, the auction, which is usually finished before dawn, dragged on until afternoon. It's no wonder that they stopped using it before long.



Bidding at an auction-Tsukiji Central Fish Market, Tokyo

Horse Mackerel and Mackerel .....Japan's Most Popular Fish


Jack mackerel
Japanese mackerel

Like sardines, horse mackerel and mackerel are given to schooling. They inhabit almost all the warm sea areas in the world, migrating freely with the ocean currents. In Europe and America these fish are canned or smoked and consumed as fish meal for the most part. In Japan, however, they are known generically as blue-skinned fish and considered one of our most important marine products.
They are widely used as fresh food, processed foodstuff, feed for raising young yellowtails and baits, or in the form of fish oil or fertilizer.
From the viewpoint of the fishing industry, horse mackerel and mackerel are "mass-catch fish" and therefoe pose a number of interesting problems regarding fishing methods, types or sizes of fishing boats, and methods of processing and distribution.

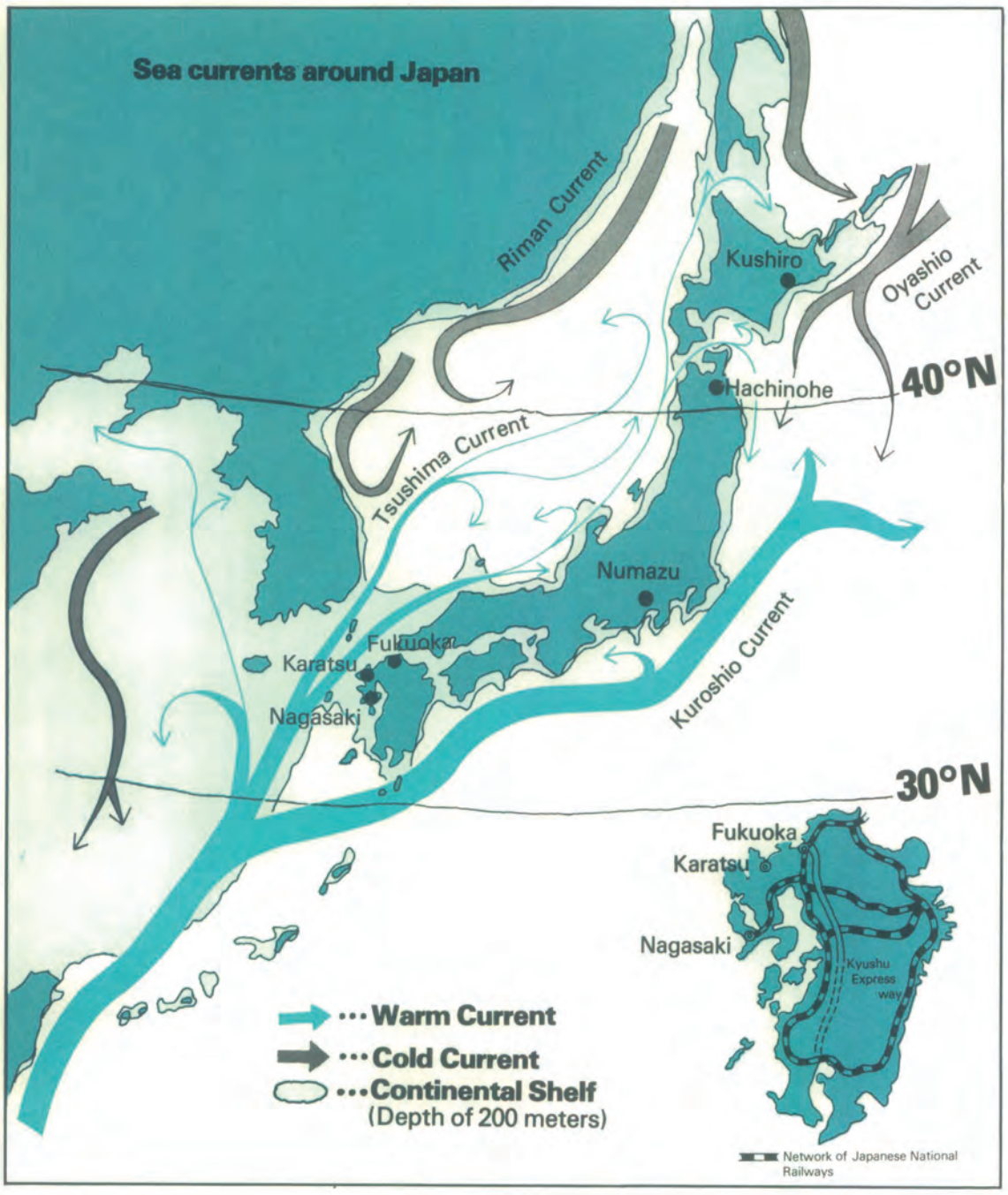
Plusieurs centaines de tonnes de poissons par jour sont vendues aux enchères sur le marché de gros, parmi les cris et les gesticulations des enchérisseurs. Un des grands marchés aux poissons essaya une fois de procéder à la mise aux enchères à l'aide d'une machine électronique commandée par touches, avec pour résultat que la vente, qui aurait normalement dû se terminer à l'aube du jour suivant, se poursuivit tard dans la matinée. Nul besoin de dire que l'on renonça bientôt à la machine.

En el mercado de venta al por mayor, varios cien tos de toneladas de pescado son subastados y esto incluye el ruidoso y rápido accionar de las ofertas. Una vez, cierta pescadería central de venta al por mayor introdujo una máquina electrónica para realizar la licitación y solamente se encontró que la subasta, la cual de otro modo hubiera finalizado antes del amanecer del día siguiente, terminó en pleno día. El resultado, por supuesto, fue renunciar a la máquina rápidamente.

PUBLICATION OF THE "FISHERY JOURNAL"

Since the early 1960's, YAMAHA has tried to be of assistance in the promotion of coastal fisheries in many developing nations through the sale and service of outboard motors and various types of FRP fishing boats.
The aim of the publishers of "Fishery Journal" is to make it a medium for informational exchange, providing technical, economical and other data concerning coastal fishing industry to members of such educational organizations as fishery colleges and to the agencies in charge of fisheries in the developing countries.
Fishing as an industry, as a result of differences in history and climate, developed differing characteristics peculiar to the nations where it thrives. As a means to mutual understanding, we will offer information concerning the circumstances of coastal fisheries in Japan in "Fishery Journal". Each issue will feature articles on certain types of fish, comments on various aspects of ecology, resources, fisheries and fish processing and distribution. Articles on horse mackerel and mackerel appear in this issue, while prawns and shrimps will be treated in the next.
It is hoped that "Fishery Journal" can provide insight into the basic problems of a fishing industry and, possibly will even find use as classroom material for discussion or study.

Yamaha Motor Co., Ltd.



Fishing Ports have personalities of their own

The characteristics of fishing ports are determined partly by the production structure dictated by the fishing ground environment and partly by the consumption pattern of the populace.

Compare, for example, the northern and southern ports in Japan. In northren Kushiro and Hachinohe, 70 to 80 per cent of the total catch is transferred to refrigerators or supplied to local processing plants, while in Fukuoka and Karatsu, the main fishing ports in the southern Kyushu district, more than 80 per cent of the total haul is shipped fresh for direct use by consumers or processers. (see Fig. 1)

In case where a single mass-catch species of fish, like horse mackerel, mackerel, sardine, Pacific saury, codfish, salmon or trout is landed in large quantities at one time, the method of shipment from the port is usually determined by the following factors:

* Whether or not there is a considerably large local or neighbouring city market for fresh fish, and
* Whether or not well-developed means of transportation are available to carry fresh fish immediately over a long distance to the fish markets of large cities.
* Also, the presence of advanced refrigerating or processing facilities near the landing port will have much to do with the method of fish utilization and distribution.

All these factors have long interacted on one other, the combined effect of which has resulted in the personalities of the different Japanese fishing ports.

Fukuoka, Nagasaki and Karatsu are the three largest fishing ports in Kyushu, accounting for 50 per cent of all the horse mackerel and 10 per cent of all the mackerel caught in Japan. Both types of fish are caught mainly by Japanese round-haul netters.

Volume of Japan's Catch by Round Haul Netters

(Horse mackerel)

	1983	1984
Fukuoka	21,998 tons	18,000 tons
Karatsu	26,782 tons	27,300 tons
Nagasaki	13,384 tons	19,300 tons
Nationwide	178,505 tons	233,916 tons

(Mackerel)

	1983	1984
Fukuoka	51,207 tons	46,000 tons
Karatsu	43,258 tons	39,000 tons
Nagasaki	12,766 tons	10,700 tons
Nationwide	804,849 tons	813,514 tons

The method of shipping fish after landing reveals an interesting agreement between Fukuoka and Nagasaki. (Karatsu is a newly developed fishing port which has emerged in recent years with fish forwarding methods similar to Fukuoka.) Figs 2 and 3 show where fresh horse mackerel are transported.

(Fukuoka) Fukuoaka is a metropolis with a population of 1,000,000 and its fish market is characterized by being both a producer and consumer market.

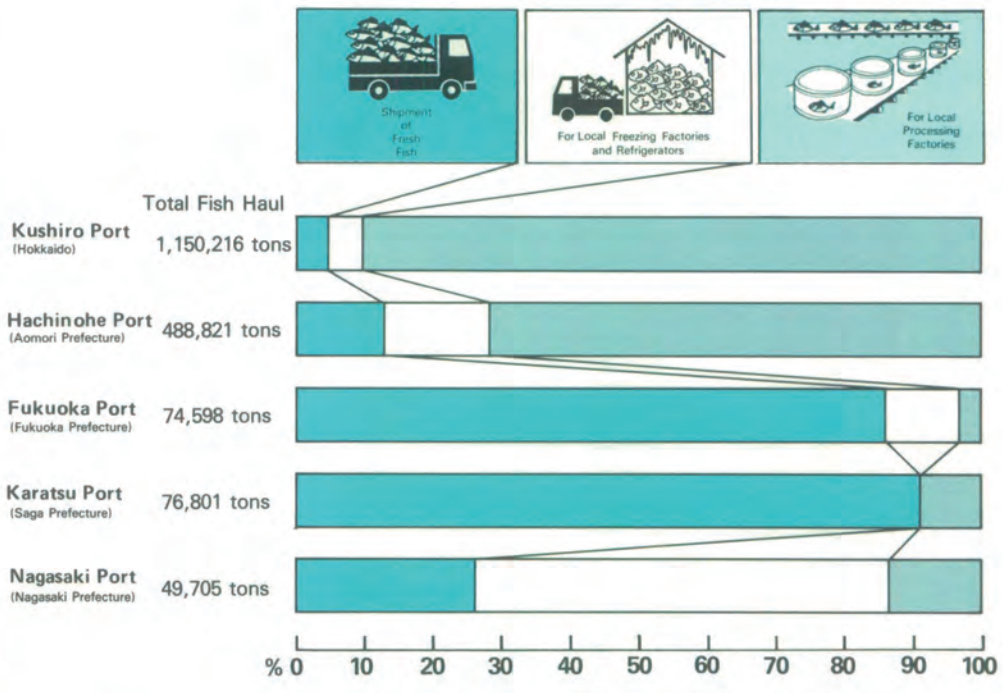
▲ With the advent of truck transport, Fukuoaka extended its fish market throughout the entire Kyushu district as well as into the neighbouring Chugoku district.

▲ Some 5,000 tons of fish bound for the Tokai district are forwarded to salted and dried fish plants in Numazu City. The improvement of highways and refrigerator trucks in Japan has made possible this kind of bulk transport of perishables to remote places.

Fig. 1 Comparison of Fish Destinations by Main Ports

Source: "Physical Distribution Statistics of Marine Products" by Ministry of Agriculture, Forestry and Fishery, 1984.

(Unit: %)



(Nagasaki) 60 per cent of the total fish shipment depends upon Japan's railway system. (In Fukuoka, 84 per cent of the total shipment is moved by truck.)

▲ The greater part of the catch, with the exception of fish consumed within the prefecture, is forwarded to Tokyo, Osaka and Nagoya and their respective neighbouring areas. Railway schedules for the fresh fish express trains "Ginrin (silvery scales)"and Tobiuo (flying fish)" have been set to meet the respective auction times at the central fish markets of these large urban centers.

Tsukiji Central Fish Market—Tokyo

Mission and Mechanism of Fish Markets

Unlike general commodities, perishables, like fish, meat, fruits and vegetables, carry with them the following drawbacks:

(1) Quick loss of freshness and deterioration of quality;
(2) Difficulty of long storage;
(3) Wide variation in amount of supply and sharp fluctuations in price.

This is especially true with fresh fish where, with the exception of cultured products, it is almost impossible to carry out planned production and shipment. Merchandising characteristics such as these have rendered the existence of fish markets extremely meaningful. The mission of fish markets is:

(1) To protect consumers from unreasonable inconvenience due to price instability;
(2) To provide equitable quality evaluation and pricing for the producers;
(3) To uphold standards of public health by improving facilities for insuring product freshness.

In Japan, the history of the fish market finds its origin in the latter half of the 16th century. After the Edo period (1603 to 1867) a formal market system was established, and licensed fish traders appeared. In 1923 the Central Wholesale Fish Market Law was enacted. Thanks to this law, Japan's fish markets were greatly improved both in structure and facilities, and the movement began towards their ultimate modernization.

In Japan, there are three kinds of fish markets:

(1) Markets managed by fishermen's cooperatives (producers associations) in local villages;
(2) Markets operated by corporations founded jointly by wholesalers and/or producers in large fishing ports;
(3) General wholesale fish markers established in both producing and consuming areas of large cities in compliance with the Central Wholesale Market Law. In this case, the local self-governing prefectural or metropolitan community is the market founder.

The following will be a brief description of the mechanism involved in fish market operations. The distribution of marine products is, of course, extremely complicated; Fig. 4 shows only a simplified primary route.

Producers of marine products are generally small and scattered along coastal or inland water areas throughout Japan. Consumers as well are widely scattered and their demand per unit is small. Thus, the threefold function of the central market is:

(1) To stabilize supply by collecting fish hauls from the markets of the fishermen's cooperatives in various fishing villages or from fish wholesalers in large fishing ports;
(2) To sort fish according to type, shape and freshness and then to set a fair price by auction or some similar method;
(3) To expedite prompt and smooth shipment of the purchased products.

With respect to the method of establishing the price of fish consignees/wholesalers (a and c) and middlemen (b and d) set the prices, standing side by side, in every market in both the producing and consuming areas.

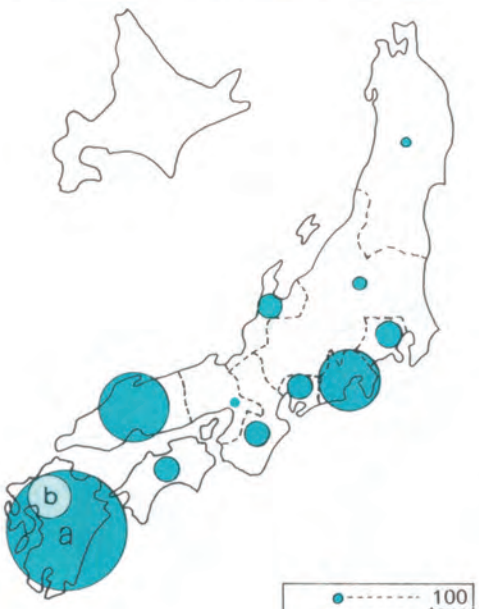
Since the 1940s, Japan's fish markets have undergone a great change. The economic fucntion of the fish market has been expanded from a regional economic block to a market of nationwide scale. At present, approximately 80 per cent of Japan's annual catch, which amounts to around 10,000,000 tons, is handled by the nation's fish markets, about one-fifth of which comprises the nationwide distribution network branching out from the central wholesale markets in the six largest cities-Tokyo, Osaka, Nagoya, Yokohama, Kobe and Kyoto.

A la suite de la promulgation de la loi de 1923 sur le Marché en Gros Central, les marchés aux poissons japonais commencèrent vraiment à se moderniser, avec de remarquables amélioration sur le plan des structures et installations.

Con la promulgación de la ley para el Mercado Central de Venta al por Mayor en 1923, la verdadera modernización de las pescaderías japonesas fue en progreso, resultando en una notable mejora en la estructura y medios del mercado.

Destinations of Fresh Horse Mackerel Cargoes (1975)

Fig. 2 Shipped from Fukuoka Port



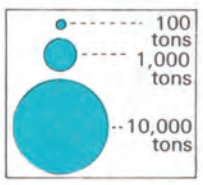
a: For shipment to the whole area of Kyushu

b: Only for local consumption

Fig. 3 Shipped from Nagasaki Port

a: For shipment to the whole area of Kyushu

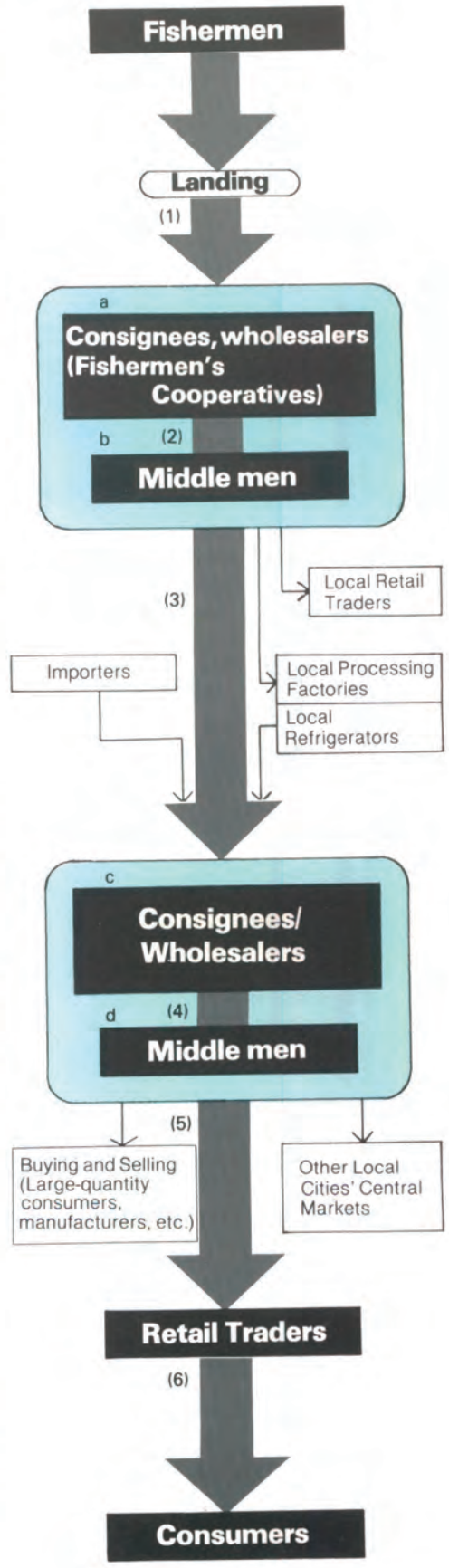
b: Only for local consumption



This of course, is only a generalized example concerning the influence of geographical location and the marketing structure on the improvement of fish markets. Fukuoka and Karatsu have recently experienced development of their respective markets as a result of positive promotional activities by fish wholesalers and middlemen. And the results of their efforts have been strongly reflected in increased demand and the enlargement of the cargo collecting power of their markets. As seen in the example of the shipment of horse mackerel from Fukuoka to Numazu for opening and drying, marine product processing is now being undertaken even in places of consumption. In other words, improvement of the "cold chain" has given marine products a longer storage life, while at the same time extending the kilometer-ton potential, thereby effecting the economic factors involved in the location of the processing industry.

Thus, in the promotion of a fishing industry, fish production, marine product processing and product distribution must all continue to develop in close relation with one another.

Fig. 4 Distribution Channel

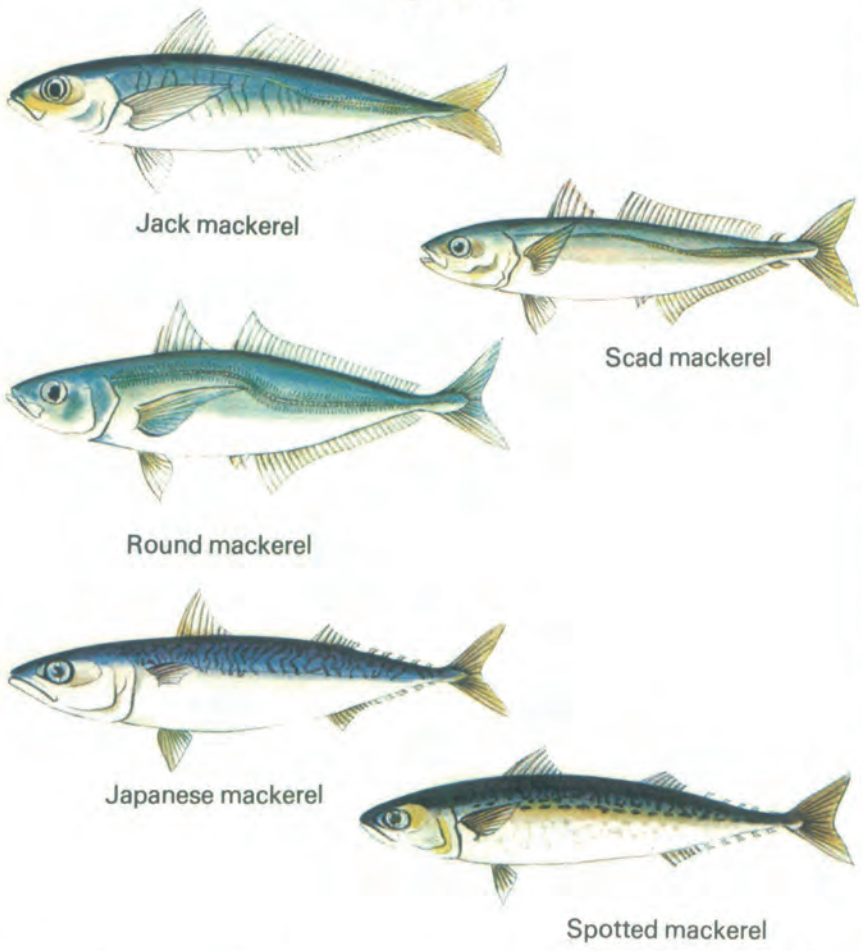


(1) Consignment
(2) Auction and Bidding
(3) Buying on Consignment
(4) Auction and Bidding
(5) Negotiated Transaction & Fixed Price Transaction
(6) Sale on Fixed Price

Chaque port de pêche a sa propre personnalité, déterminée d'une part par la structure de production dépendant des pêcheries et, d'autre part, par la structure de consommation qui la supporte.

Cada puerto de pesca tiene que encargarse de sus propios recursos naturales. Esta postura está determinada por la estructura de producción dictada por su pesquera por una parte, y por el sustento de la estructura de consumo por la otra.

Species



There are, of course, numerous species of horse mackerel and mackerel, but those caught in largest quantities off Japan are jack mackerel, scad mackerel, round mackerel, Japanese mackerel and spotted mackerel.

Japanese Name	English Name	Scientific Name	Features	Main Points of Mode and History of Life
Maaji	Jack mackerel	Trachurus japonicus	The body is of a slightly slender spindle-shape, and somewhat tapered on both sides and fully covered with scutes. The back is dark grey, and the abdomen is silver white.	This species of fish lives in the middle water depths near coast, and feeds on plankton in schools. The young fishes of this species are often seen in the inside of a bay, but the mature fishes migrate in schools in northern water areas from spring to summer and in southern water areas from autumn to winter in search of feeding grounds.
Muroaji	Scad mackerel	Decapterus muroadsi	The features differing from those of jack mackerel are that this fish has one solitary fin on top and bottom between the dorsal and anal fins, and that the direct running portions only are covered with scutes. The back is blue green and the abdomen is silver grey.	This species of fish grows in schools in the middle water depths between 30 and 50 meters and enters shallow-sea areas along the coast during the spawing season. Very quick in motion.
Maruaji	Round mackerel	Decapterus maruadsi	Very similar to the jack mackerel, but different in the respect that this species of fish has only one fin on top and bottom between the dorsal and anal fins. The back is more blue than that of the jack mackerel.	This species of fish lives in the warm sea of the Japanese current. It is mostly seen in the off-shore waters and rarely approaches the inside of a bay.
Masaba	Common Japanese mackerel	Scomber japonicus	Thick and spindle-shaped body, of which the cross section is oval. The scales are extremely small. The back is dark green, and has a black wavy pattern. The abdomen is silver white, and normally unspotted.	Lives near the surface water area of the sea, and migrates in seas with temperatures between 10 and 22°C. It comes to the coast during spawning season and returns off-shore after spawning. This species feeds on smaller fishes and large plankton.
Gomasaba	Spotted mackerel	Scomber tapeinocephalus	The first fin is somewhat larger than that of the common Japanese mackerel. The cross section of the body is almost oval. The back is similar to that of the common Japanese mackerel, but the abdomen is fully covered with irregular, small, black spots.	This species of fish lives in warm water areas strongly influenced by the warm water of the Japanese current and is found further to the south than the common Japanese mackerel.

Progress of Fishing

Since ancient times, mackerel has been caught by either angling or seining. Horse mackerel, too, has been caught utilizing the same two methods. These methods can be better understood by classifying them into two age groups—pre-seining and roundhaul seining.

Pre-seining

In the early days angling was more widespread than seining. In angling, the pole-and-line method was generally employed, although long-line fishing was also used. The method of attracting fish with lamps and/or ground bait was a clever advancement which took advantage of the schooling behavior of horse mackerel. This was and still is an important technique common to both seining and angling.

Fig. 1 shows several types of horse mackerel and mackerel angling equipment which have been in use since the 17th century. They are still used by small-sized fishing boats in operation along the west coast of Japan. The three objects on the right in Fig. 1 are fishing aids called "tenbin (balance)". A piece of wire or split bamboo is attached to the lower end of the line (l), and drawn threads (m) are hung from the end. When a fish is hooked, the balance provides a "striking" action which the fisherman would normally do with his rod. Either fresh or artificial bait is used as the conditions demand. There are numerous cases where a cloth bag containing ground bait is also used. When fishing after sunset, 100-300W lights are projected from both sides of the fishing boat to attract schools.

In seining, both dragnets and stationary nets are used. However, the square net (Fig. 2) and the stick held dip-net (Fig. 3) are two of the more important fishing methods, both being used for catching schools by luring them over the net using nocturnal fish fires.


Fish landing

Roundhaul seining

A look at the graph showing Japan's horse mackerel and mackerel haul shows that since 1948, in the wake of the devastation of World War Ⅱ, Japan's fishing industry was gradually restored and showed a rapid rise in its output curve—which attests to the advancement of fishing efficiency through technical innovation and the expansion of fishing grounds.

(1) Locating dense schools of fish has become easy owing to the spread of many types of fishfinders throughout the world during the period of 1949-52. As a result, Chiba Prefecture developed an efficient fishing method called spring-angling, which was immediately adopted throughout the nation. (Fig. 4)

(2) Next came the introduction of synthetic fiber nets. In seining, the cotton net replaced jute net around 1900. Then the purse seine, or purse net, offered improved results together with the advent of the powered seiner.

Back in the days of cotton it was necessary to dry the net every day. Thus the seiner could not operate far from their bases. The introduction and subsequent rapidly expanding use of nylon and vinylon nets, however, released the seiner from its distance restrictions, and medium to large round-haul seining fleets were dispatched to new fishing grounds on the high seas.

Of course, the increase in horse mackerel and mackerel hauls since the latter half of the 1950's is largely the result of the following two factors:

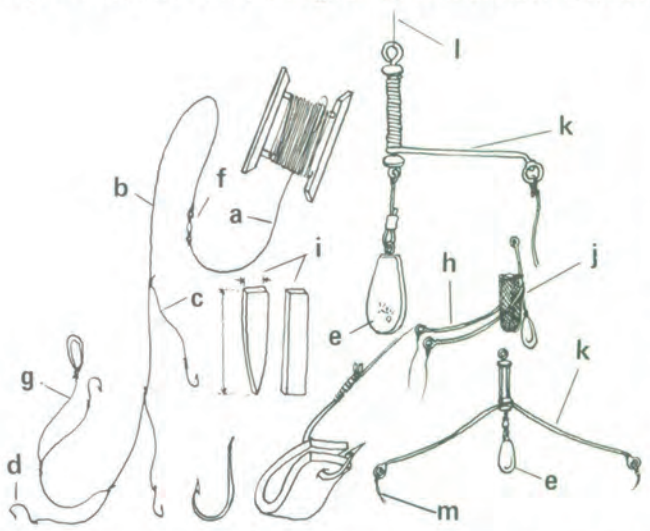
(1) Fishermen have shifted their operational objectives to these fish as new marine resources (as substitutes for sardines in the '40's and mackerel pike in the first half of the '50's).
(2) Hauls have been increased due to highly efficient operations resulting from fishermen's adoption of technical innovation.

However, in view of the marked decrease in horse mackerel hauls, while mackerel hauls have remained constant in recent years, it must be said that the catching of horse mackerel and mackerel is reaching a very important turning point.

Il existe une grande variété de saurels et de maquereaux. Parmi ceux que l'on trouve en abondance au large des côtes du Japon, on peut citer le "maaji", le "muroaji" (maquereau bâtard), le "maruaji" et le "gomasaba". Ces espèces sont traditionnellement pêchées à la ligne ou à la seine. Dans les deux cas, on utilise comme leurres des lampes et des amorces de fond.

Hay una amplia variedad do Jurel y caballa. Estos se encuentran en abundancia frente a las islas japonesas y dentro de su variedad se incluyen el "maaji", "muroaji" (una variedad de jurel)", "maruaji" y "gomasaba". Tanto la pesca con red barredera come con caña han sido los mètodos largamente utilizados para la captura de estos peces. También se utilizan los mètodos de señuelo que comprenden cebos luminosos o gusanos.

Fig. 1 Pole-and-Line Fishing for Horse Mackerel/Mackerel



(a) Main line
(b) Trunk leader
(c) Branch leader
(d) Hook
(e) Sinker
(f) Monkey link
(g) Root line
(h) Spool
(i) Bait
(j) Bait basket
(k) Tenbin (balance)
(l) Trunk leader
(m) Drawn thread

Fig. 2 Square net ("Shiki-ami")

Fig. 3 Stick held dip-net ("Bōuke-ami")

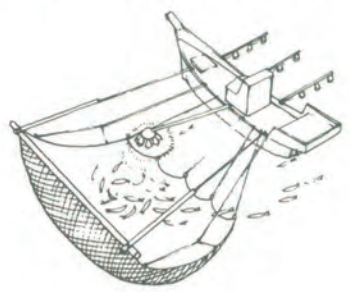
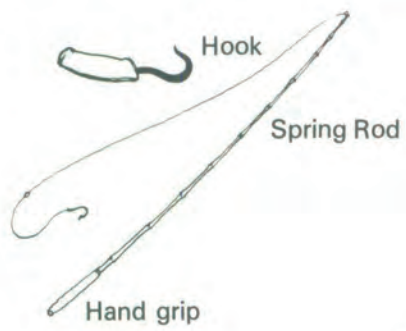


Fig. 4 Spring-angling tackle ("Hane-tsuri")



Distribution of Resources and Fishing Grounds

Distribution of mackerel and horse mackerel in the sea areas of Japan is generalized as follows: (Data: Regional Fishery Research Laboratories)

Mackerel

Mackerel caught in waters off Japan include two species of mackerel found in the warm water areas to the south, and Japanese mackerel living in the colder northren areas. The distance from the southren waters of Kyushu to the southern Pacific is great, with distribution of both species in places overlapping, but in most cases spotted mackerel are distributed in shallower waters than those inhabited by Japanese mackerel.

Japanese mackerel: They spawn in the coastal water zone within warm currents, and their fry distribute into the open sea, riding the ocean currents. Their feeding grounds are formed between warm and cold water areas as determined by ocean currents, but (1) the southern sea area of Kyushu, where the Japanese Current joins the coastal water of the Continent of China, and (2) the Pacific northren sea area, where the Kuroshio Current comes in contact with the Oyashio Current, offer the greatest fishery resources now. These sea areas have become the sites of round-haul seining, while the netting of schools gathered during the spawing season has also grown (as seen in spring angling offshore of the Kanto area and the like).

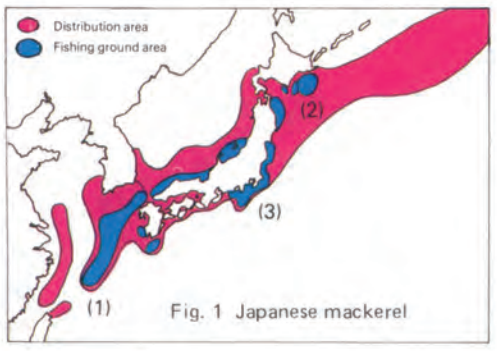


Fig. 1 Japanese mackerel

Spotted mackerel: Spawning occurs over (1) the belt of sea extending from southern west Kyushu to Taiwan and (2) the sea surrounding Yakushima and Tanegashima Islands, but these two locations differ in species of fish. In the former, the fish distribute from the southern portion of the East China Sea to the western sea area of Kyushu and the southren part of the Pacific to form their feeding ground, but in the latter, the greater, number of fish remain where they spawn for the entire year.

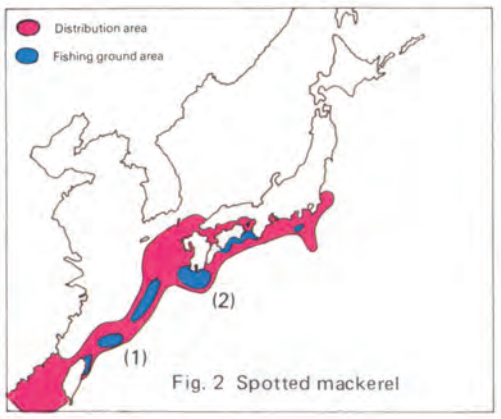


Fig. 2 Spotted mackerel

Horse mackerel

Jack mackerel: Jack mackerel spawn throughout the Japanese waters, with the exception of some areas in the winter, the year round. Their distribution is vast, extending from the East China Sea to Hokkaido. Important as far as fishing is concerned because of their especially dense areas of distribution in the western part of the Japan Sea, the eastern section of the East China Sea, and the southern and middle portions of the Pacific, with as much as 80 per cent of the total haul caught in the western Japan Sea and the eastern portion of the East China Sea.

Scad mackerel and Round mackerel: Mainly, these species live in the sea areas influenced by warm currents. Scads prefer living near islands, while round mackerel abound in coastal zones, such as off Shikoku and Kyushu, and continental China.

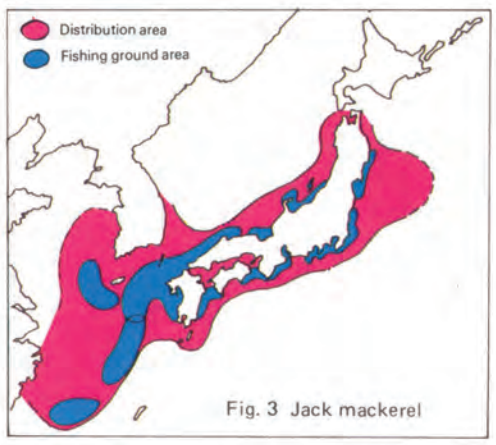
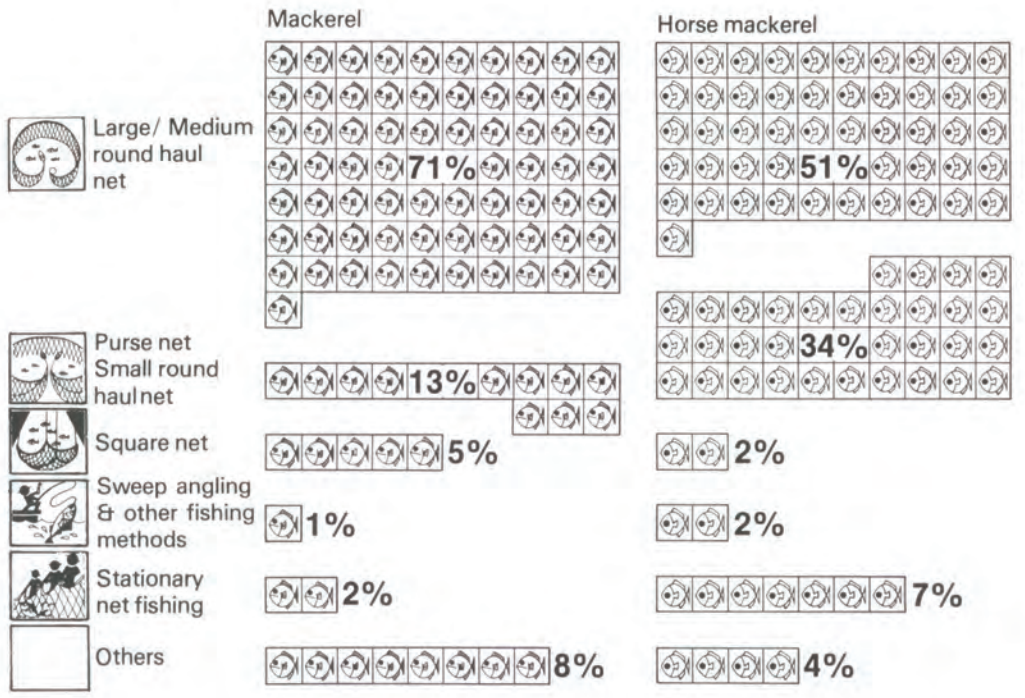
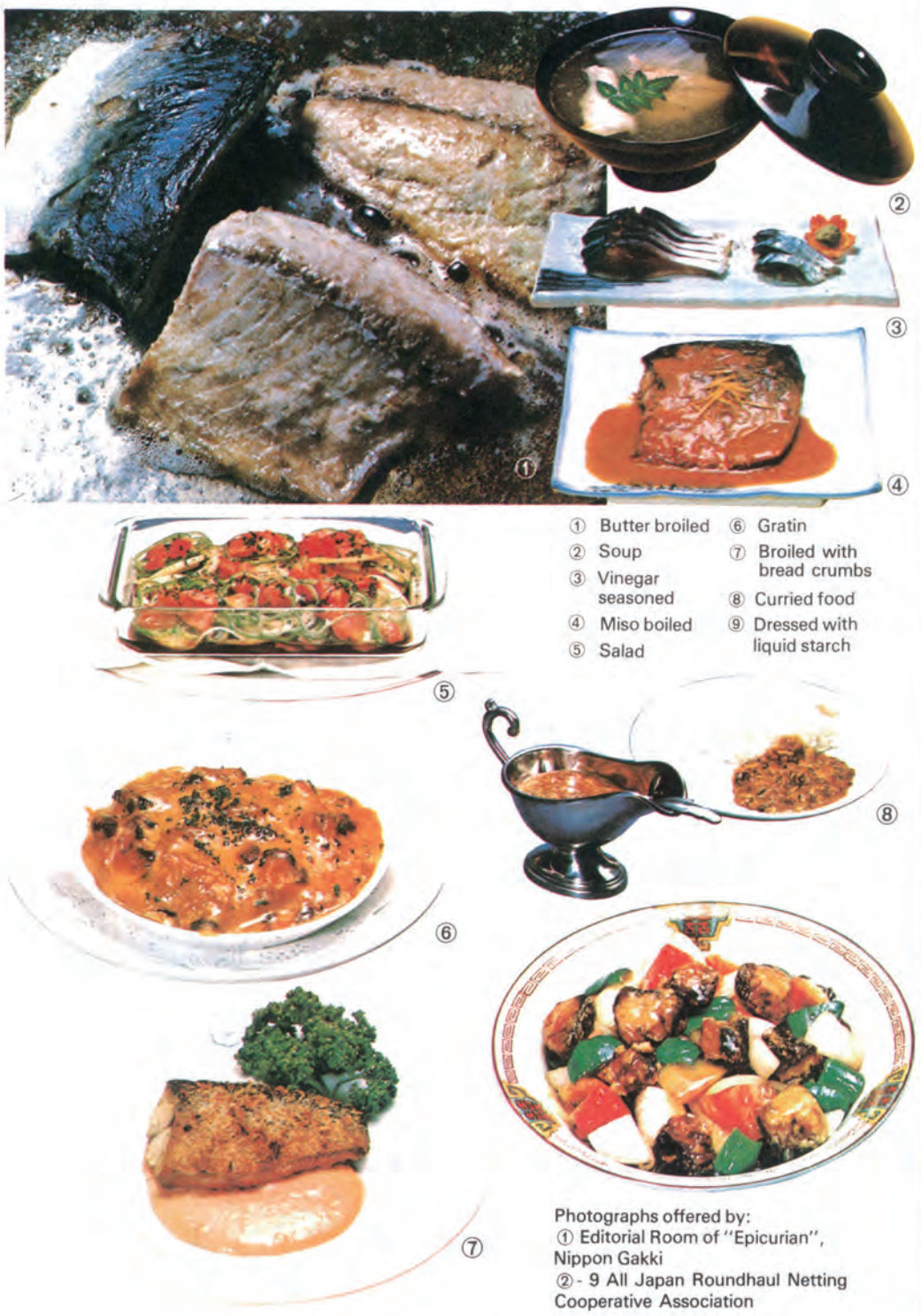


Fig. 3 Jack mackerel

Methods of fisheries (1983)





① Butter broiled
② Soup
③ Vinegar seasoned
④ Miso boiled
⑤ Salad
⑥ Gratin
⑦ Broiled with bread crumbs
⑧ Curried food
⑨ Dressed with liquid starch

Photographs offered by:
① Editorial Room of "Epicurian", Nippon Gakki
②-9 All Japan Roundhaul Netting Cooperative Association

Varying Applications of Mackerel in Japan (1976)

Gross total hauls				984,000 tons	
				Weight in finished products	Live weight
Human consumption	Perishable	(a) Eaten almost raw (lightly roasted or vinegar seasoned)		Data unavailable	100,000 tons
		(b) Heated and seasoned (boiled, broiled or fried)			
	Processed	Simple Processing	Salt dried	36,000 tons	230,000 tons
			Salt preserved	26,000 tons	
			Smoked	Very little	
			Dried and hardened	26,000 tons	
		Complex Processing	Canned	185,000 tons	305,000 tons
Freezing (Processed not for eating in most cases)				336,000 tons	
Applications other than eating	Feed for raising young yellowfish			Data unavailable	350,000 tons
	Baits for other fisheries			Data unavailable	
	Fertilizer, fat-removed fish (processed into fish meal eventually)			5,000 tons	
	Fish oil (secondary products of fat-removed fish)			9,000 tons	

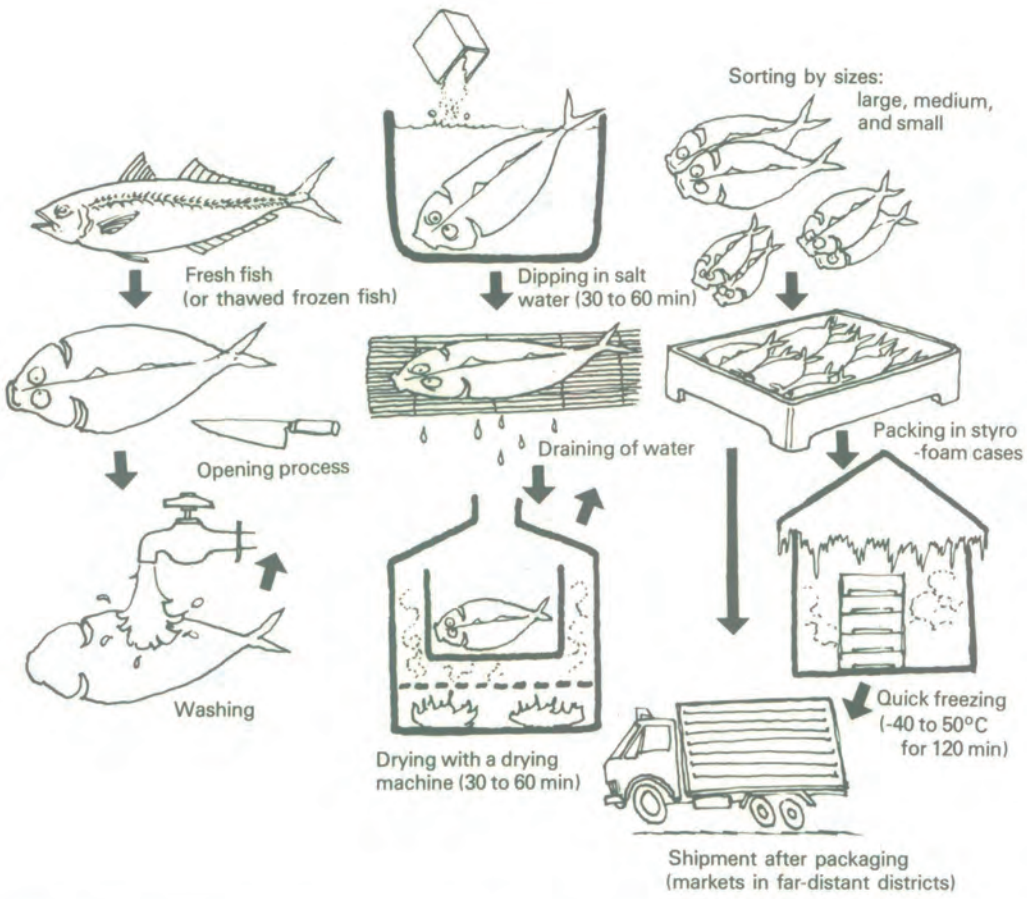
Opening and Drying of Horse Mackerel

The Japanese have always had a liking for opened and dried horse mackerel slightly salted, calling it "a bit of salt horse mackerel." So great, in fact, is their taste for it that 25 per cent of the 20,000 tons of annual horse mackerel catch is eaten in this delicious way.

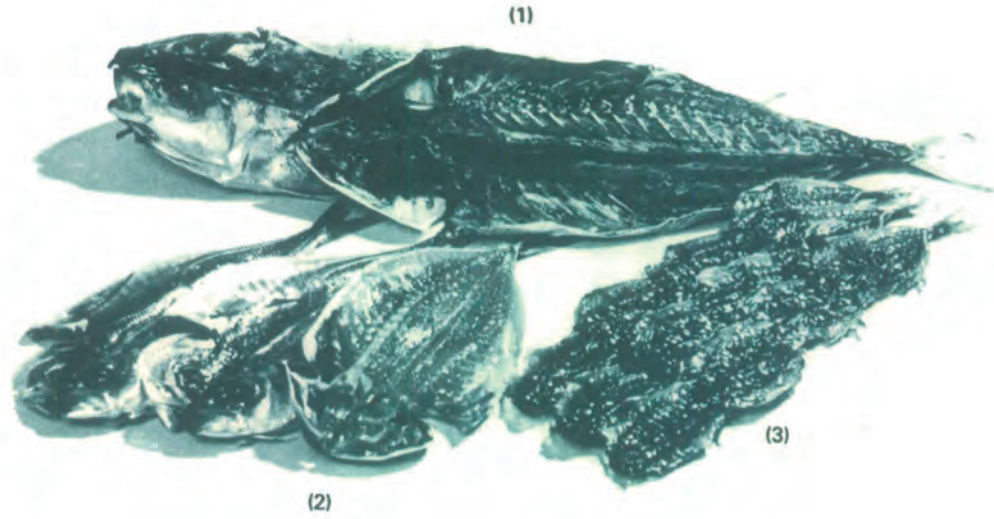
The method of salting and drying fish begins by slicing open either the abdomen or the back of the fish to dry it without actually cutting it in two. Fish weighing 70 g to 120g are considered suitable for opening and drying. An outline of the general production process follows:

For shipment of opened and dried horse mackerel to remote markets the fish are refrozen to prevent loss of freshness in transit, and subsequently thawed by the consumer. Heat-proof styro-foam containers have made this method possible, with the result being a vastly enlarged market.

The major producing center is Numazu City, Shizuoka Prefecture, boasting a 42.6 percent share of the nation's market (in 1975).



Although these are comparatively simply processed marine products, their commodity value is greatly influenced by such delicate factors as how clean the opening is, color and tonality of the meat, the selection of fish of uniform size packed individually in cases etc. These factors consistently spur competition among the producers.



(Opened and dried horse mackerel)
(1) *"Kusaya"* (dipped in salt water).
(2) Seasoned with slight salt, and fried.
(3) Dried *mirin* (Japanese sweet sake)—seasoned.

Canned Mackerel

In Japan, the annual output of canned mackerel has reached some 200,000 tons, well surpassing the 50,000-60,000 tons of canned tuna, which ranks second. Recently, the demand for canned fish has shown a sharp increase, particularly mackerel. One of the main causes of this increase in popularity of canned fish is that since the material costs of canned crab, tuna and salmon, which have traditionally been used as canned fish, have risen, causing the processing industry to strive to increase canned fish sales by revising their course of production. Items like "mackerel meat preserved in salad oil" have appeared on retail shelves. As a result, mackerel can now be prepared and eaten in many different ways; boiled, steamed, broiled, fried, stir fried, in salad, in sandwiches, what so ever, and all to the convenience of the consumer.

Various kinds of canned mackerel

La façon la plus répandue de traiter le maquereau est la mise en conserve. Les méthodes de traitement se diversifient de plus en plus, et offrent maintenant un choix varié de préparations. Le maquereau à l'huile n'en est qu'un exemple parmi beaucoup d'autres. Le maquereau peut être aussi traité par séchage. La Station expérimentale de Traitement des Produits Marins de la préfecture d'Ishikawa, située au bord de la Mer du Japon, a réussi à mettre au point une méthode de conservation des poissons gras par séchage.

La façon la plus répandue de traiter le saurel ("hiraki") consiste à sécher le poisson ouvert et légèrement salé. L'industrie du traitement des poissons de Numazu, préfecture de Shizuoka, ville célèbre au Japon pour la qualité de son poisson séché, a adopté le surgelage et les emballages isolants, ce qui contribue à son expansion sur le marché des denrées alimentaires.

El método típico de preparación de la caballa es el envasado en latas. Los métodos de preparación recientemente desarrollados son diversificados y permiten una más amplia elección para su utilización en las comidas. Uno de estos es la preparación de la caballa en aceite.

Por otra parte, está el método de preparación de la caballa por medio de desecarla. La Estación Experimental de Pesquerías de la Prefectura de Ishikawa situada sobre la costa del Mar del Japón ha realizado dicho proceso exitosamente.

El método más popular de preparación del jurel es "hiraki", o sea abierto, desecado y ligeramente salado. La industria de preparación de este pescado en la ciudad de Numazu, Prefectura de Shizuoka, un lugar famoso en Japón por el jurel desecado, ha introducido un sistema que permite el congelamiento y calentamiento rápido del envase aislante para contribuir a su expansión en los mercados.

Yamaha Fishery Journal

Success in Dry Processing of Fatty Fish

Another major application of mackerel is dry processing. Since skipjack was the first dry-processed fish in Japan, dried mackerel is called" miscellaneous dried fish," like dried sardines. Nonetheless, dried mackerel is an important processed product used together with flaked dried skipjack as seasoning.

The most important thing in fish processing is to reduce body fat as much as possible. Otherwise, the excessive fat in the processed fish will easily oxidize and quicken the deterioration or decay of the fish meat.

The Ishikawa Prefecture Fisheries Experimental Station, one of several such facilities established in prefectures throughout Japan for the purpose of conducting research on resources and performing fisheries guidance, pursued the study of processing relatively fatty Japanese mackerel caught in the Japan Sea for a two-year period during 1975-76, and succeeded in developing good quality products by putting its new technology to practical use.

Generally, dried mackerel undergoes a process wherein the fish is first boiled down in a special oven, then broiled and dried. The Ishikawa Fisheries Experimental Station's dried mackerel process, however, eliminates the need for the oven, since (1) the fish is first boiled down and dried in a hot-air drying machine, then (2) is steamed and boiled down by pressure in a retort. This new process, then, has made possible the manufacture of good quality dried mackerel from fatty mackerel. At the same time, the method has produced a number of secondary merits which surpass the old conventional way:

(1) The new method reduces loss of flavor to a minimum.
(2) Environmental pollution is eliminated because no fish stock is drained out.
(3) The skin of the fish comes off cleanly. In the old method it is impossible to completely peel off the skin.
(4) The largest quantity of subcutaneous fat can be easily separated.

(Process of drying fish)
(Upper) A hot-air drying furnace
(Lower) Press

Priority to Development of Overseas Markets

The developing nations, as a means to improve their way of life and secure animal protein sufficient to feed their rapidly increasing populations, are striving to effectively utilize marine resources and, as a first step, are exerting efforts to promote coastal and offshore fishing by converting conventional fishing boats into powered vessels.
In consideration of the enormous amount of time and the huge investment required by large-scale fishing projects, this course of development is regarded more sound from the standpoint of "Feasibility".

Expanding market of Yamaha outboard motors

YAMAHA outboard motors, with their superior utility and merchandising features, are the machines being purchased throughout the developing countries. Also, with the development of shallow-sea culture fishing and the popularization of marine leisure, YAMAHA outboard motors will unquestionably enjoy increasing sales both in Japan and abroad.
Outboard motors are playing an important role in the improvement of people's lives worldwide. Recoginizing this, YAMAHA will apply itself to the task of enlarging its market share by giving priority to the expansion of its overseas markets. Since the development of its first small 7-horsepower motors in 1960, YAMAHA's outboard motor business has steadily grown in both production and sales. Including its full-scale export business, which began in 1972,YAMAHA,as of April, 1977, has secured for itself approximately 65% of the total domestic market and accounts for about 73% of total exports from Japan.
The outboard motor business grew from 4.2% of Yamaha's gross product sales in 1971 to 7.5% in 1975.

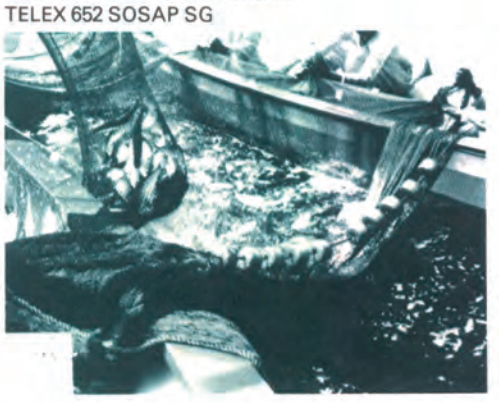
YAMAHA—Tops Among Consumers

In a commodity survey conducted by the Publicidad Allas S.A. a prominent publisher of journals in Mexico, YAMAHA won top honors in the areas of outboard motors and small-sized FRP boats. In 1971, Mexico began a "Presidential Program" for the purpose of changing from the conventional small-sized coastal fishing boats to the FRP fishing boats and vessels powered by outboard motors.
YAMAHA participated in the First National Fishing Village Traverse PR Campaign. Since then,YAMAHA has supplied great numbers of small-sized fishing boats and outboard motors to fishing villages. It has even gone into joint ventures for local production of small-sized fishing boats, to better satisfy local demand.

Success in Trial Operation of Small Round Haul Netters (Senegal)

Some time ago YAMAHA supplied Senegal, on the west coast of Africa, with its DT-43 FRP fishing boats and J-18 FRP small-sized fishing boats as FAO fishery guidance and research vessels. The results of a trial round net haul operation using these boats were excellent. So successful, in fact, was the trial that the boats caught an amazing five tons of sardine, sea bream, hairtails, and mackerel in a single day.
The Senegal Government has for some time planned to develop its coastal fishing and is determined to promote the introduction of better boats. In line with this, it was decided that two YAMAHA DX-199 FRP fishing boats, fully equipped with tackle, be supplied free of charge, together with 8 W22S boats and 1,019 outboard motors, by the Japanese Government. These vessels are scheduled to be shipped from Japan in November, 1977, and be delivered to the address on the left by February, 1978.

MINISTERE DU DEVELOPPEMENT RURAL
ET DE L'HYDRAULIQUE
TEL 23996—B.P. 289—DAKAR
TELEX 652 SOSAP SG

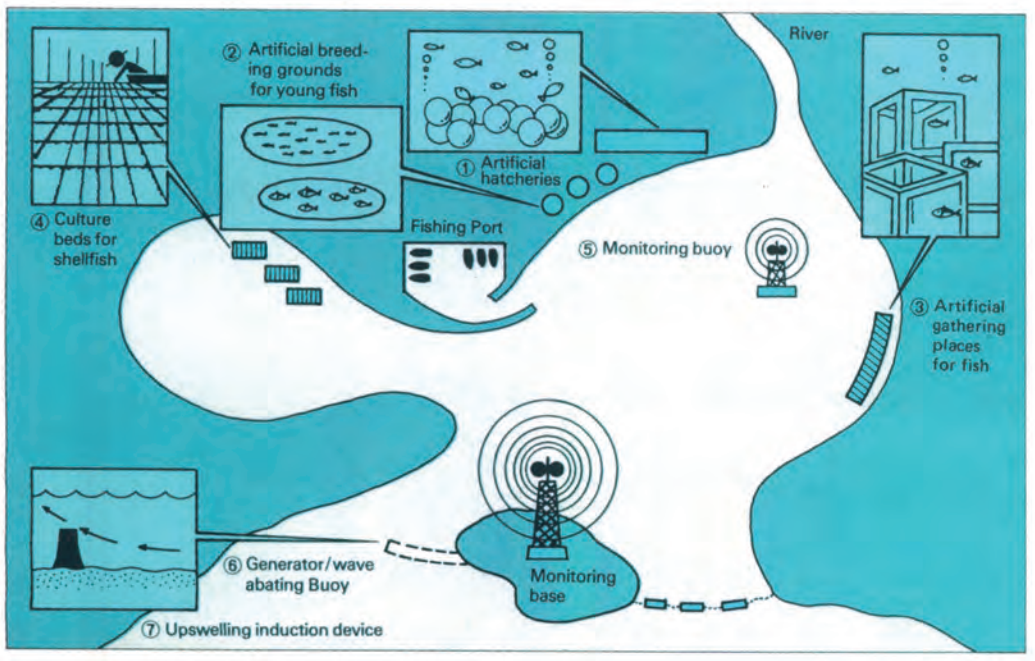


D'après les résultats d'un sondage d'opinion organisé par Publicidad Allas S.A., une des plus importantes maisons d'édition de magazines au Mexique, Yamaha s'est révélée la marque la plus populaire pour les moteurs hors-bord et les bateaux en plastique armé de petite taille.

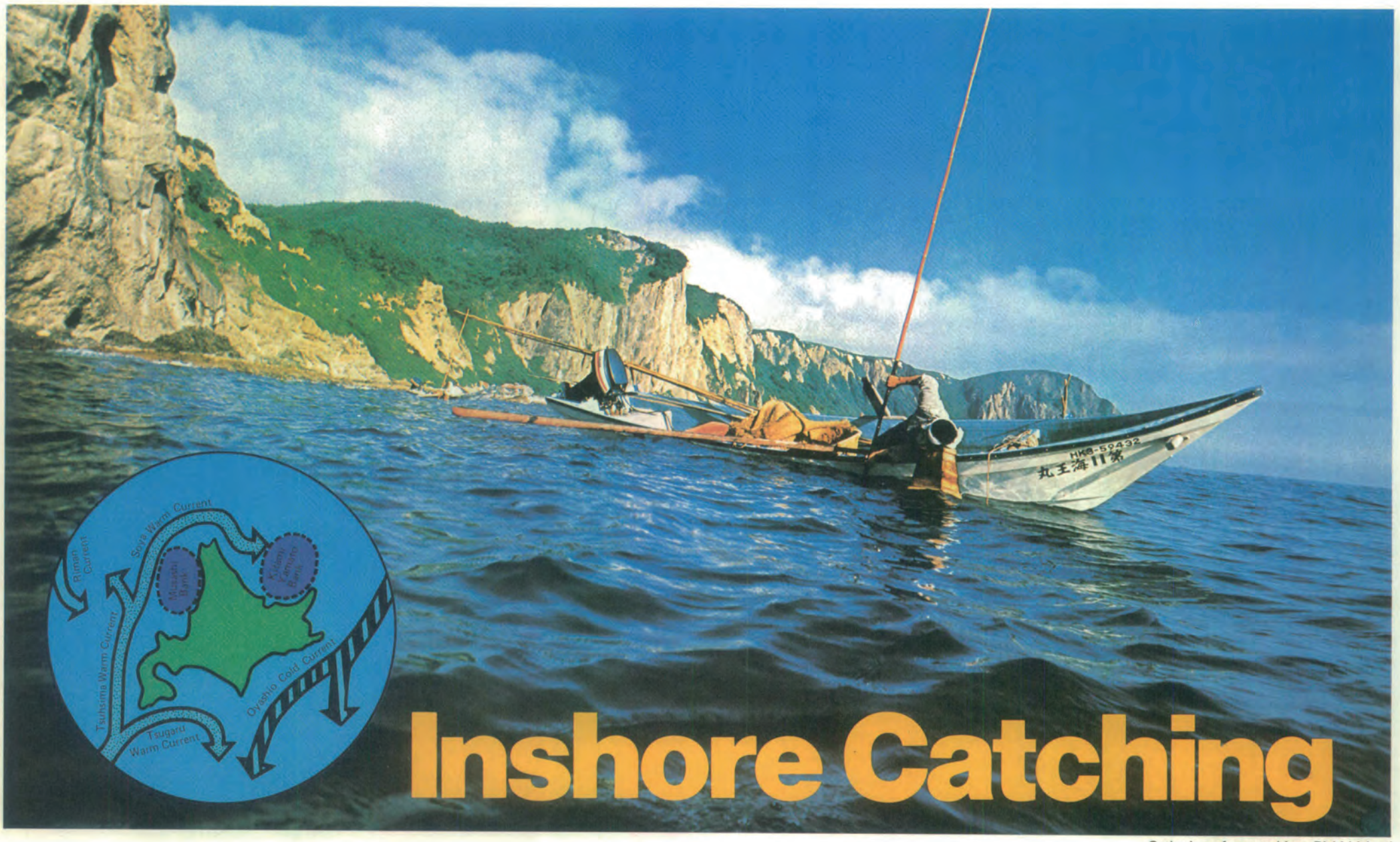
De acuerdo a los resultados de una encuesta llevada a cabo por Publicidad Allas S.A., que edita una importante revista en México, Yamaha ganó el primer puesto en un certamen de popularidad que comprendía motores fuera de borda y botes ERP de pequeño tamaño.

A fascinating idea for culture fishery development

Ocean Culture Grounds



The Fishery Agency of Japan is now promoting a comprehensive program for coastal fisheries development in order to solve various problems arising in conjunction with the enactment of the 200 nautical-miles coastal limit. The Agency, as part of this program, has recently announced concrete details concerning a construction plan for ocean culture grounds. According to this plan, large-scale culture grounds will be constructed making use of actual cove or bay conditions along the coast of Japan in order to utilize marine resources in a more systematic way for efficient culture fishery development.
The culture ground will consist of (1) artificial hatcheries, (2) artificial breeding grounds for young fish, (3) artificial gathering places for fish and (4) culture beds for shellfish and seaweeds. Also, in order to preserve desirable environmental conditions for fishing grounds, the culture ground will incorporate various control functions, such as (5) a monitoring buoy measuring water temperatures and sea current conditions, (6) a generator buoy for generating electricity and abating waves, (7) an upswelling induction device for stabilizing the volume of plankton within the bay area, and so on. "We have long possessed a satisfactoy level of culture fishery technology (artificial stock or culture)", says one high-ranking official of the Agency, "But, as for the utilization of fishing grounds, imperfect control systems have often caused various adverse problems, including overcrowded cultivation and overfishing after stocking. We, however, intend to incorporate our advanced cultural fishery technology in a master plan for coastal fishing grounds in order to ensure the future growth of culture fisheries".



Inshore Catching

Gathering of sea urchin • Rishiri island
(Photos offered by Soju-sha)

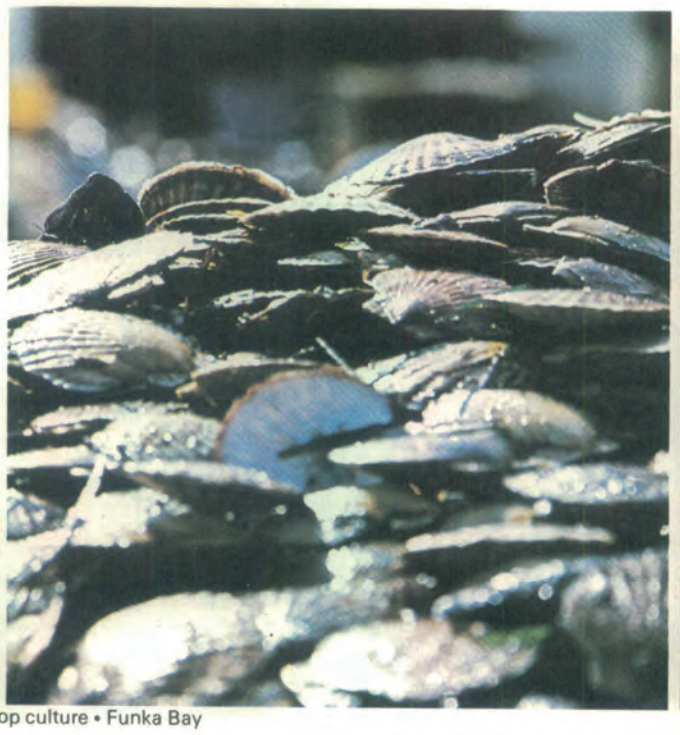
The western and southern coasts of Hokkaido, Japan's nothernmost island, are washed by the warm Tsushima and Tsugaru Currents, while the cold Oyashio Current flows along its east coast. Even though the warm Soya Current, which diverges from the Tsushima Current, flows along a portion of Hokkaido's northern coast, the area is bound by floating ice which drifts ashore all along the coastline for nearly half of the year. The drifting ice is caused by the East Sakhalin Current which flows from the north into this area.
In the shallow sea areas of Hokkaido, marine resources peculiar to warm waters are naturally fewer in kind and lesser in quantity, even near the rocky beaches benefitting from the warm currents; thus, the "few species but great quantities" cold water biota prevails. The area is rich in tangle and shellfish, like urchin and scallops. Compared with other areas of Japan, the coast of Hokkaido abounds in shallow-sea resources because of its negligible loss of fishing ground area to industrial encroachment. In Hokkaido, seaweed gathering ranks first, immediately followed by gill netting and shellfish gathering. Increased culturing of shellfish and algae is being carried out extensively in this area. And YAMAHA FRP fishing boats and outboard motors are becoming increasingly essential to the success of these fisheries.

Les côtes d'Hokkaïdo, île septentrionale de l'Archipel Japonais, sont particulièrement riches en ressources marines. Parmi les principaux produits, on peut citer le "kombu" (varech), le"wakame" (algue comestible), les oursins et les coquillages comme les coquilles Saint-Jacques. Bien que relativement peu variés, ces produits des mers froides sont recueillis en grande quantité, et leur commerce représente une activité très importante.

Las costas de Hokkaido, la isla más al norte del archipiélago japonés, son ricas en recursos marinos. Los productos principales incluyen "konbu" y "wakame", dos especies de algas marinas, y también erizos de mar y moluscos del tipo veneras. Estos productos de agua fría, aunque limitados en variedad, se encuentran en grandes cantidades. Su cultivo representa también una actividad muy importante en el orden comercial.

Beam netting for surf clams • Ishikari Bay

Gathering of kelp • Funka Bay



Scallop culture • Funka Bay