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Traditional Fisheries Maturization & Modernization

Small-scale Modern Coastal Trawl Fishery with High Net towing Power and Fishing Efficiency

Coastal fisheries in Japan have strived to develop and modernize along a course different from that of large-scale commercial fisheries.

Industrialization of Japanese fisheries began roughly at the beginning of the 20th century. Since around 1906, fishing boats and techniques began to be imported from the advanced nations in Europe and America, leading to the development of offshore and pelagic fisheries. However, the modernization of fishing techniques in the small-scale coastal fisheries remained far behind that of the commercial fisheries for a long time, primarily due to the stagnant production system in the fishing villages.

After World War II Japan started to rebuild itself as a pacifist nation, and since the 1960's when Japan's economic basis began to recover, the coastal fishing villages began to take big steps forward in overall modernization of their fisheries through such measures as the consolidation of fishery cooperative associations, the expansion of the financial system for fisheries, as well as the improvement of fishing boats, engines and equipment. In the case of these fishing villages, traditional fisheries have developed along with the village community as a whole over many generations, so when new technology and a new highly economic society was introduced, they were ready and able to accept these changes. The successful coastal fisheries with high productivity in the many districts in Japan today invariably show a combination of traditional techniques and modern industrialized techniques.

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Trawl fishery is one of the basic high-productivity small-scale coastal fishing methods. Although large-scale trawling was first imported from Europe early in the 20th century, at that time in Japan small-scale trawling methods were already in practice in various districts. Since then various technical improvements have been made in these traditional techniques as a result of the inflow of European and American technology. These improvements include motorization of fishing boats, improvements in the performance of small-scale diesel engines, improved net mouth opening apparatus, the introduction of synthetic fibers for nets and ropes, the motorization of winches and the introduction of fish finders. These factors have led to improved net towing power and fishing efficiency, resulting in a small-scale but modern coastal trawl fishing industry.

La pesca con red es de las más importantes, y ofrece gran productividad tratándose de pescas costaneras de pequeña escala. En la éra de Meiji se importaron de Europa métodos de pesca a la rastra para gran volumen. Sin embargo, en diferentes distritos del Japón ya existían varios tipos de pesca a la rastra, o varios métodos para volúmenes pequeños. Estos métodos tradicionales de pesca habían sido mejorados en varios aspectos tecnológicos con motivo de la introducción de la cultura europea y americana desde la éra de Meiji. La innovación técnica, como la motorización de los botes pesqueros, la mejora del rendimiento de motores Diesel pequeños, la mejora del aparato de abertura de la boca de la red, la introducción de fibra sintética para cuerdas y redes de pescar, la motorización del malacate, y la introducción del descubridor de peces se ha venido acumulando; y la potencia de remolque de redes así como la eficiencia de la pesca han mejorado grandemente, con el resultado del establecimiento de pequeña pero moderna pesca costanera a la rastra.

La pêche au chalut constitue un moyen de pêche clé étant donné qu'elle est d'une productivité importante parmi les pêches côtières de faible envergure. A l'époque Meiji au Japon, la méthode de pêche au chalut de grande dimension fut importée d'Europe. Quoique au Japon, on notait dans plusieurs régions déjà des méthodes de pêche au chalut de petites dimensions. Ces méthodes de pêches traditionnelles ont donc été améliorées sous divers aspects techniques grâce à l'apport en masse de la culture Européenne et Américaine depuis la période dite Meiji. Ainsi, les innovations techniques telles que la motorisation du bateau de pêche, l'amélioration des performances du moteur diesel de petite dimension, l'amélioration des apparaux et du filet à large ouverture, l'introduction des fibres synthétiques pour le filet de pêche et les cordages, la motorisation des treuils et l'adoption du détecteur des pêches ont eu des répercussions radicales; Puis le chalutage motorisé et les méthodes raffinées des pêches ont grandement amélioré la situation avec pour résultat l'établissement d'un système de pêche côtière au chalut de faible envergure mais néanmoins moderne.

Small Beam

A case example from small shrimp trawl Japanese name: Ebi-kogi-ami

Classification of Coastal Small-Scale Trawls

The trawl fishing methods presently in operation in Japan can roughly be divided into four types, trawls without beams, beam trawls, dredge nets and otter trawls.

(1) Trawls without beams

This is the simplest type of trawl, consisting of a net without an opening apparatus at the mouth. This type of trawl can be further divided into; (a) trawls towed by one boat; (b) trawls towed by tying tow lines to outstretched poles at the bow and stern while using the tidal currents or wind for power (Utase-ami small-scale sailing trawl) and; (c) trawls towed by two boats.

These are long-established fishing methods, but they have gradually been replaced by the more effective beam trawls, dredge nets and otter trawls that have developed with the increased motorization of fishing boats. In the offshore trawl fisheries in the Sea of Japan, however, two-boat trawls are still in operation.

(2) Beam Trawl

Beam trawls are a type which has a beam of bamboo, wood, FRP or metal to hold the mouth of the net open. In this issue we will talk about small shrimp trawls used to catch mainly tiger shrimp and other small shrimps, as an example of beam trawl coastal fishing.

(3) Dredge Net

A dredge net has a wood or steel frame with claws made of steel or other metals that scrape the sea floor as the net is towed. This type of net catches shellfishes.

(4) Otter Trawl

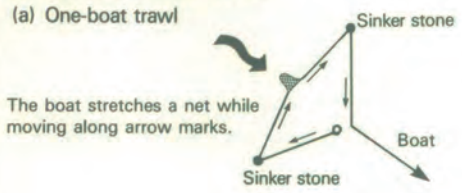
This is the most highly developed type of trawl. Two "otter boards" attached one at the right and left edges of the net mouth function to hold the net open horizontally. This method which was imported into Japan in the first-ninties, was first used in large offshore trawls, and was later adapted for use in coastal fisheries.

These various trawls are used in one of two ways; side trawling in which the net is haulded from the side of the boat, and stern-trawling in which it is hauled from the stern. In general the stern-trawl is more efficient, but it requires that the boat be equipped with a net hauler.

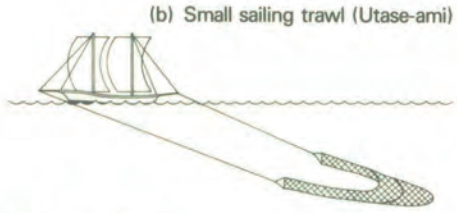
In each of the trawl methods excluding dredge net, namely, non-beam trawls, beam trawls, and otter trawls, the net is towed near the bottom or in the middle water layer of the sea depending on the conditions of the grounds and the type of fish being caught. There is a type of net fishing where the net is towed in surface layer, but in Japan this is called boat seine and thus distinguished from trawl fishing.

1) Trawl without Beam

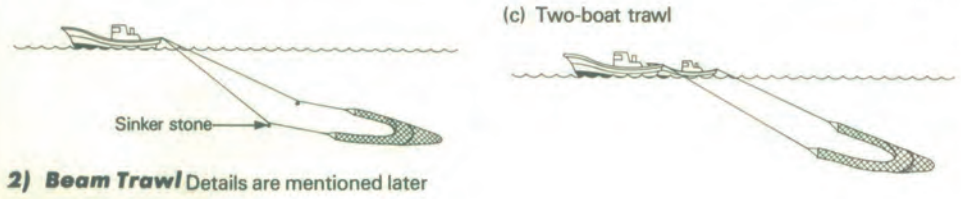
(a) One-boat trawl



(b) Small sailing trawl (Utase-ami)

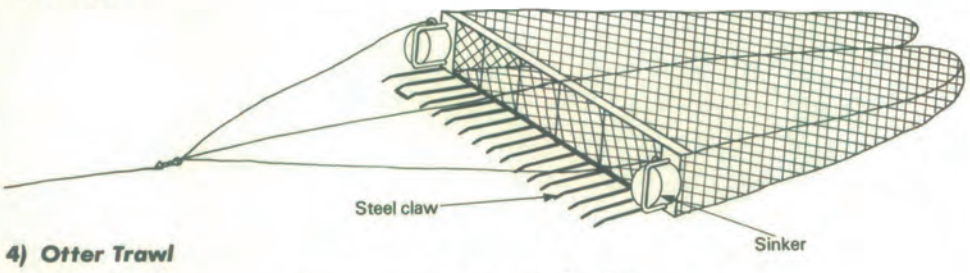


(c) Two-boat trawl



2) Beam Trawl Details are mentioned later

3) Dredge Net



4) Otter Trawl

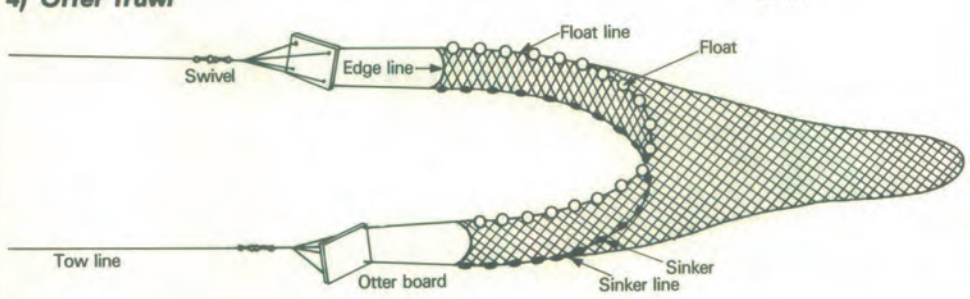
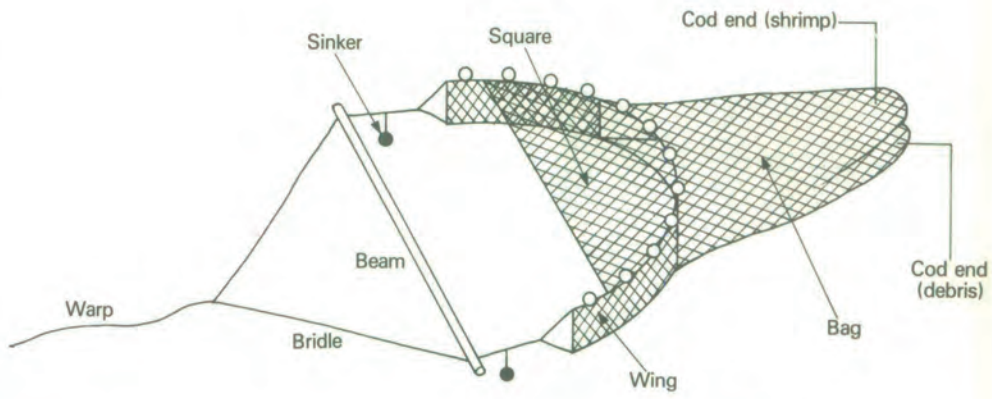
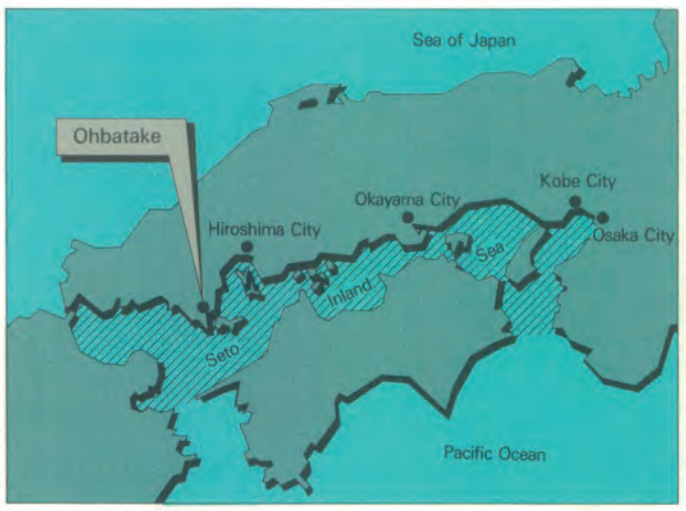


Fig. 1 Construction of a Beam Trawl



Warp: 200-300 m
Bridle: each 50 m
Wing: Height 90-270 cm, length 60-70 m
Bag: Length 10 m

Cod end (for shrimp: 5 m)
Cod end (for debris: 2 m)
Beam: Length 10 m
Float: 16-17 floats made of styrofoam



Beam trawl is a fishing method using a net equipped with a beam (rod) made of bamboo, wood, FRP or metal attached near the net mouth. As a representative example of beam trawl operated in coastal fishing grounds, we will discuss here small shrimp trawls used for catching mainly tiger shrimp and other small shrimps.

In small shrimp trawls operated in the Seto Island Sea, various improvements have been divised concerning the number and arrangement of nets towed by one fishing boat and concerning the construction of the net. As seen in Figure 2, there are two methods of net towing; i.e., one-line type in which one net is towed by one fishing boat; and two-line type in which two nets are towed by one fishing boat. Furthermore, there are three kinds of nets; i.e., a net with one bag, one with two bags, and one with three bags. In this issue the one-line one-bag type fishing method will be introduced, based on information that was collected in a fishing village "Ohbatake", facing the Sea of Suo located in the western district of the Seto Inland Sea.

Operation of this fishing method is as follows: Fishing gear (small beam trawl) is laid piled up on the quarter deck after assembling all parts of the trawl except the beam. At the fishing grounds, while running a fishing boat at slow speed along the direction of the tidal current, the bag net and wing net are thrown into the water in that order. In the process of throwing, the beam is attached to the base of the bridle with a hook. Next, after the beam and bridle are thrown in, the fishing boat is moved forward at full speed while letting out the warp. When the boat has run until the warp becomes stretched, the behavior of net is adjusted. Subsequently the boat's speed is reduced and the net is towed along the tidal current at a slow speed of 1-2 knots for 45-60 min.

Fishing is started at about sunset, because shrimps remain in sand during the daytime and they move about seeking food during night. During net towing, the left and right wings scrape the bottom. This action scares the shrimps and drives them out to the center of the net. Then the shrimps are scooped up with a bag net.

In net hauling the warp is wound around a side roller driven by a directly connected engine with the aid of a roller at the stern.

Clasificación de la Pesca de Poco Volumen con Red

Las pescas a la rastra que de presente están operando en el Japón pueden dividirse en los cuatro siguientes tipos generales: pesca con red sin caña, pesca a la rastra con caña, red barredera, y pesca con red a la nutria.

(1) Pesca con red sin caña

Es éste un método de pesca en que se usa una red sin aparato de abertura en la boca de la misma red; es también el tipo más sencillo entre las pescas a la rastra. Este tipo se subdivide en: (a), pesca con red remolcada por un bote; (b), pesca con red remolcada por líneas que se extienden hasta postes de bambú en proa y en popa empleando la potencia de las corrientes de marea o viento (Utase-ami, remolque pequeño de vela); y (c), pesca con red remolcada por dos botes.

Son métodos de pesca desarrollados desde hace mucho; pero con el avance de la motorización del bote pesquero, la mayoría de los métodos harevolucionado en pesca con red de caña, red barredera, y pesca a la nutria, más efectivas. Sin embargo, la pesca a la rastra de dos botes se ha venido operando hasta el presente en aguas alejadas de la costa del Mar del Japón.

(2) Pesca a la rastra con caña

La pesca a la rastra con caña es un método que usa una red dotada de cañas hechas de bambú, madera, FRP o metal para abrir la boca de la red. En esta edición, como ejemplo de pesca con red de caña en campos pesqueros de la costa, se presenta la pesca de camarones para capturar principalmente langostinos y otros camarones pequeños.

(3) Red barredera

En la red barredera se fija a la boca de la red un marco de madera o acero con uñas de acero o de otros metales. Estas redes se remolcan mientras el fondo del mar es escarbado con uñas. Con esta red barredera se recogen mariscos. En otra edición se presentará este método de pesca.

(4) Pesca con red a la nutria

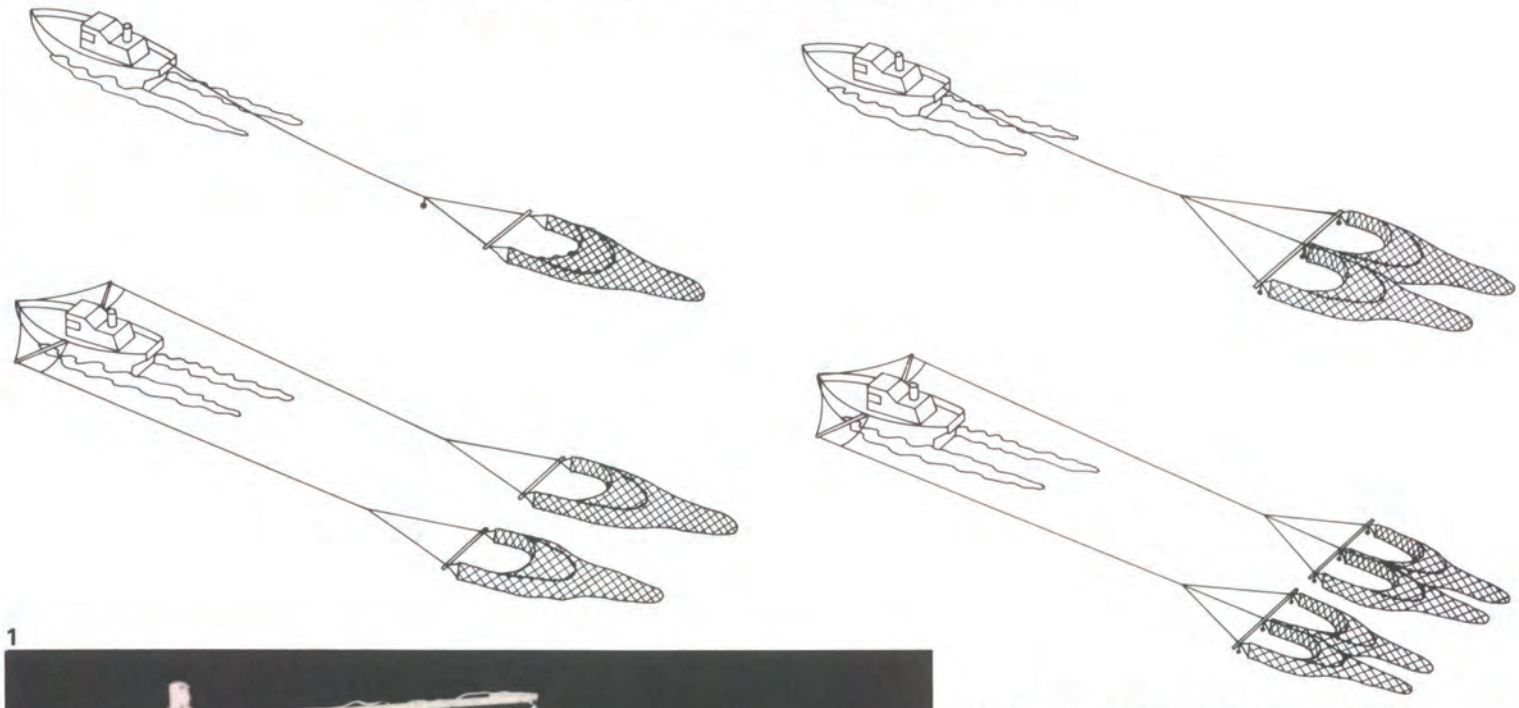
Este es el método más desarrollado de pesca a la rastra. Dos placas (derecha e izquierda) de tablero de nutria adheridas a la línea de remolque cerca de la boca de la red, funcionan para abrir horizontalmente la boca. Este método fue importado al Japón después de la éra de Meiji. Al principio, fue puesto en práctica en la pesca alejada de la costa de gran escala, y más tarde se extendió a la pesca costanera. Este método de pesca también será presentado en una futura edición de esta revista.

Las operaciones de estos métodos de pesca a la rastra se dividen en "pesca a la rastra lateral" en que la red es remolcada a babor o estribor, y "pesca a la rastra de popa" en que la red es remolcada desde la popa. En general la pesca a la rastra desde popa es superior en eficiencia de trabajo, aunque al bote pesquero se ha equipar un remolcador de red.

En cada método de pesca con red sin caña, de pesca a la rastra con caña, y de pesca a la nutria (exceptuada la red barredera), la red es remolcada en el fondo o en capa de media agua según el estado del mar o la captura de peces. Existe un método de pesca de red en el cual la red es remolcada sobre la capa de la superficie; pero en el Japón se llama pesca barredera de bote, y se distingue de la pesca con red.

Trawl

Fig. 2 Operation Methods for Small Shrimp Trawls



After the bridle appears, the net is hauled in with side rollers on both sides (photo 12 on P. 5). Next, the beam is removed, and the net is hauled in by hand. The bag net (cod end) is grasped by hand, moved to the side from the stern while the net is kept in the water, and the bag net is dragged up onto the deck through an opening at the left side of the foredeck. When the net is too heavy to haul in by hand because of an excessive catch of seaweeds and stones, winch is used.

The trawl has an elaborate construction. The cod end called the "mito" is divided into upper and lower portions, and seaweeds and debris are roughly collected into the lower and shrimps into the upper. Although it is difficult to show with a diagram, there is another net of larger mesh in the bag net and large fishes are caught with this filter net. Of course, useful fishes are also sometimes caught in the cod end meant for debris. Therefore, careful sorting work as mentioned later is carried out after each net is opened.

This fishing operation is usually done by two persons, but in recent years a special labor-saving fishing boat has appeared in which throwing and hauling of the net are motorized, remote-control apparatus for the engine and rudder are set up on the foredeck and quarter deck. These innovations have enabled the navigation of the boat and fishing work to be done by just one person. This is another example.

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1-4. Net dragging: The bag net (cod end) is grasped by hand, moved to the side from the stern and dragged up onto the deck. Catches are taken out by opening the cod end.

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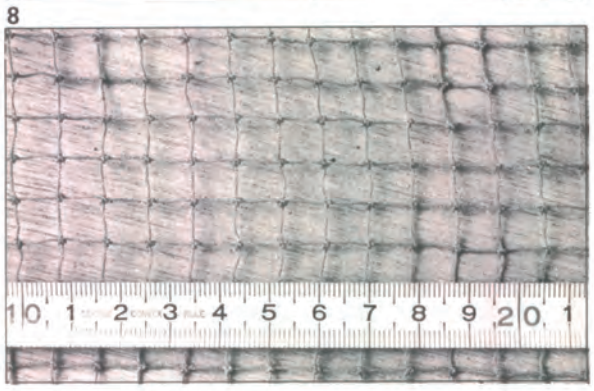

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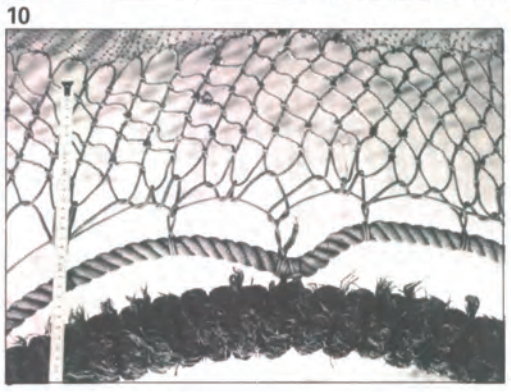

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5. The whole view of trawl net equipment.
Actual size can be calculated by comparison with a fisherman.
6. Wing end
7. Float
8. Bag net
9. Cod end moutn
10. Wing bottom and ground rope
11. Ground rope using a lead rope as its core

Classifications du petit chalutage côtier

Les méthodes de pêches au chalut qui sont utilisées actuellement au Japon peuvent être classées approximativement suivant les quatre types ci-après : Le chalut sans balancier, le chalut à balancier, le filet de drague, et le chalut à double panneau.

(1) Chalut sans balancier

C'est une méthode de pêche qui utilise un filet sans appareil d'ouverture à l'entrée du filet, et le type le plus simple parmi les chaluts. Ce type peut se diviser encore par: (a) chalut traîné par un bateau (b) chalut traîné par des aussières fixées à des perches reliées à l'étrave et à l'arrière du bateau et en mettant à profit la force des courants ou du vent (Utase-ami, petit chalutier à voile); et enfin (c) chalut traîné par deux bateaux.

Ce sont des méthodes de pêches longuement éprouvées, mais avec les progrès de la motorisation du bateau de pêche, la plupart des méthodes ont été modifiées avec l'adoption du chalut à balancier plus efficace, du filet de drague et du chalut à double panneau. La méthode à deux chalutiers n'a eu lieu jusqu'à maintenant seulement dans les pêches de chalut au large dans la mer du Japon.

(2) Chalut à balancier

Le chalut à balancier est une méthode de pêche utilisant un filet avec deux balanciers (perches) en bambou, en bois, en fibre FRP ou en métal montés à l'ouverture pour ouvrir le filet. Dans ce numéro, sera présenté le petit chalut à crevette ou à langoustine et autres variétés de crustacés pour donner un exemple de ce qu'est le chalut au balancier utilisé dans les pêches côtières.

(3) Filet de Drague

Dans un filet de drague, un châssis en bois ou en acier ayant des dents métalliques de forme similaire est monté à l'embouchure du filet. Ce genre de filet est traîné tandis que les dents ratissent le fond de la mer. Avec un tel filet, on peut ramasser les coquillages et crustacés. Cette méthode de pêche sera présentée dans un autre numéro prochain.

(4) Filet à double panneau

C'est le type de chalutage le mieux développé. Deux plaques sont fixées à deux filins de traînée près de l'embouchure du filet et ont pour fonction d'ouvrir horizontalement l'embouchure du filet. Cette méthode fut importée au Japon après l'ère Meiji. Au début, elle fut mise en pratique dans le grand chalutage au large et ensuite s'est répandue dans les pêches côtières. Cette méthode de pêche sera aussi présentée dans un numéro prochain de ce journal.

Les opérations suivant ces méthodes de pêche au chalut se divisent en "chalut latéral" selon lequel le filet est remonté par le côté du bateau et le "chalut arrière" selon lequel le chalut est remonté par l'arrière.

En général, le chalut arrière est d'un rendement supérieur, quoiqu'un "monte-filet" doit être équipé sur le bateau de pêche.

Dans chaque méthode de pêche, soit au chalut sans balancier, au chalut à balancier ou au chalut à double panneau, sauf le filet de drague, le filet est traîné au fond ou par demi-fond selon l'état de la mer ou selon les poissons à prendre. Il existe aussi une méthode de pêche dans laquelle le filet est traîné en surface, mais au Japon on la désigne par "senne à bateau" et qui se distingue du chalutage.

Yamaha Fishery Journal

Careful Sorting and the

The term "mass catch" is not applicable to small trawl shrimp fishing in the Seto Inland Sea. From 20-30 kg of fishes may be caught in one net towing, but this catch will contain 10 to 15 different species. In other words you get small catches of many species.

Here are the contents of the catch from one night's operation on Nov. 6, 1981 by Mr. Yukio Yura. That night the net was towed four times and the resulting catch was said to be an average one.

(1)	Small shrimp, "Esa-ebi"	40.0 kg
(2)	Small shrimp, "Yori-ebi"	20.0 kg
(3)	Small shrimp, "Buto-ebi"	11.5 kg
(4)	Tiger shrimp, "Kuruma-ebi"	1.1 kg
(5)	Flatfish	3.0 kg
(6)	Conger eel	4.5 kg
(7)	Black sea bream (one)	1.6 kg
(8)	Blue crab	1.2 kg
Total		82.9 kg

The species listed above are sold as commodities and shipped away. However, in addition to this the catch included about 20 kg of goby, small horse mackerel, mackerel, hairtail, octopus and so on, which are consumed in the fisherman's own home or given to neighbors. The names of the three kinds of "small shrimp" listed here are not names of species but rather they are commercial names indicating the size or the way they will be used,

Esa-ebi: Less than 3 cm in body length. Live shrimps are used as bait while dead ones are sold for use in making processed foods.

Yori-ebi: 4-6 cm in body length used for food.

Buto-ebi: 7-10 cm in body length used for food.

Useful shrimps inhabiting the Seto Inland Sea consist of "kuruma-ebi" (tiger shrimp *Penaeus japonicus*) "saru-ebi" (*Trachypenaeus curvirostris*), "aka-ebi" (*Metapenaeopsis barbata*), "tora-ebi" (*Metapenaeopsis acclivis*) and other species. Tiger shrimp is considered a prime fish and has the highest commodity value. "Saru-ebi" has the next highest commodity value. The "saru-ebi" is especially strong in nature and its survival rate after capture is very high. Therefore, it is considered important as a bait.

The shrimps that are caught are first kept in a corf, and then they are sorted according to the size by scooping them up with a spoon net little by little. In another corf are hung three to four net baskets into which the sorted shrimps are put. This work is done in the free time during net towing.

Right after the fishermen return to the fishing port after finishing the day's fishing, they will start the preparation for shipping. Live shrimps are transferred into polyethylene containers with iced water, because shrimps enter hibernation when the water temperature falls below 13-14°C. After the shrimps are dipped into iced water for ten-odd minutes and immobilized, water is drained off from shrimps. Then, the shrimps are packed into containers for transportation and preserved with ice. Dead shrimps are packed into containers without any treatment and preserved with ice. Live shrimps for bait are put into large net baskets which are in the water for temporary storage. The shrimps that are shipped are transported to wholesale markets in the cities during the night by trucks of a transport company in order to be in time for action in the following morning.

Corfs installed in front of the bridge and sorting of shrimps. Unsorted shrimps are kept in a corf (upper part of the picture) and they are sorted according to the size and kind by scooping them up with a spoon little by little. Sorted shrimps are put in another corf (lower part of the picture).

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Bow

Foredeck with a corf, and bridge

Trawl net equipment at the quarter deck

Making into Commodities

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Photos

1-4 Preparations for the shipment of sorted shrimps. These shrimps are packed into containers with ice after they have entered hibenation in iced water.
They are truck-transported to Hiroshima, a large city with a population of some 800,000 about 100km distant from here.

5-6 Live bait - small shrimp or octopus. They are sold mainly to local anglers or long-line fishermen on an individual contract basis.

7-8 A small quantity of misc. fishes are also caught. They are not shipped to the market but consumed by fishermen's own families.

Esmerado Cuidado de Selección y Preparación de Artículos

No se puede hablar de "pesca masiva" tratándose de pesca pequeña con red de camarones en el Mar Interior de Seto. En cada remolque de red, se cogen de 20 a 30 kgs de peces y otros animales marinos; pero las recogidas contienen de 10 a 15 especies. En otras palabras, se trata de "pesca pequeña de multi-especie".

Por ejemplo, en la noche del 6 de noviembre el Sr. Yukio Yura subió a tierra lo siguiente. Aquella noche el remolque se hizo cuatro veces, y el resultado se considera de promedio.

(1)	Camarón pequeño, "Esa-ebi".....	40,0 kgs
(2)	Camarón pequeño, "Yori-ebi".....	20,0 kgs
(3)	Camarón pequeño, "Buto-ebi".....	11,5 kgs
(4)	Langostino, "Kuruma-ebi".....	1,1 kgs
(5)	Peces planos.....	3,0 kgs
(6)	Congrio.....	4,5 kgs
(7)	Besugo (uno).....	1,6 kgs
(8)	Cangrejo azul.....	1,2 kgs
	Total	82,9 kgs

Las especies enumeradas antes son bienes despachados vendidos como mercancías; sin embargo, además de estas especies se han capturado unos 20 kgs de gobio, chicharro, caballa, "hairtail", pulpo y otros. Estas especies eran consumidas en las casas de los pescadores como plato cotidiano, o dadas a los vecinos. Los nombres de tres clases de camaranos pequeños no pertenecen a las especies; pero son nombres comerciales usados en el mercado, que indican el uso o tamaño.

"Esa-ebi"..... menos de 3 centimetros de largo.
Los camarones vivos se usan como carnada, y los muertos como materia prima para alimentos procesados.

"Yori-ebi"..... 4 a 6 cms de largo. Se usan para alimento.

"Buto-ebi"..... 7 a 10 cms de largo. Se usan para alimento.

Travail minutieux de triage et de transformation en produits commercialisables

Le petit chalut, dans la mer intérieure de Seto, et qui se caractérise par la "prise en masse" ne s'applique pas à la crevette. On attrape de 20 à 30 kg de poissons et autres espèces du monde animal marin en un seul remorquage de filet, mais les prises contiennent de 10 à 15 variétés de faune marine. Autrement dit, on rapporte avec cela une "petite prise à espèces multiples".

Par exemple, le contenu des prises obtenues par le pêcheur Yukio Yura, lors d'une opération de pêche dans la nuit du 6 novembre, 1981, fut le suivant:

Au cours de cette nuit là, le remorquage du filet eut lieu quatre fois, et le résultat fut considéré comme moyen.

(1)	petite crevette, "Esa-ebi".....	40,0 kg
(2)	petite crevette, "Yori-ebi".....	20,0 kg
(3)	petite crevette, "Buto-ebi".....	11,5 kg
(4)	Langoustine "Kuruma-ebi".....	1,1 kg
(5)	Poisson plat.....	3,0 kg
(6)	Congre.....	4,5 kg
(7)	Brème de mer noire.....	1,6 kg
(8)	Crabe bleu.....	1,2 kg
	Total	82,9 kg

Les espèces ci-dessus sont alors des denrées expédiées et distribuées sur le marché; Cependant, outre ces espèces, environ 20 kg de gobie, maquereau bâtard, maquereau, trichiure, poulpe et autres espèces furent aussi attrapés. Cette prise fut consommée en plusieurs jours par la famille du pêcheur lui-même ou distribuée à ses voisins. Les trois désignations de crevettes ne concernent pas des espèces différentes, mais des indications commerciales pour la destination ou la grosseur selon les cas.

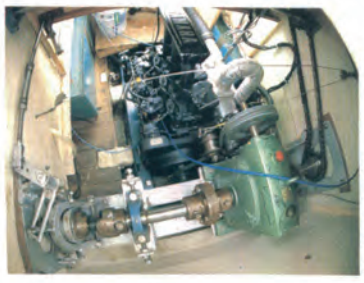
"Esa-ebi"..... Moins de 3 cm environ en longueur. Les crevettes vivantes servent alors d'appâts et les autres servent à préparer les aliments de transformation.

"Yori-ebi"..... 4—6 cm de longueur. Servent pour l'alimentation.

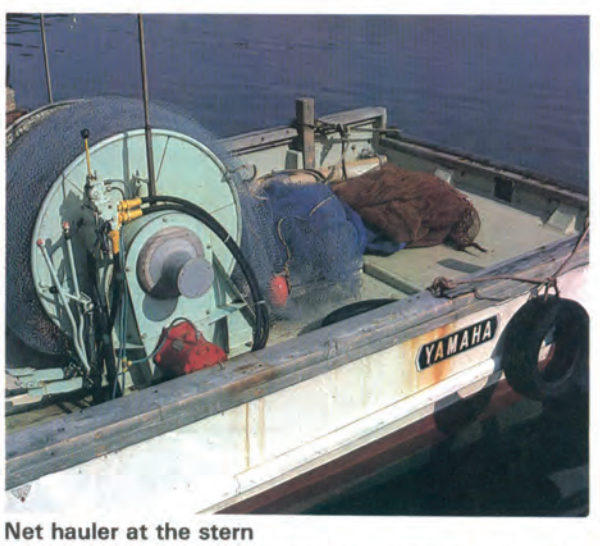
"Buto-ébi"..... 7—10 cm de longueur. Servent pour l'alimentation.

Starboard side roller

Port side roller



Engine room and power transmission mechanism (taken by using a wide-angle lens)



Net hauler at the stern

As a more advanced type of fishing apparatus, there is a method in which a net roller is set up in the stern. This roller is driven by an oil pressure pump or a dynamo.

Distribution of Marine Products in the Inland Sea

Japan catches a larger quantity of marine products per capita than any other country in the world, and these products are supplied to the people in the form of fresh fish, frozen products or processed foods, through a complex and sophisticated distribution system. Japanese fish markets are divided between those in the producing areas and those in the consuming areas.

Here is a summary of the general distribution pattern in markets in the producing areas:

(1) In Japan almost every coastal city, town or village has some fishing port facilities as well as an established local fishery cooperative association. Every day small coastal fishing boats belonging to the fishery cooperative set sail from these base ports, returning in the evening or early morning. Usually the fish catches are landed at the fish market conducted by the fishery cooperative.

(2) Fish catches consist of fish kept live in the fishing boat's corf and also dead fish. The live fish are transferred to the markets' water tank, while the dead fish are packed in fish boxes with ice before landing. The price of catches is set by means of competitive biding by middlemen in the presence of the staff of the fishery cooperative.

(3) The middlemen who have made the highest bids will once more fill the fish boxes with ice and send the fish off to a large central market in the producing area or else send them directly to fish markets in the consuming areas of large cities by common truck, refrigerator car, live fish car or a special goods train.

(4) To meet the needs of the fishermen and aid in the distribution system, the regional fishery cooperative operates an ice making plant and an ice storage house along with the fish market. The cooperative also has a fish refrigerator so that it has the option to withhold the shipment of fishes by storing them temporarily when low prices are expected at the destination markets. Some cooperatives also have fish preserving ponds and processing factories, again to help allow them to make the most profitable use of their products and sell when the price is good.

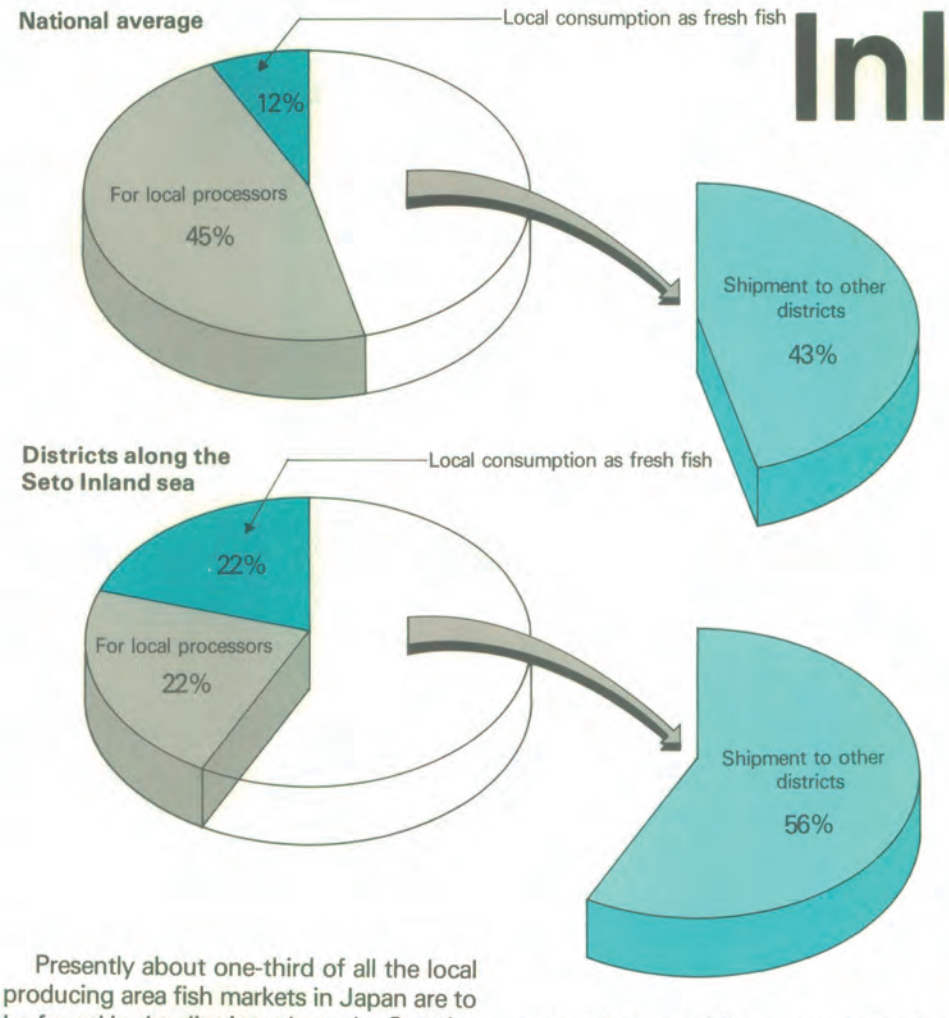
(5) In general the distribution pattern for marine products in coastal villages is as described above. However, in villages where the fishery cooperative is weak, individual fishermen will often ship catches directly to central markets without first passing through their cooperative's market system. Special products such as live fish, cultured fish and processed products are in most cases shipped through distribution routes established by specialized dealers.

How about the situation in the consuming areas? There are "local wholesale markets" in main cities around the country and "nationwide wholesale markets" in the large metropolices such as Tokyo and Osaka. These markets handle large quantities of products gathered from the producing areas through the efforts of middlemen who sell them in turn to wholesalers by means of a modern auction system at these markets, after which the products are sold to retailers. The large majority of marine products are consumed in cities having such wholesale markets, and the distributors have the option to transfer their goods from the nationwide markets to the local markets or vice versa, depending on the price fluctuations.

* * * * * * * * * *

In the coastal districts along the Seto Inland Sea fisheries have been developed extensively since old times because of several historical factors, namely: (1) The Seto Inland Sea is a calm inland sea blessed with the abundant marine resources; (2) it is near the large metropolitan cities with their large consumption and demand; (3) active marine transportation facilities have made shipment to and from even remote places possible. It is even said that most of the fishing methods currently in use were actually devised in the middle ages, and only perfected in the modern age (17th to 19th centuries).

Fig. 1 Proportion of Destination in Fish Markets in Producing Area (1968)



Presently about one-third of all the local producing area fish markets in Japan are to be found in the districts along the Seto Inland Sea, although these markets are usually small-scale in terms of facilities and volume of goods handled. Moreover, most of the middlemen in these districts are retailers as well.

Let's take a closer look now at the nature of the distribution system for marine products in these coastal districts of the Seto Inland Sea.

In the period of high economic growth rate since the 1960's, a large industrial complex has grown up in these districts along the Seto Inland Sea, and with this there has been the construction of a large number of secondary industries (manufacturing industries). At present industrial production of this area accounts for about 30% of that of the entire country, with oil refining and crude steel production accounting for 40% of the national total.

The development of industries and accompanying suburban-type living environment have been given top priority in this area, which has been densely populated since old times. This construction of industrial zones over wide areas of the coast region has naturally posed various problems for the fishing industry, including the loss of fishing grounds, water pollution and a decrease in the labor force for fishery.

However, despite the large amount of reclamation that has been done, and the resulting decrease in fishing grounds, the Seto Inland Sea is still blessed with an abundance of marine lives, indeed some more than 900 different species have been identified in these waters. Of these 900 some species about 100 are presently sold as commodities, which means the utilization rate of useful species is extremely high by world standards.

Another characteristic of this area is the fact that a very advanced and diversified distribution system has been developed, linking it to the nearby consuming areas.

(1) Special sales methods have been developed to deal with the multi-species, small quantity type catches that are characteristic of coastal fisheries. Firstly, fishes caught in small quantities are often consumed as perishables in the producing area itself, and secondly, small scale fish peddlers still exist, who take these catches to neighboring towns and villages to sell directly without passing through the regular producing area fish market.

(2) The Seto Inland Sea is also a Japanese national marine park with many beautiful sightseeing resorts. In recent years, because of the great industrialization of the area and the resulting affluence, including the spread of privately owned cars, many tourists from the industrial centers are now coming to the seaside resort area for leisure enjoyment and sightseeing. This has resulted in the construction of many hotels and private lodging houses which in turn have increased the demand for fresh fishes and shellfishes for the tourists. Thus,

Table 1. Production of Destination in Fish Markets in Production Area

Items		The Inland Sea	Whole country	Ratio in whole country
a. Total population (in thousands)	'80	23,144	117,057	20%
b. Working population (in thousands)	'80	10,743	55,665	19%
c. Annual sum of industrial products shipped (in millions of Yen)	'78	39,994,762	164,810,378	24%
d. Working population in fishery (in thousands)	'79	76	468	16%
e. Sum of fishery production (in millions of Yen)	'79	326,926	2,478,828	13%
f. Sum of production per fisherman e/d (in millions of Yen)	'79	3.9	5.3	
g. Number of fish markets in producing area	'68	353	1,244	28%
h. Amount of fishes handled in the above fish market (in thousands of tons)	'68	568	4,896	12%
i. Number of middlemen in the above fish market	'68	16,423	59,444	
j. Number of fresh fish retail stores	'79	11,595	56,461	20%
k. Monthly outgoings for consumption per household (Yen)	'78	195,229	210,803	
l. Monthly outgoings for food per household (Yen)	'78	59,081	61,503	
m. Monthly outgoings for fresh fishes and shellfishes per household	'78	5,592	5,087	
n. Monthly outgoings for salted and dried fishes and shellfishes per household (Yen)	'78	1,637	2,158	

System of ts in the Seto Districts

fishermen were able to start selling a large quantity of medium and prime grade fish directly to neighboring hotels or use these fishes in lodging houses that they themselves manage as a side business.

(3) Medium and prime grade fishes occupy an important percentage of the total fishery production. Therefore, by the use of a corf on the fishing boat and net pens in the fishing port, they are able to keep live medium and prime fish for shipment to sightseeing resorts or large city markets. Cultured tiger shrimp, red sea bream and yellowtail are also shipped either alive or in a highly fresh state.

(4) With the development of sales methods for the direct delivery of cultured products to the consuming area, methods of live fish transportation and direct delivery to sightseeing resorts have developed, and the percentage of the total marine production that is being shipped without passing through the fish markets in the producing area is increased to about 50%. By comparison, the national percentage is only a little less than 20%.

* * * * * * * * * * *

Modernization of fisheries in Japan since the first-ninties has proceeded in two directions. First of all, modernization has taken place in the promotion of pelagic fisheries. Large fishing boats and trawling techniques were imported from Europe and America, and technical guidance was provided to the crews. Fishing grounds were also enlarged from coastal to offshore waters and further to the high seas; and through these innovations, the development of large-scale commercial fisheries was promoted. Japanese fisheries began to be industrialized starting in the first-ninties, and at present, after the lapse of about 80 years, they have developed to a constant production level of a 10 million ton annual catch.

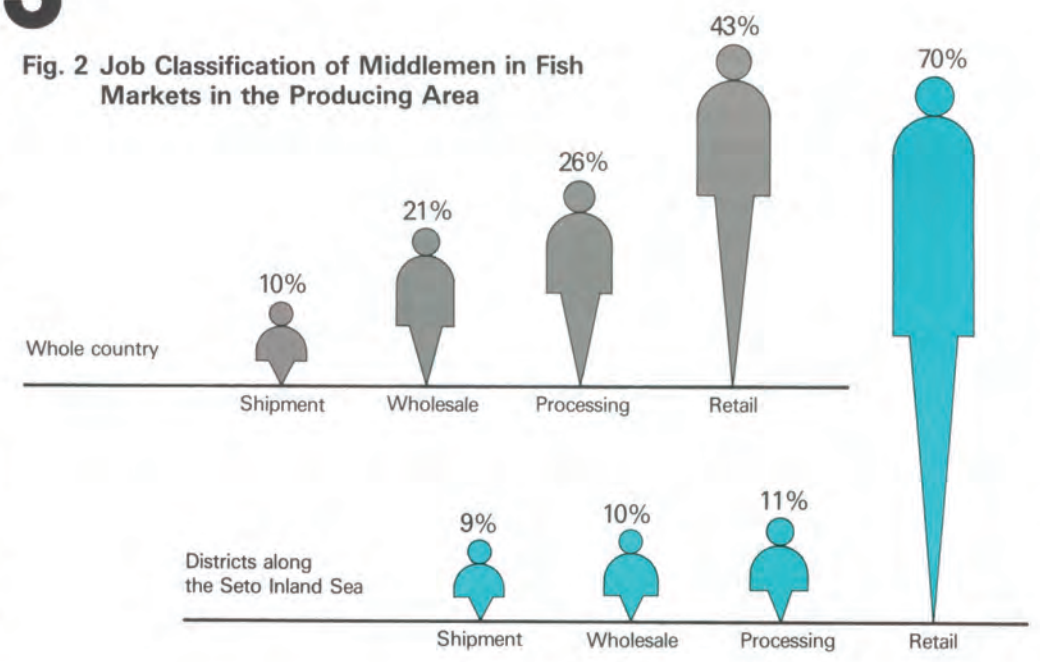
However, it must be pointed out that about 40 percent of the 10 million tons of fishery production consists of the production from coastal fisheries and culture fisheries. As to the size of Japanese fishing boats, 90 percent of them are small motorized fishing boats under 5 tons.

An overwhelming majority of workers engaging in fisheries throughout the country are coastal fishermen. This fact indicates that the promotion of coastal fisheries is important as the primary means for overall development of fisheries.

Coastal fisheries are managed by families and produce a small amount of medium and prime fishes with high market value. Fishermen have continued to devise various fishing gears and methods throughout the years and have strived to elevate productivity although the form of fishery has remained as traditional small-scale fishery. In the Japanese coastal fisheries, modernization of fishery production was realized by motorization of fishing boats, mechanization of fishing work and an attempt to transfer to culture fishery from capture of natural resources; however, at the same time the value of marine goods was raised by improving the methods of maintaining freshness of catches and processing techniques, and by rationalization of distribution.

Japanese coastal fisheries have demonstrated that the pursuit of ever larger scale such as the construction of larger fishing boats and expansion of management scale is not the only means for developing fisheries. Small-scale fisheries have a direction of development of their own. There are many countries in the world that need to strive to raise their standard of living by giving employment opportunities to coastal inhabitants by promoting fisheries and by increasing fishery income. We must reconsider the importance of small-scale coastal fisheries from this viewpoint. Furthermore we can anticipate that a smooth development of offshore fisheries conducted by medium and large fishing boats will occur naturally after small-scale fisheries with adequate technology and management have been developed and established as industries.

Fig. 2 Job Classification of Middlemen in Fish Markets in the Producing Area



Distribución de Productos Acuáticos en Japón

Japón está capturando gran cantidad de productos acuáticos, sin pararelo en el mundo si se calcula en términos de cantidad por persona o porcentaje de población, y está suministrando estos productos a través de un sistema de distribución complicado y sofisticado en las formas de pescado fresco, productos congelados o alimentos procesados. Los mercados japoneses del pescado pueden dividirse así: mercados del área de producción, y mercados en área de consumo.

La distribución general en el mercado de pescado en el área de producción se resume de la siguiente manera:

(1) Se han fundado asociaciones cooperativas de pescas regionales en casi todas las ciudades, pueblos y aldeas a lo largo de las costas japonesas, y también se han establecido puertos de pesca bien equipados. Botes pesqueros pequeños para costa pertenecientes a asociaciones cooperativas pesqueras zarpan cada día de tales puertos de pesca considerados como base, y vuelven al puerto por la mañana temprano o al anochecer. Generalmente lo pescado se descarga en el mercado de pescado por la asociación cooperativa de pesca.

(2) Lo pescado consta de peces vivos conservados en los cofres del bote, y de pescados muertos. Los primeros se transfieren al tanque de agua del mercado, y los segundos se despachan después de empacarse en cajas con hielo. El precio se fija mediante un método de subasta realizada por intermediarios en presencia del personal de la asociación cooperativa de pesca.

(3) Los intermediarios que hayan hecho una oferta exitosa, llenarán nuevamente las cajas de pescado congelado. Luego se envían a los grandes mercados centrales de pescado del vecindario establecidos en el área de producción, o son despachadas directamente a los mercados de pescado del área de consumo mediante camiones de uso general, camión refrigerador, camión de pescado vivo, o tren de carga.

(4) La asociación cooperativa de pesca regional tiene fábrica de hielo y bodega para hielo aparte del mercado de pescado y suministra hielo a los pescadores a fin de cumplir la mencionada función de distribución. La asociación tiene también refrigerador de pescado y regula los despachos almacenando en el refrigerador cuando en el sitio de destino se esperen precios extremadamente bajos. Algunas asociaciones tienen pozos de conservación de pescado vivo y fábricas de procesamiento para mantener y elevar el precio del pescado.

(5) Lo anterior es un modelo general de distribución de productos acuáticos en las aldeas costaneras de pesca. Sin embargo en las aldeas donde la asociación cooperativa de pesca es débil y pobre, a veces los pescadores despachan sus productos sin pasarlos a través del mercado de pescado de su propia asociación. Productos especiales, tales como pescado vivo, pescado de cultivo y productos procesados en la mayoría de los casos se despachan a través de la ruta de distribución formada por comerciantes especializados.

Por otra parte, ¿cuál es el estado del área de consumo? Hay "mercados locales al por mayor" en las ciudades estratégicas regionales, y "mercados nacionales al por mayor" en las grandes ciudades, como Tokio y Osaka. En estos mercados se reune gran cantidad de productos acuáticos procedentes de los mercados de área de producción mediante el trabajo de los intermediarios, y son vendidos por el sistema moderno de subasta a los intermediarios al por mayor, para revenderlos a los vendedores al por menor. La mayor parte de los productos acuáticos es consumida en las ciudades en que existen los mencionados mercados al por mayor; pero de acuerdo con la fluctuación de precios en varios distritos, los bienes son a veces transferidos del "mercado nacional al por mayor" al "mercado local al por mayor" o viceversa.

Distribution des produits aquatiques au Japon

La quantité importante de produits aquatique prise par le Japon est sans parallèle dans le monde quand on calcule selon la quantité consommée par tête de population, et un système complexe de distribution est adopté pour les distribuer sur les marchés sous forme de produits frais, congelés ou transformés. Les marchés japonais du poisson se divisent pratiquement en deux; la zone de production et la zone de consommation.

Le réseau général de distribution du poisson au Japon dans la zone de production est schématisé ci-après:

(1) Des associations coopératives de pêche régionales ont été établies dans presque toutes les villes, cités et villages côtiers dans tout le Japon, et l'on y trouve aussi des ports de pêche et infrastructures en rapport. Les petits bateaux de pêche côtiers appartenant aux associations coopératives de pêche prennent la mer chaque jour à partir de ces ports de pêche qui sont considérés comme leur base et ils retournent au port tôt le matin ou tard le soir. Généralement, les prises de poisson sont acheminées vers le marché de poisson dirigé par l'association coopérative des pêches.

(2) Les prises de poisson comprennent des poissons vivant gardés dans le banneton dans le bateau et des poissons non vivants. Les premiers sont transférés ensuite dans le bassin d'eau du marché de poisson, et les autres sont débarqués après avoir été empaquetés dans des boîtes à poisson avec de la glace. Le prix est fixé par enchère par le crieur et en présence du personnel de l'association coopérative des pêches.

(3) Le crieur ou intermédiaire qui a enlevé l'enchère, remet alors de la glace dans les boîtes de poissons. Ensuite, ces poissons sont envoyés dans les grands centres de distribution du poisson voisins dans la zone de production ou sont expédiés vers les marchés de poissons dans la zone de consommation des grandes villes en général par camions, voiture frigorifique, voiture à poissons vivants ou par train marchandise.

(4) L'association coopérative des pêches régionale possède une fabrique de glace et un entrepôt frigorifique à côté de celui du marché pour le poisson et fournit la glace aux pêcheurs afin de régulariser le circuit de distribution mentionné plus haut. L'association possède aussi un rérigérateur à poisson et régularise l'expédition en stockant le poisson dans ses entrepôts frigorifiques quand le prix du poisson s'annonce très bas à la destination. Certaines associations possèdent des bassins de préservation du poisson vivant et des usines de traitement en vue de mieux gouverner le prix sur le marché.

(5) C'est donc ci-dessus, le schéma général de distribution des produits aquatiques dans les villages de pêche côtier. Cependant, dans les villages où l'association coopérative des pêches n'est pas très puissante, les pêcheurs eux-mêmes expédient parfois leurs produits sans passer par ces associations. Les produits spéciaux tels que le poisson vivant, le poisson de culture et les produits traités sont dans la plupart des cas expédiés par l'itinéraire de distribution formé par des négociants spécialisés.

D'un autre côté quelles sont les conditions dans la zone de consommation? Il existe des "marchés locaux grossistes" dans les grandes villes comme Tokyo et Osaka. Une grande quantité des produits aquatiques qui proviennent de ces marchés dans la zone de production des secteurs variés par des intermédiaires sont amassés dans ces marchés, vendus par le système d'enchère moderne au grossiste intermédiaire, puis aboutissent aux détaillants. La plus grande part des produits aquatiques est consommée dans les villes ayant des marchés de gros mentionnés ci-dessus; mais suivant les fluctuations de prix dans les divers secteurs, les marchandises sont parfois transférées depuis les "marchés" de gros nationaux" vers les "marchés de gros locaux" ou vice-versa.

A Happy Family

Selecting the Kind of Fishery by Age and Family Make-up of a Fishing Village

The straight of Ohbatake (in Yamaguchi Pref.) where we did our research on small shrimp trawling is a good fishing ground for line angling in the Seto Inland Sea. Mr. Yoshito Yura, the father of Mr. Yukio Yura who owns a small shrimp trawler, is a veteran fisherman who engages in line angling fishing. He is especially skilled in red sea bream angling. Although he does commercial fishing as well, in recent years he has been busy in the sport fishing business.(*) On the average he has about 20 sport fishing customers per month.

This year he will be 56 and his wife Chiyoko will be 51, and he has 4 sons and one daughter. All but the youngest child are now married with families of their own. All of his children have either chosen fishing as their own profession or married a fisherman. Mr. and Mrs. Yoshito Yura live alone now that all of their children have moved into houses of their own in the same village. All of their houses are grouped near the parents house and they exchange frequent visits everyday.

Mr. Yoshito Yura is proud of having taught all his children the skills of angling. "As soon as my sons were old enough to go to elementary school, I would take them on board and teach them how to use the various gear, how to select bait and read the tides. I wanted them to learn the angling techniques and the habitats of the fishes as young as possible. With these skills they would be assured of being able to make a living when they grew up."

After finishing school his sons all have gone to the cities to work for a while as truck drivers or salaried workers, but in the end they have all came back to their home town to become fishermen, just as their father predicted. From that day they returned home they were all able to earn a living from angling. In Japan, they call this phenomenon of the young people going away to work in the cities for a while and then returning to their home towns to live, the U-turn phenomenon. It is not the usual phenomenon but in fishing villages recently in Japan it has become increasingly common.

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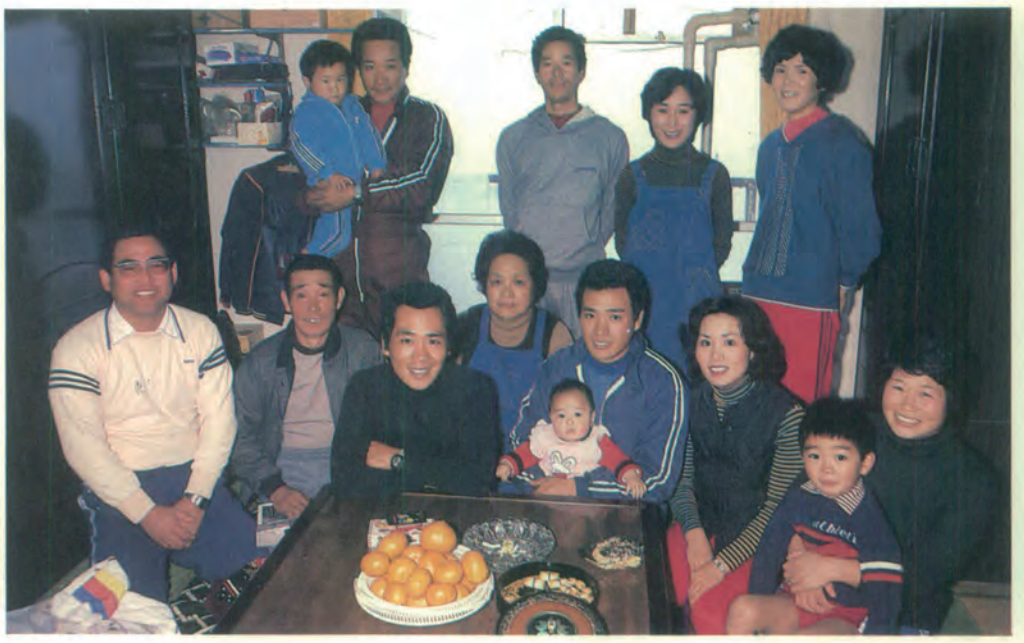
Now, let us take a look at the changes that have taken place in fisheries at Ohbatake. Until 30 years ago, almost all of the fishermen here were engaged in hand and line fishing using a powered boat of 1.5 to 2 tons. Rock-fishes such as red sea bream, sea bass, rock trout and black sea bream were caught in abundance. Back in those days there were only three small shrimp trawlers in operation. Beginning in the latter half of the 1960's there began to be an increase in the number of small shrimp trawlers. The new boats were 3 ton type with a 10 hp. engine.

Shellfish dredge net



Annual Schedule of Trawl Fishery

Fishing method	Catch	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Shellfish dredge net	Cockle, Ark shell	■	■	■									■
Small beam trawl	Flatfish and other miscellaneous fishes	■	■	■									■
Small shrimp trawl	Shrimps and miscellaneous fishes					■	■	■	■	■	■	■	

At present there are about 150 boats under 3 tons and 49 boats of between 3 and 5 tons being operated in Ohbatake. The boats under 3 tons are used mostly for line angling and as in the case of Mr. Yoshito Yura, almost all of these are used for sport fishing. On the other hand, the 3-5 ton type boats are used mostly for trawling fishery, such as small shrimp trawl, shellfish dredge net and beam trawl.

The fishermen engaging in line angling are mostly very old while those engaged in trawl fishery are the younger generation ranging in age from their thirties to forties. As seen in the example of Mr. Yura and his children, they work at the kind of fishing appropriate to their age.

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In Japan, amendments to the Civil Laws in 1947 led to the rapid collapse of the old father-centered family system, and the principle of the modern family based on monogamy and equality of the sexes become established. Starting in the 1960's there was a marked break-up of families into the so-called "nuclear family" and this nuclear family became the basic unit of the work force in coastal fishing towns. And now with the further mechanization of boats and fishing methods the majority of the 3-5 ton type fishing boats can now be operated by just one person.

However, when we look at the trends of fishery in Japan as a whole, we can see the appearance of several negative trends such as the overall aging of the work force and the lack of successors to fishery enterprises. Especially in the coastal fishing villages the lack of successors to carry on the fisheries is becoming acute.

It is not yet known what the future family structure will be in the coastal fishing villages. The "compound family" that we see in the case of Mr. Yoshito Yura, which consists of many small families is only one example. And probably it is safe to say that their's is one of the happiest cases.

(*)Business in which the angler's boat is leased to amateur anglers who come from the cities, with the owner going along on board as a helper and guide.

Una Familia Feliz

El Sr. Yoshito Yura, pescador de caña y anzuelo tiene cuatro hijos más una hija. Los cuatro hijos se han hecho pescadores, y la hija se casó con un pescador. Las casas de los cinco se hallan esparcidas alrededor de la casa paterna dentro de la misma aldea. Cada días se visitan mutuamente para ayudarse los unos a los otros, y viven felices muy unidos.

En el Japón, las correcciones al Código Civil hechas en 1947, han terminado el sistema familiar centrado en el padre, y establecido el moderno sistema de familia basado en la monogamia y en la igualdad de sexos. Más tarde, especialmente en la década de 1960, se ha producido la división de la familia numerosa para aumento de la "familia nuclear", de suerte que en cuanto al estilo de trabajo de los pescadores, los trabajadores extraídos de las familias nucleares se han hecho la principal fuerza laboral.

Sin embargo, al observar todas las pesquerías del Japón se advierten ciertas tendencias negativas, tales como el envejecimiento de los trabajadores; y en años recientes se ha desarrollado falta de sucesores en el trabajo de la pesca. Especialmente en las aldeas pesqueras este prblema de asegurar sucesores se ha hecho crucial.

No se sabe todavía qué dirección va a seguir en el futuro el estilo familiar de las aldeas pesqueras de la costa. Un ejemplo del complejo familiar compuesto por familias pequeñas se ha visto en el caso del Sr. Yoshito Yura, y probablemente éste es uno de los casos más felices.

Une famille heureuse

Yoshito Yura est un pêcheur à la perche et à la ligne, dont la famille se compose de cinq enfants dont quatre fils et une fille. Tous ses enfants sont devenus des pêcheurs et la fille est mariée à un pêcheur. Les maisons des enfants sont dans le même village que celle des parents aux alentours. Ils se voient tous chaque jour et s'entraident et forment ainsi un groupe de familles heureuses.

Au Japon, suite aux modifications de lois dans le code civil de 1947, l'ancien système familial paternel a été supprimé, et le principe de la famille moderne basé sur la monogramie et l'égalité des sexes a été établi. Par suite, en particulier dans les années 1960, le démembrement de la grande famille du passé et l'accroissement de la "famille dite cellulaire" est ressenti, et quant au mode de vie et de travail des pêcheurs côtiers, le travail en famille repose sur le système familial dit cellulaire.

Néanmoins, en considérant de près le monde de la pêche au Japon, certains aspects négatifs menacent à l'horizon comme le vieillissement moyen des travailleurs de la mer et le manque de main d'œuvre jeune pour les remplacer. En particulier dans les villages de pêcheurs côtiers, c'est devenu un problème crucial pour trouver des remplaçants aux pêcheurs qui prennent leur retraite.

On ne sait pas encore dans quelle direction et quel style de vie familiale les villages de pêcheurs côtiers vont évoluer. Le système de grande famille comprenant les diverses branches familiales qui la composent comme on le voit dans le cas de Yoshito Yura, le vieux pêcheur, n'est qu'un exemple, et c'est probablement l'un des cas les plus heureux.