Skipjack Tuna in Papua New Guinea

M. MITCHELL, Fisheries Superintendent

Those of you who like to go fishing outside the reef will have come across a smallish tuna, about 4 *to* 10 *pounds in weight, which has distinct broad stripes along the belly. This is the skipjack tuna, or* Katsuwonus pelamis. *It is much sought after, since it is quite acceptable to most of the world's tuna eaters, and is also suitable for some traditional processes of curing in Japan.*

COMMERCIAL tunas of the world include albacore, yellowfin, big-eye, bluefin, and skipjack, with a miscellany of other species, many of which are only available in small quantities. Many of the tuna fleets of the world, especially Japanese and American, have been concentrating on oceanic yellowfin tuna. The resulting decline in fish population has caused some concern internationally, and catching quotas are recommended. It is a peculiar fact that whilst the Japanese are expert fishermen in most respects, they have never matched the Americans at yellowfin purse-seining but have concentrated on their own favourite method of longlining. Purse-seining consists of running a very large encircling net around a school of fish and then quickly closing the bottom of the net by means of a drawstring. Longlining, on the other hand, consists of paying out a very long length of main line (up to 30 miles at a time) from which hang baited hooks.

Tuna of the same species may differ in schooling and other habits according to their size and particular oceanic locality. This may determine the method of fishing attempted.

One of the drawbacks of oceanic longlining is the fact that this method is economical only with large fish. It will be appreciated that one hook will catch only one fish, the bigger the better, whereas an encircling net may catch so many more individuals. Purse-seining is, therefore, a much more efficient method of fishing.

With the population decline of larger tunas, especially yellowfin, and with world demand for fish rapidly growing, fishing nations of the world are looking further afield to exploit fresh stocks or new areas.

It is thought that in the Pacific Ocean there exist two main stocks of skipjack tuna and that these roam the ocean in separate swimming tracks, one in the eastern part and the other in the west. The western population, which concerns us, is thought to circle the ocean in a clockwise motion which brings it into Papua New Guinea waters at one stage of its travels. So now that the demand for skipjack tuna is increasing due to general world scarcity of fish, this area is attracting more attention.

Recently the Japanese have become very interested in exploring Papua New Guinea waters with a view to setting up a skipjack industry. Other countries, including Australia and America, have also shown some interest. Since a large amount of capital is required to set up a full-scale fishing and processing operation, it will be evident that exploratory fishing, on a 'no commitment' basis, is the first step. The Japanese attitude has been stimulated by the Australian-Japanese Fisheries and Trade Agreements, which encourage the setting up of joint-venture operations, especially in Papua New Guinea.

Consequently three Japanese fleets have arrived in our waters and have conducted skipjack fishing surveys under limited period permits, with encouraging results. Two purse-seine fleets are now exploring the Coral Sea area. Both have American interest and one has already become incorporated within Papua New Guinea.

Skipjack are smallish fish and it would not be an economical proposition to longline them, but purse-seining has not yet proved satisfactory. Luckily there is a traditional method much used in the industry. This is called the 'pole and live bait' method, or 'poling' for short. Briefly, the poling boats must first catch a supply of suitable small live bait before they proceed to the tuna grounds. As soon as feeding schools of tuna are sighted, the catcher boat moves in and live bait is thrown overboard. The tuna are attracted by the bait

Plate I.—Papua New Guinean trainees with Okinawan crew members aboard the *Tamoyoshi Maru* (Photo D.I.E.S.)

to the boat's side, where about 20 men are waiting with short bamboo poles to which are attached short lengths of strong nylon line. A feather 'jig' with a barbless hook is fastened to the line. The excited tuna strike at the lures as they dash in amongst the live bait. Provided the line is kept tight, the tuna cannot throw the hook, but once the line is slackened the fish throws the jig and the line can be immediately thrown back into the water. In practice many tuna do throw the jig whilst they are still flying through the air to land on board behind the fishermen. Those which have not already thrown the jig do so immediately they hit the deck. It can be seen that the fishing is fast and furious when things are going well.

At the same time, sprays of water are emitted from jets along the side of the boat and these tend to hide the fishermen from the fish as well as to excite the fish. Sometimes the tuna show undue caution and will not take a feather jig. On these occasions the fishermen have a special pole ready which has a plain hook on the end, which is baited with a live fish. As the tuna cannot throw these hooks like a jig, then the fish has to be caught as it flies towards the fisherman. The tuna is firmly tucked under one arm and quickly unhooked. With a quick twist of the body the fisherman throws the tuna behind him onto the deck. Whilst the whole method may seem somewhat amateurish by modern standards, in fact it is very efficient and up to 20 tons per fishing day may be boated. It is a young man's game and yet some quite elderly fishermen are involved. They are given the best and physically easiest fishing positions on the boat.

This method of poling tuna is exactly the same as used in Australia except that there larger fish may be encountered amongst the bluefin schools. With the larger fish two or even three poles may be used for the one fish, the lines being joined to one hook, of

course. Experiments have been made with mechanical automatic tuna poles, which can fish unattended.

A form of tuna poling has been practised in Papua New Guinea for generations, but the gear has been primitive and the fishing done from canoes. There has been no incentive to progress above this level owing to lack of refrigerated transport to supply demands outside any particular area. The scene is now changing of course, and plans to involve local fishermen are under consideration. With the eradication of freezers at various points in Papua New Guinea, coupled with a growing awareness by shipping owners of the advantages of installing freezers, there is now every inducement to train our fishermen in modern techniques.

The Department of Agriculture, Stock and Fisheries has a Fisheries School at Madang. DASF employees and others wishing to specialize in fisheries work may go there for training. With the accent now on skipjack poling, arrangements were made to put a group of such trainees aboard a Japanese tuna boat and let them participate in the normal routine. The joint venture firm at Kavieng, Gollin Kyokuyo, volunteered to do this and six DASF trainees went to Kavieng for the experiment. Despite language difficulties and the general air of caution and unfamiliarity which surrounds such an exercise, the whole thing went off quite well. The first thing which emerged was that the food is simple, the living is hard and office hours don't exist.

Plate II.—Three tuna fly through the air to the catcher ship as the live bait is thrown out to sea (Photo D.I.E.S.)

Plate III.—Washing down the catch
(Photo D.I.E.S.)

The whole fishing operation cycle takes a complete 24 hours, beginning with catching the bait. In some cases the bait fish are collected on a reef by driving them into nets using a gang of swimmers. The more usual method of catching bait however, is by light attraction.

Boats using the light technique anchor at a suitable site before dark with a bait boat 50 feet astern of the catcher boat, attached to it by a rope. After dark, the bait boatman lowers a waterproof light down into the water. The light is powered by a diesel generator in the bait boat. The submerged lamp is brighter than any light above the water as the surface of the water reflects most of the light anyway. Small bait fish are attracted to the light so strongly that they do not leave it. After a while they are seen milling around the light in an orderly circle. About 4 a.m. a bell is rung aboard the the catcher and the crew all turn out to secure the bait. The crew have enjoyed about six hours' sleep, except for the bait boatman. He does not work during the day but takes the bait boat back to the mother ship.

The catcher boat has a net stowed along one side which is termed a 'stick held dip net'. The sticks are fat bamboos, several of which are lashed together to form pieces about 40 feet long. One piece which is floated parallel to the ship's side is held out by two more pieces, one at each end. The whole looks like soccer goalposts lying on the water. From the crossbar piece a curtain of very fine mesh net is hung and weights attached to the bottom of it to ensure that is hangs vertically in the water. To the bottom of the net, several ropes are attached, which are led to the side of the catcher boat. When all is ready, the bait boat is slowly pulled inside the floating bamboos, still with the light suspended below, and bringing with it all the bait which has collected there. Thus the bait boat, light and bait fish are all eventually positioned between the bait net and the side of the catcher boat. At a signal the crew heave up the ropes and pull the net up so that the bait and bait boat are enclosed completely. The bait boat then moves slowly out and is manoeuvred over the side of the bait net without letting the bait get away. A weak light is then suspended over the bait in the net to encourage them to mill in an orderly fashion and not damage themselves against the net. The bait is very easily damaged and is handled with great care at all times. The side pieces of the bamboo 'goalposts' are then drawn onto the catcher boat and the net is pursed up into a small area. The bait is bailed out in buckets of water, and then gently lowered into wet-wells on the catcher boat. Sea water circulates through the wet-wells as the bait would soon die without constant circulation of oxygenated water.

By this time daylight has come and the catcher boat can get on its way to the fishing grounds. A minimum of 30 buckets of bait is required for a day's fishing but anything from 75 to 150 may be carried and used. The catcher then puts to sea and fishes as described previously. About 2 p.m. the catcher returns to the mother ship and unloads, takes a breather and gets under way again about

4 p.m. This is repeated seven days a week barring bad weather. The fishermen have about one free day per month.

Our trainees were apparently fascinated by the whole business, which was quite strange to them. There were men from Popondetta, Daru, Samarai, Lae, Buin and Manus in this group. Despite forebodings about food, there was no trouble with rice and raw fish or whatever was served up. The tinned meat remained unopened. Catching fish was, however, considered more important than meals; the skipper once took up into a school of tuna just as rice was being served and we had all squatted down with our chopsticks. Food went untouched while we got stuck into the tuna. That's the way of it.

The crews of the catcher boats are Okinawans. The work is hard and the living conditions are most spartan. Our trainees slept, when they could sleep, between decks on the engine room level, on bare boards. Luckily the main engine was stopped at night, otherwise it would have been too hot down below. The headroom where we slept was about three feet so that it was unwise to sit up quickly when the bell rang early in the morning. Likewise the minute hatch through which one had to struggle to get out of the place was about three feet by two feet. It was hard to find with sleep-filled eyes.

The first trainees have now completed their course and have been posted to fisheries stations in Papua New Guinea. We hope that they will pass on what they have learnt, and thus stimulate interest which will benefit both the people and the country.

Plate IV.—The catch is transferred from the catcher ship to the mother ship for freezing and dispatch (Photo M. Mitchell)