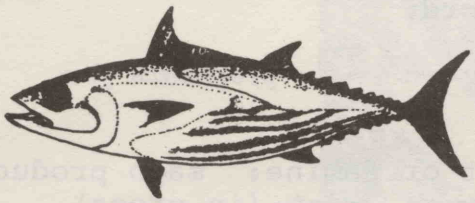
THE JAPANESE PURSE SEINE TUNA FISHERY

By J.W.J. Wankowski
Senior Tuna Biologist, Kanudi Fisheries Research Station

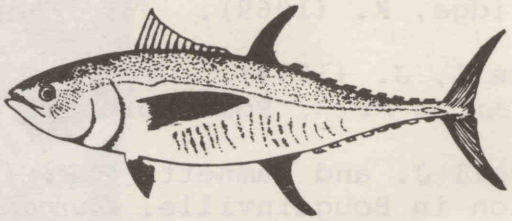
Many tuna in Papua New Guinea are caught by the pole-and-line method of fishing (see HARVEST 5(2)). Another way of catching tuna swimming in schools near the sea surface, is by purse seining.

Purse seining is a fairly new method of catching tuna. The technique was developed in the United States of America and has become established in the Eastern Pacific Ocean. A few years ago, the Japanese started purse seining in the Western Pacific Ocean and Japan now has a fully developed purse seine fisnery with 12 commercially operating vessels.

The Japanese fishery caught 14 000 tonnes of tuna in 1976, 25 000 tonnes in 1977, and 28 000 tonnes up to December 1978. Of these catches, about 5 000 tonnes in 1976, 6 700 tonnes in 1977, and 6 000 tonnes in 1978 came from waters which are now part of the Papua New Guinea 200 mile zone. This part of the fishery is now controlled by Papua New Guinea.



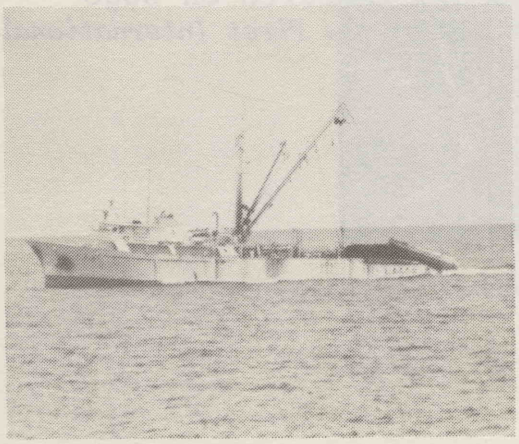
Skipjack tuna



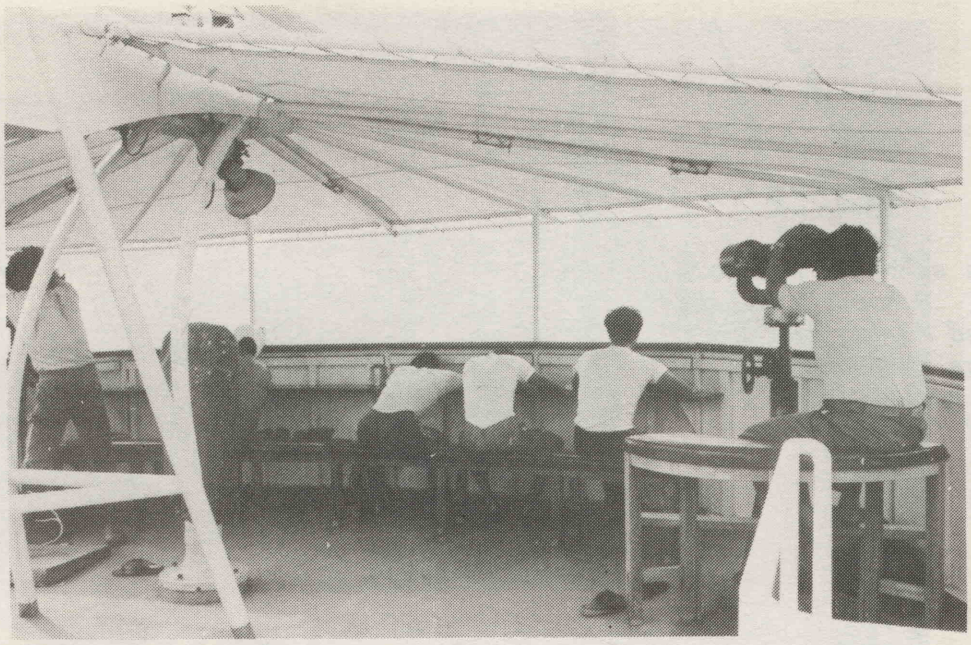
Yellowfin tuna

Two types of tuna are caught by the Japanese fishery, skipjack tuna and yellowfin tuna.

The following photographs show how purse seining is done.

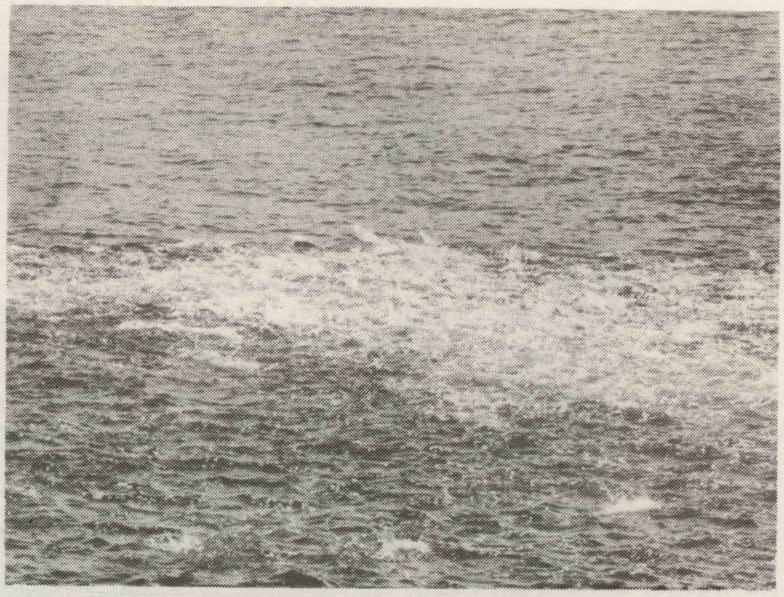


This Japanese purse seiner is 55 metres long, has a gross tonnage of 499 tonnes and can hold up to 420 tonnes of frozen fish. Note the crow's nest (this is a high place to look out from), the big working deck which takes up half of the ship's length and the large skiff (a type of boat) on the stern.
A typical voyage lasts 40-50 days when enough fish are caught to fill the holds

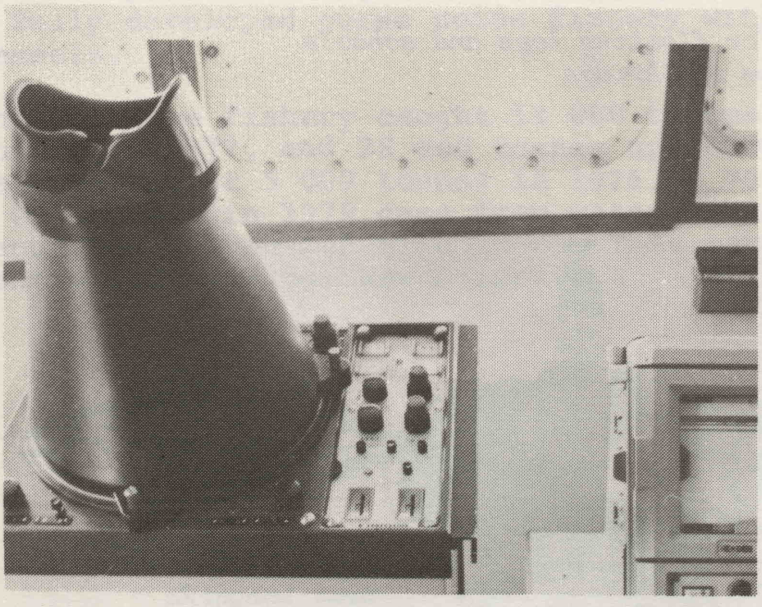


Searching for floating logs and schools of fish from the bridge

The crow's nest. This is also used for searching for logs and schools of fish. The fishing operation is directed from here

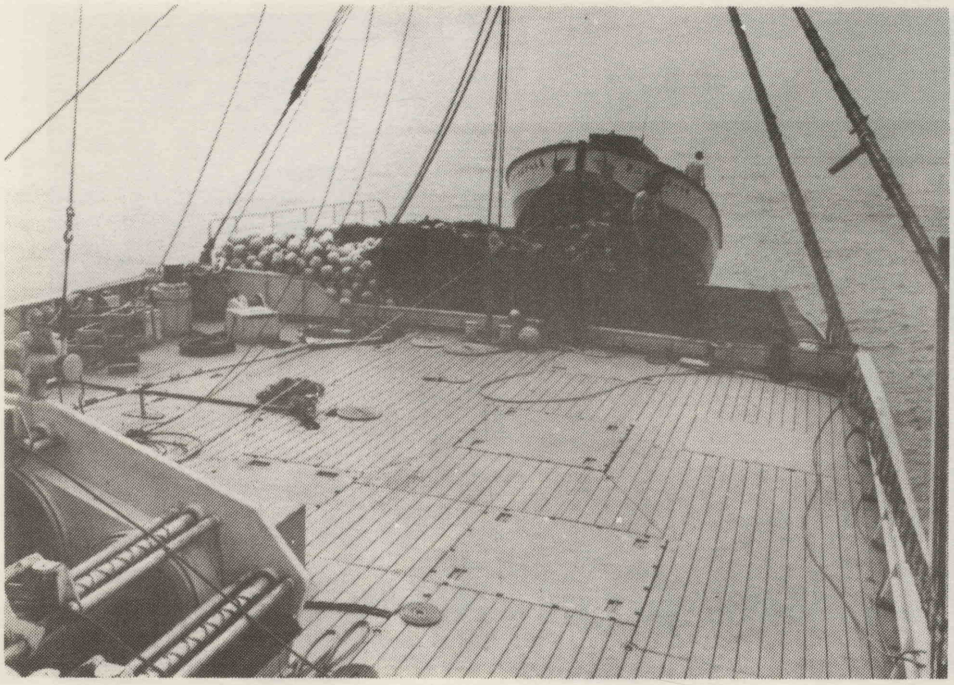


A surface school of yellow-fin tuna. Schools like this are fished during the day as soon as they are seen. They may have 50 to 100 tonnes of fish in them

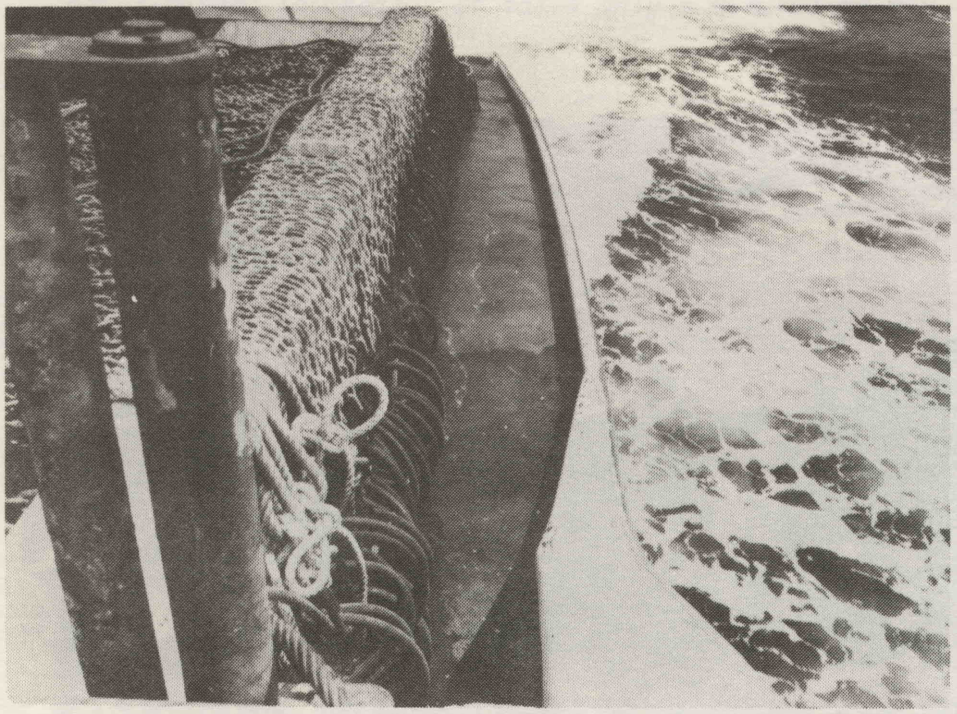


A more common type of tuna school is found near floating logs and Nypa palms. These schools are usually 20 to 40 metres below the logs. To find these deep schools the sophisticated sonar equipment shown in the photograph is used

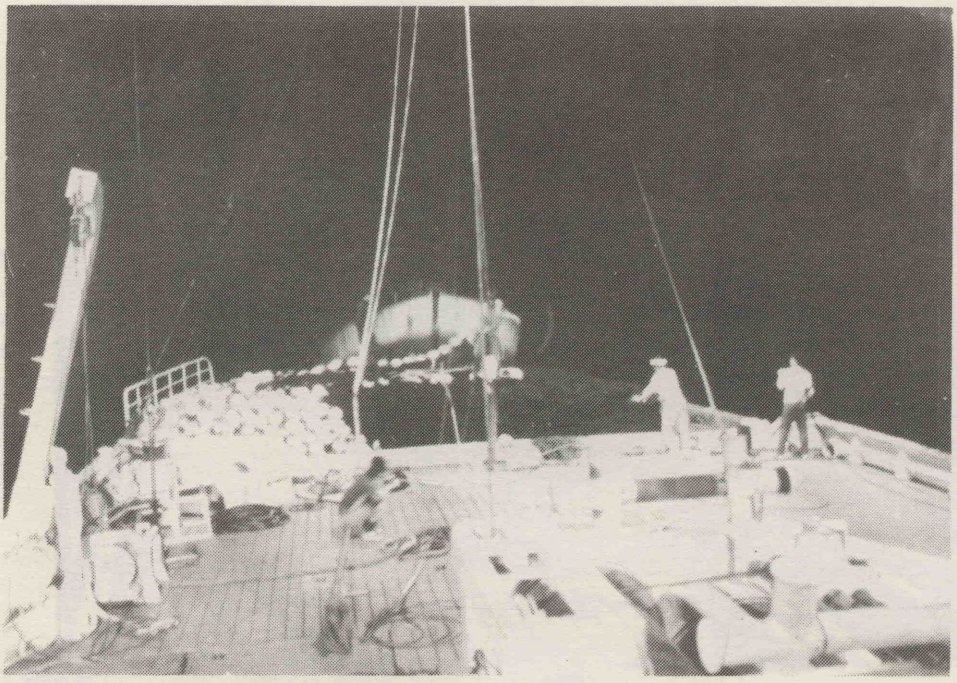
If the equipment shows that there are tuna below the log, it is marked with a radio beacon and a light. The purse seiner will come back to the log in the evening and set the net for the fish just before dawn



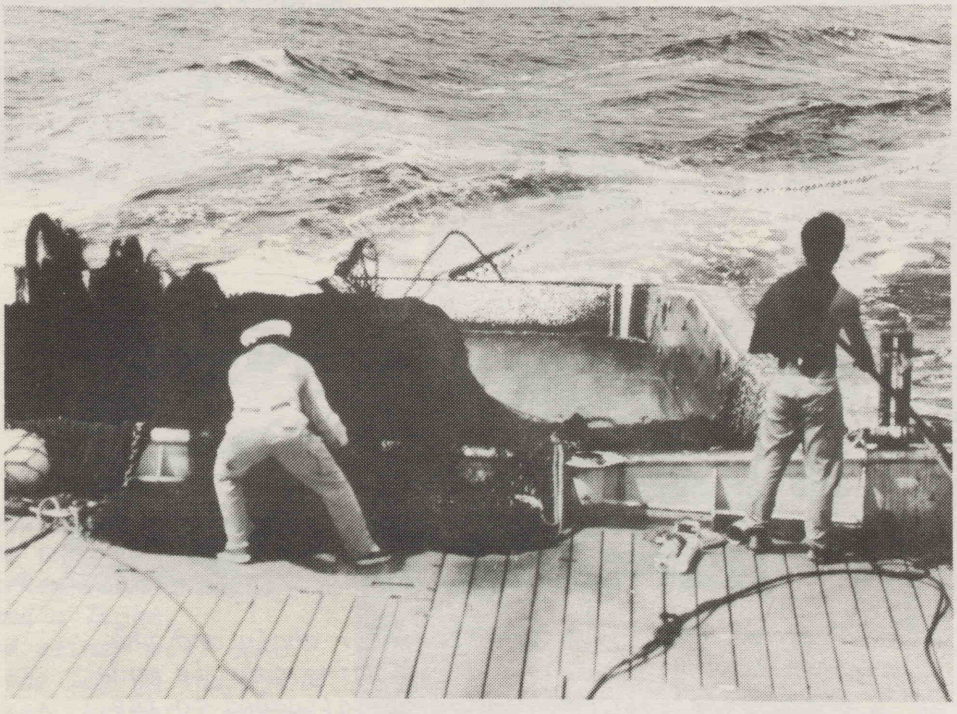
The gear set up ready to go. The net is folded up with one end attached to the skiff and the other to the purse seiner. The winch on the left of the photograph is used to close the bottom of the net



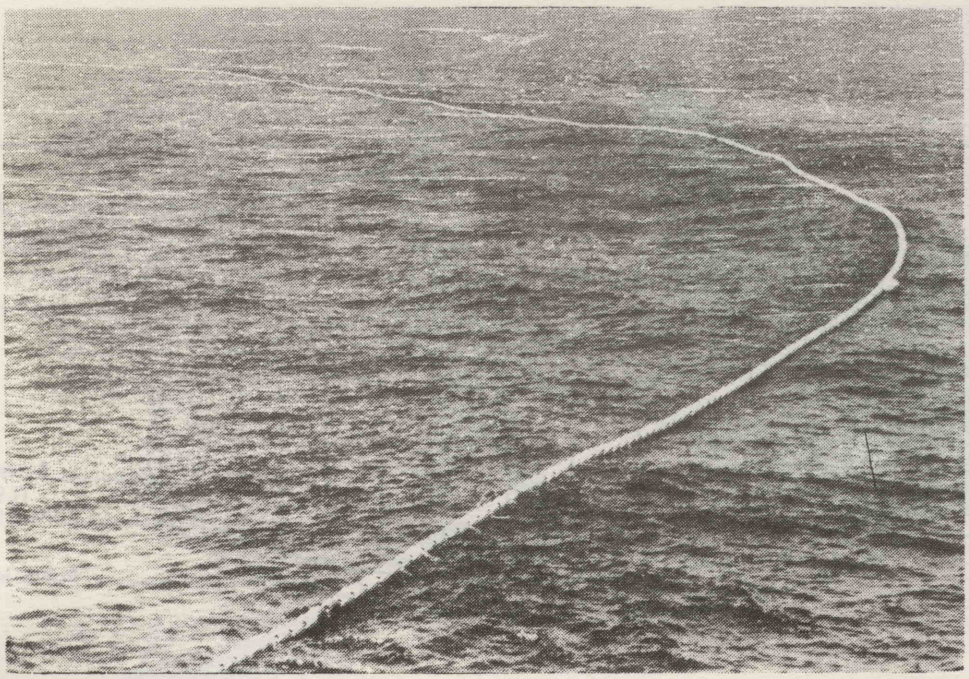
At the bottom of the net is the sinker chain and the pursing (net-closing) gear. The pursing gear is made up of a row of steel rings which are attached to the net by chains. The pursing line passes through the rings and both ends of the line are attached to winches



At 4.30 am, about 40 minutes before dawn, the skiff and net are released. The net is set before dawn because it has been found that at that time the tuna stay around the log and do not swim away as they often do during the day

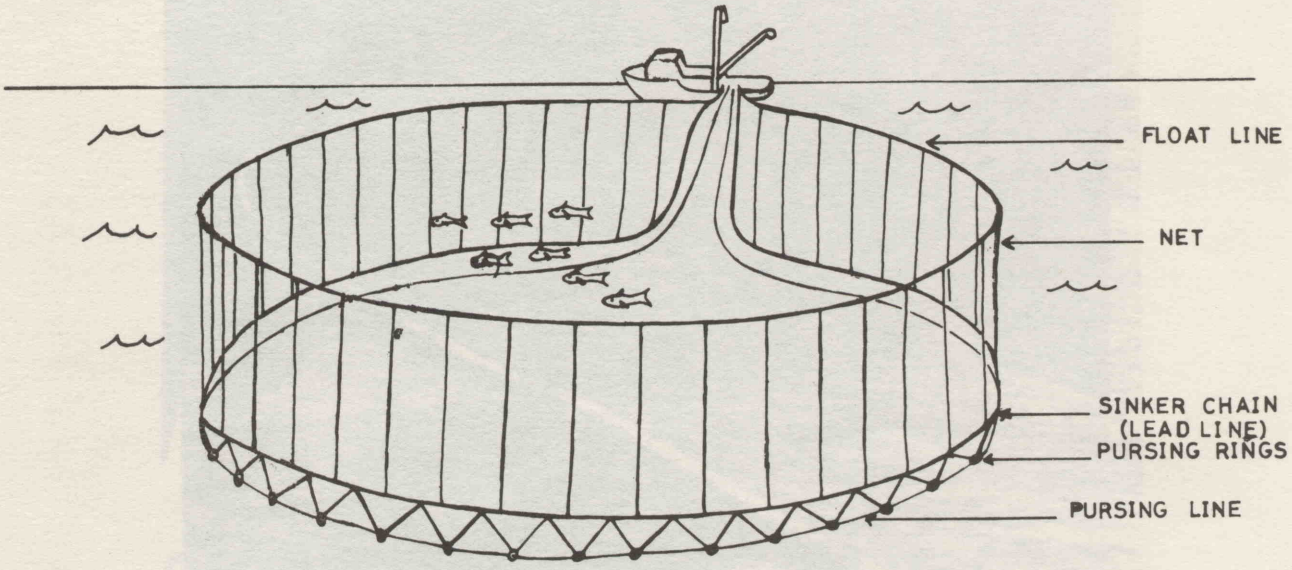


Over half of the net is now out. The skiff stays in one place while the seiner makes a large circle around the log letting out the net as it goes

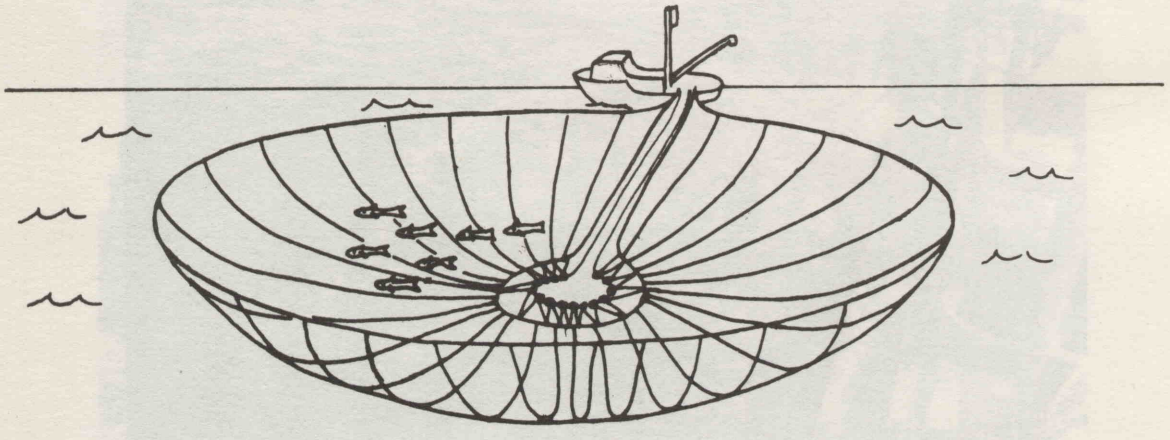


The circle is now complete. The seiner has returned to the starting place and both ends of the net are now attached to the seiner. The net is about 1.5 kilometres long and over 200 metres deep. When set the net makes a circle about 0.5 kilometres in diameter and the bottom of the net reaches a depth of 100 to 130 metres before being pursed (closed). It takes only 6 minutes to put out this net

Pursing the net. The pursing line is pulled in by the winches. This closes the bottom of the net. The net is now bowl-shaped with all the pursing rings together at the bottom of the bowl. In the photograph these rings are just starting to be pulled out of the water on the pursing line. The fish are trapped in the net. The pursing operation has taken just over half an hour and it is now dawn



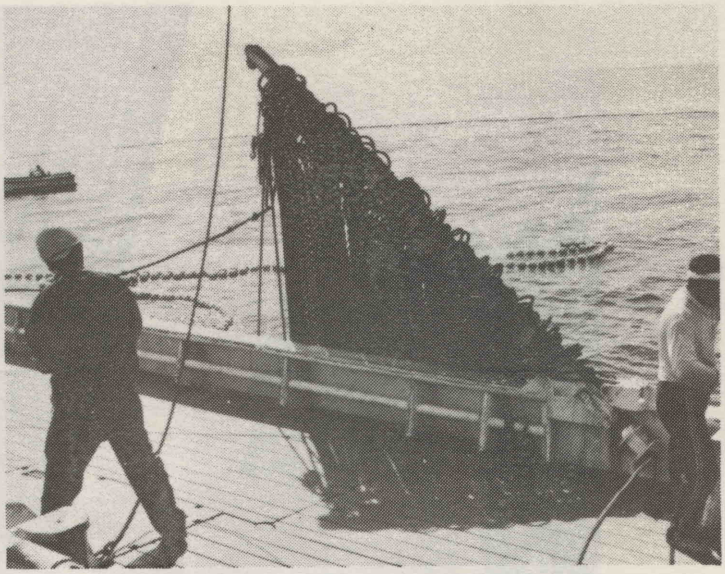
Open

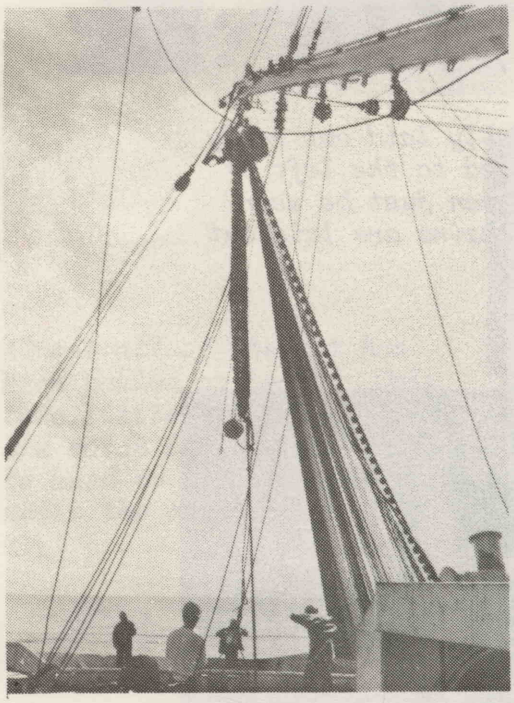


Closed

These diagrams show how the net is closed to trap the fish in purse seining. They are not drawn to scale

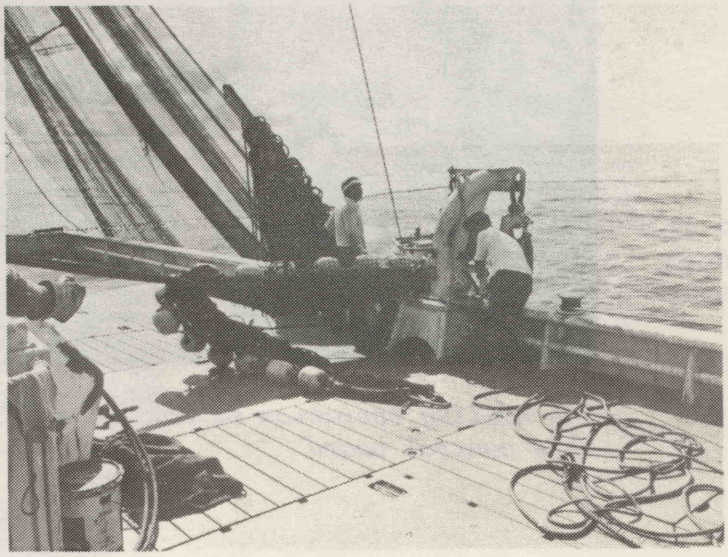
The pursing rings are put on this special arm so that they don't get tangled when the net is hauled aboard

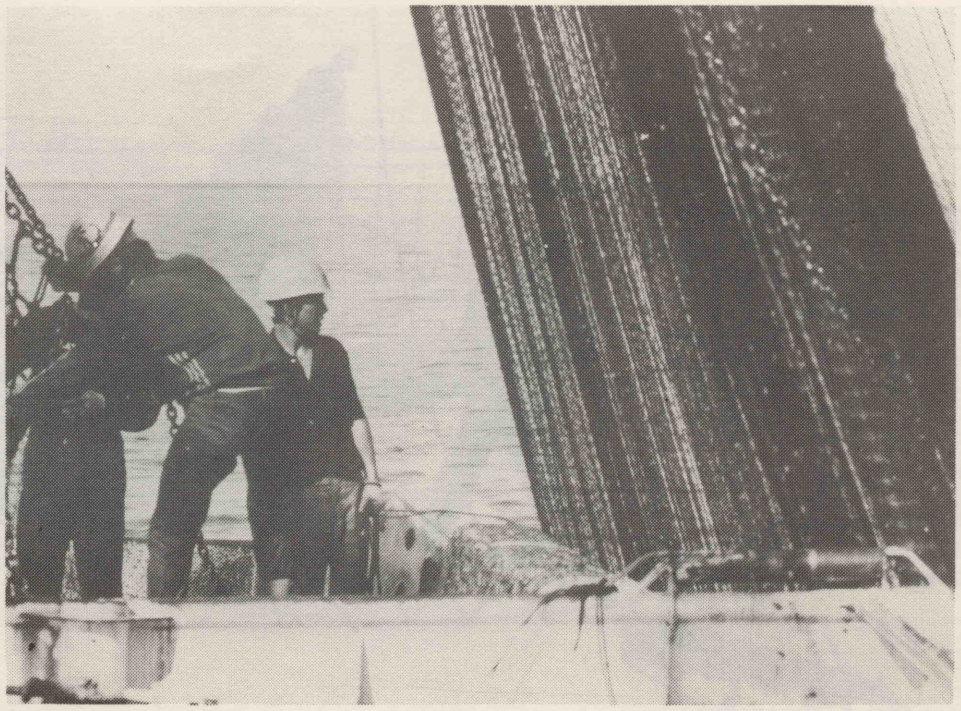




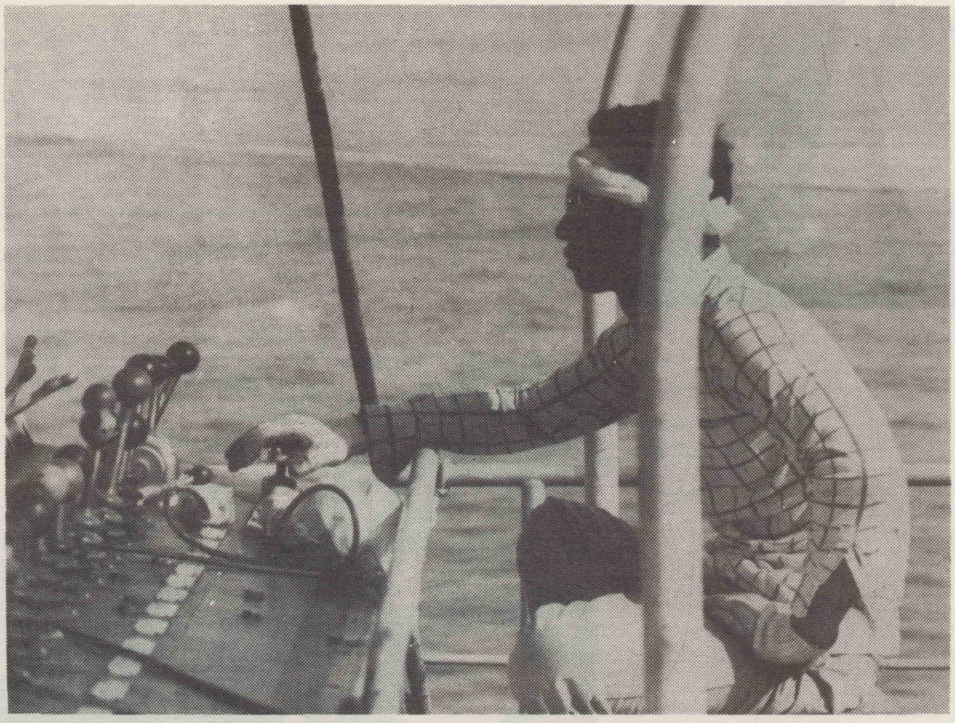
Pulling the first end of the net on board. This end was attached to the seiner at the start

The other end of the net secured on deck

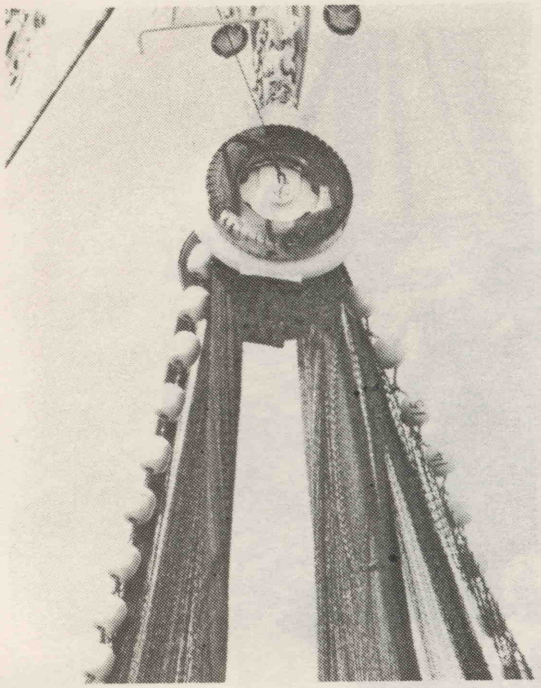




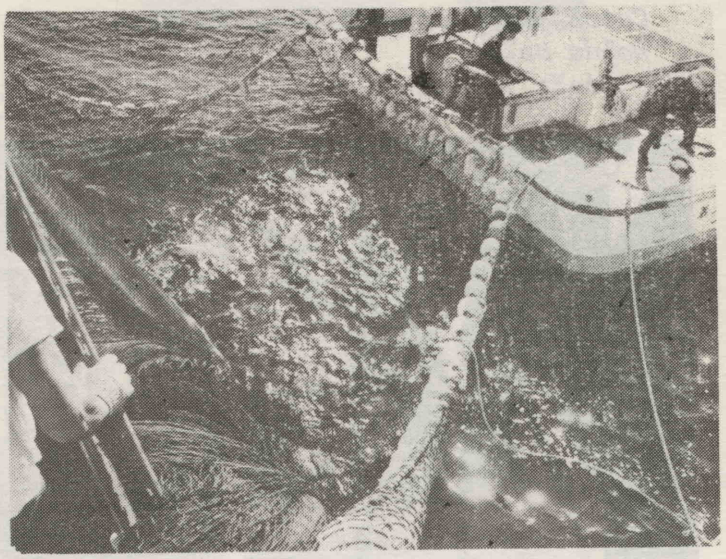
The net is hauled on board and carefully laid out ready for the next school. The net is folded to the left of this photograph but the sinker chain can just be seen here on the left and the purse-ring chains are laid out in the middle of the photograph



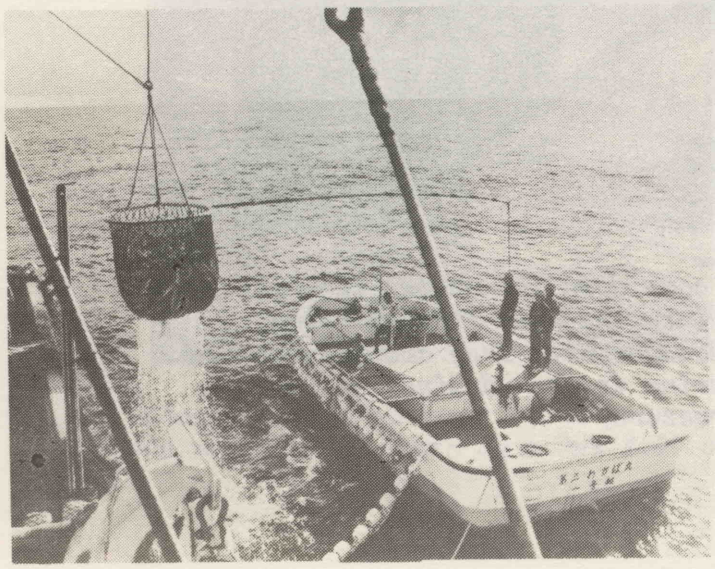
The hauling operation is controlled by the fishing master from this control board



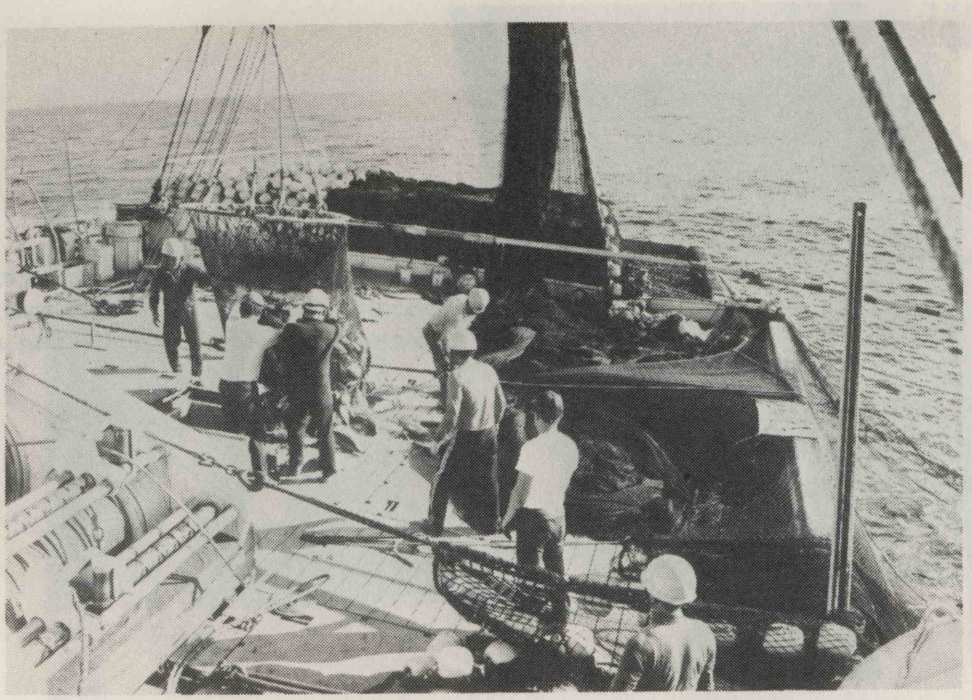
The entire net including floats, sinker chain and purse-rings is hauled on board over this hydraulic power block attached to the main boom



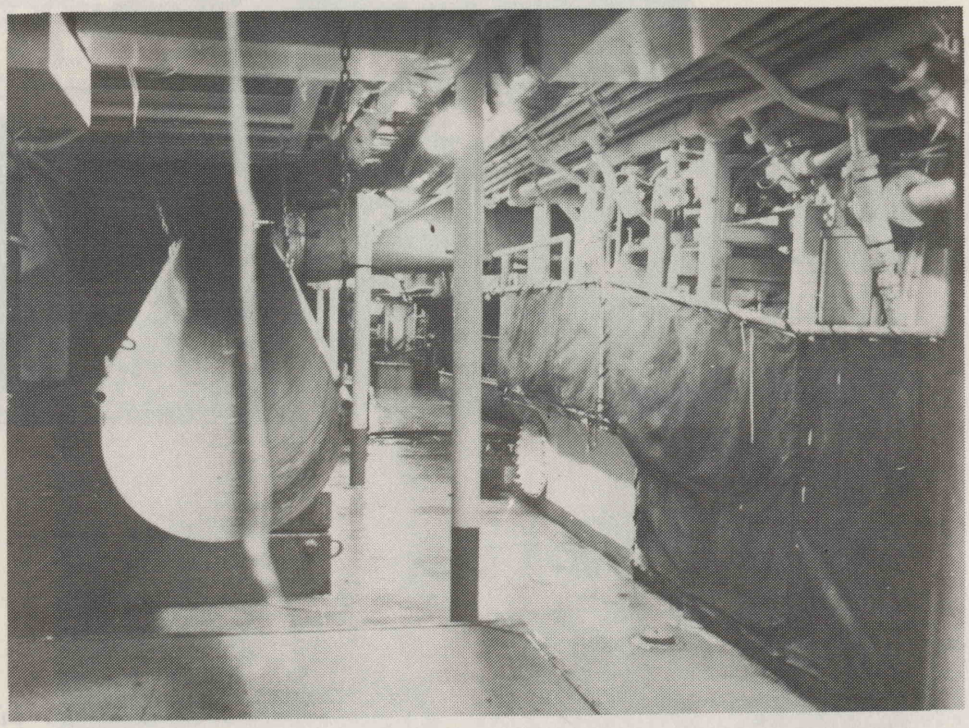
Almost all of the net has been hauled on board. Only this little bit is left with the catch in it. The skiff is used to keep the net open while the catch is removed



A dip net is used to lift the catch out of the net. Each load contains about 1 tonne of fish



Catch being dropped down the fish hatch to the freezer holds below



The freezer hold deck. Fish come down the chutes from the working deck above and slide into the open freezer holds (closed by hatches in this photograph). They are frozen in brine in the holds. The brine is then drained and the holds are used as ordinary freezers

The last of the catch going on board. Ninety tonnes of fish were caught in this set

Cleaning up afterwards. The year is set up and the seiner is ready to go again by about 8.00 or 9.00 a.m.