Gear and Behaviour
Committee

International Council for the
Exploration of the Sea

AN AUTOMATIC FEEDING SYSTEM FOR THE ROTARY SHRIMP SIEVE

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INTRODUCTION

In 1968 the first rotary shrimp sieve was installed on board of a Dutch shrimp beamtrawler. Until then the shaking sieve was commonly used. An advantage in comparison with the shaking sieve is that the shrimps are also washed in the rotary sieve. Moreover the sorting effect of the rotary sieve is better than the sorting effect of the shaking sieve.
Up to now, about 75 rotary sieves are installed on Dutch shrimp boats.
The introduction of this machine has another important aspect too. The working conditions of the crew, onboard of a shrimp trawler equipped with a rotary sieve, are better in comparison with a shaking sieve (see figure 1).
Although the rotary sieve has a good sorting efficiency, the fishermen commented that the efficiency could be better if there was a continuous instead of an interrupted supply of shrimps (Crangon crangon) into the sieve. Therefore some kind of a feeding system had to be developed.
The developing of a feeding system also had a biological aspect. The feeding system must create optimal survival conditions for undersized shrimps, -flatfish and other species.
The investigations started in 1972. In 1975 the first prototype was tested on a commercial shrimp trawler, during a whole year. The results were very succesfull.
Up to now, there are six automatic feeding systems for the rotary shrimp sieve installed, and four more have been ordered.

THE CONSTRUCTION AND PERFORMANCE OF THE AUTOMATIC FEEDING SYSTEM

The automatic feeding system consists of two glass-fibre storage tanks, filled with seawater. The cod-ends of the two beamtrawl nets are emptied into those tanks. The rotary sieve is situated between the two storage tanks (see figures 2 and 3). The storage tanks are linked by a rectangular tube. This tube allows the catch to move from the starboard tank to the port-side storage tank. A conveyor-belt carries up the catch out of the port tank and at the top of its way up the catch is transferred to the sieve by water jets.

The surface of the innersides of the storage tanks is very smooth, to prevent flatfish sticking to it.

The transport of the catch in the tanks into the direction of the conveyor-belt is assisted by means of a number of water-nozzle's.

As already mentioned, the storage tanks are filled with seawater. The shrimps and fish are therefore protected against damage and dyhydration. In this way the undersized shrimps, flatfish and other species have an optimal chance of survival.

At the topside of each storage tank two removable gratings are mounted, to stop stones and coarse benthos (see figure 4 and 5).

The capacity of both storage tanks is 0,87 m3. In case of big catches the capacity can be increased by means of a loose brim, which can be mounted on top of each storage tank. The total capacity is now 1,22 m3.

The glass-fibre storage tanks are mounted in a galvanized frame. This frame also functions as a cod-end catcher.

The flow of water and catch to the conveyor-belt is controlled by a trap door. The perforated conveyor-belt (about 50%), is made of stainless-steel.
Owing to the construction even relatively big fishes will be transported (see figure 6).
Flatfishes of commercial size are collected from the conveyor-belt by a crewmember.
At the rear of the rotary shrimp sieve the consumption shrimps are collected in baskets; the undersized shrimps. -flatfish and other species are flowing back into the sea through a rubber hose.
The conveyor-belt is driven by a D.C.-electromotor, 0,34 hp/2000 revs. The speed can be adjusted between 1,25 - 7,15 m/min.
The amount of water, required for the automatic feeding system is appr. 20 m3/h, for the rotary sieve appr. 20 m3/h and for the washing machine for the boiled shrimps appr. 10 m3/h.

THE INFLUENCE ON THE WORKING CONDITIONS

The automatic feeding systems for the rotary shrimp sieve means a change in the working conditions on board of shrimp beamtrawlers.
Figure 1 shows the processing diagrams on board of shrimp trawlers with a shaking sieve, a rotary sieve and a rotary sieve with an automatic feeding system.
The diagram gives a clear picture of the differences in working conditions between the three installations.
When judging the working conditions on a shrimp trawler (without a feeding system) on ergonomical criteria,

we have to conclude that the main part of the work by the crew is done in contradiction with the ergonomical insights.
When using an automatic feeding system, work can be carried out far better.

THE INFLUENCE OF QUANTITY AND QUALITY ON THE LANDINGS

Quantity:

In October 27th, 1975 the first four automatic feeding systems were installed on shrimp beamtrawlers.
It was interesting to study the landing-results of these four trawlers before and after the feeding system came into operation. Also a comparison in landing-results was made between shrimp trawlers with and without the feeding system. We selected trawlers with appr. the same propulsive power and usually fishing in the same area's.
The results of these investigations were remarkable.
An increase in landings could be shown. The increase in landings seems to be due to a number of factors.
Most important is that an automatic feeding system gives a continuous flow of shrimps into the sieve instead of an interrupted supply.
A continuous sorting proces gives a better and more accurate sieving result.

Quality:

A more accurate sieving of the shrimps has a great influence on the market. Moreover, there are other aspects having possitive influence on the quality of consumption shrimps. The mortality of shrimps

previously caused by other methods of sieving is now almost reduced to zero, because the cod-ends are emptied in storage tanks, filled with seawater (see figure 7). Also the possibility of removing unwanted bycatch at the surface of the tanks, e.g. sprat, improves the quality. The separation of sprat from shrimps in the rotary sieve is difficult if both have the same width. Boiling a mixture of shrimps and sprat decreases the quality of the boiled shrimps due to the fat contents of the sprat.

CONCLUSIONS

The automatic feeding system for the rotary shrimp sieve is now in operation for more then one year.
At this moment the conclusions are:

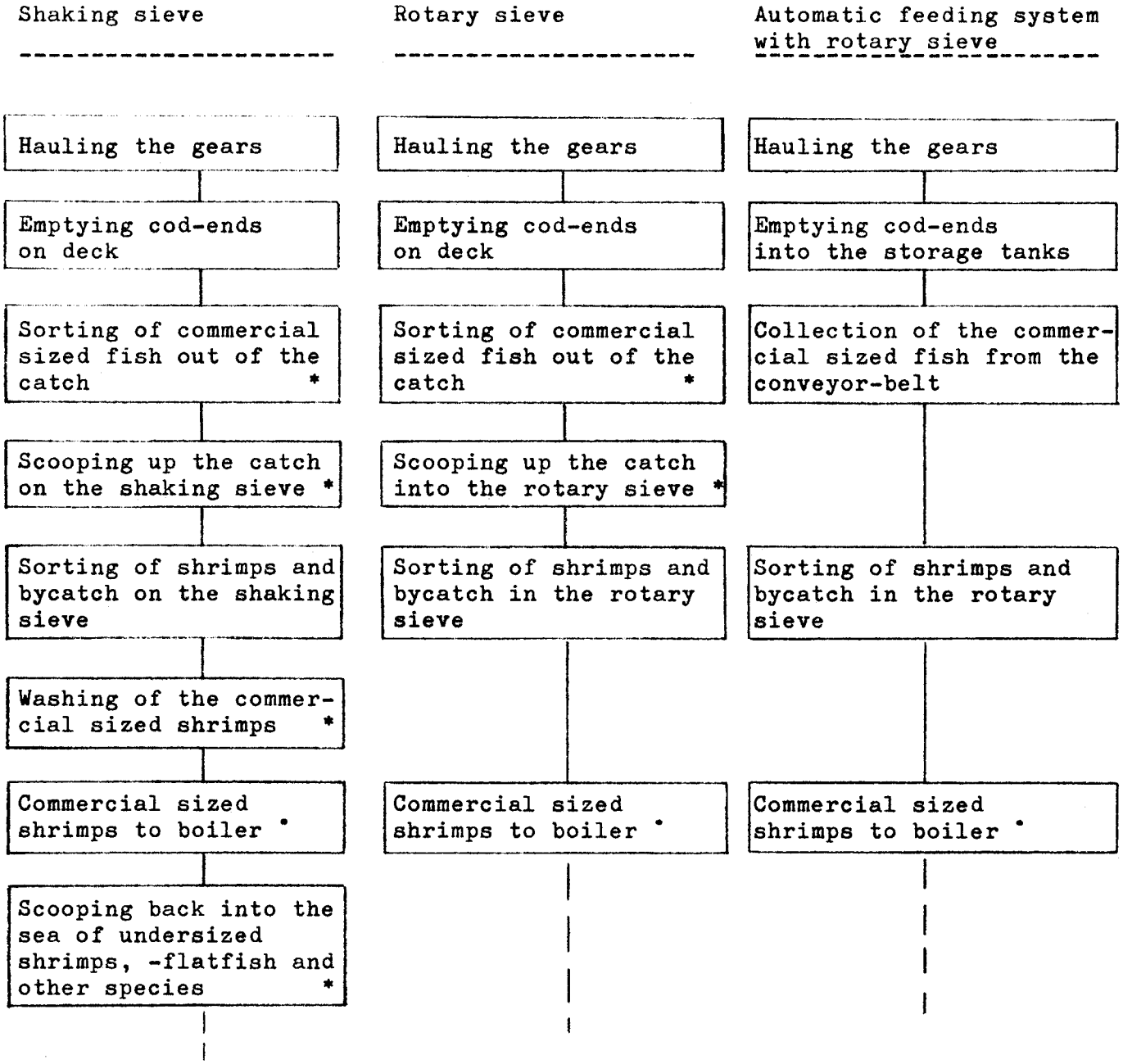
- increasing of the landings;
- better quality of the consumption shrimps;
- optimal protection of undersized shrimps, -flatfish and other species (during several commercial trips it is observed that even vulnerable species, like whiting and herring, will be transferred into the sea alive);
- better working conditions for the crew;
- stronger economic position for owner and crew.

Lit.

Boddeke, Dr. R. and Verbaan, A. — The automatic feeding system for the rotating shrimp grader Visserij, oktober 1976.

Figure 1

PROCEDURE DIAGRAM



* Heavy manual labour in contradiction with the ergonomical insights

• Manual labour which can be reduced to a minimum when having a good deck lay-out

Fig. 2

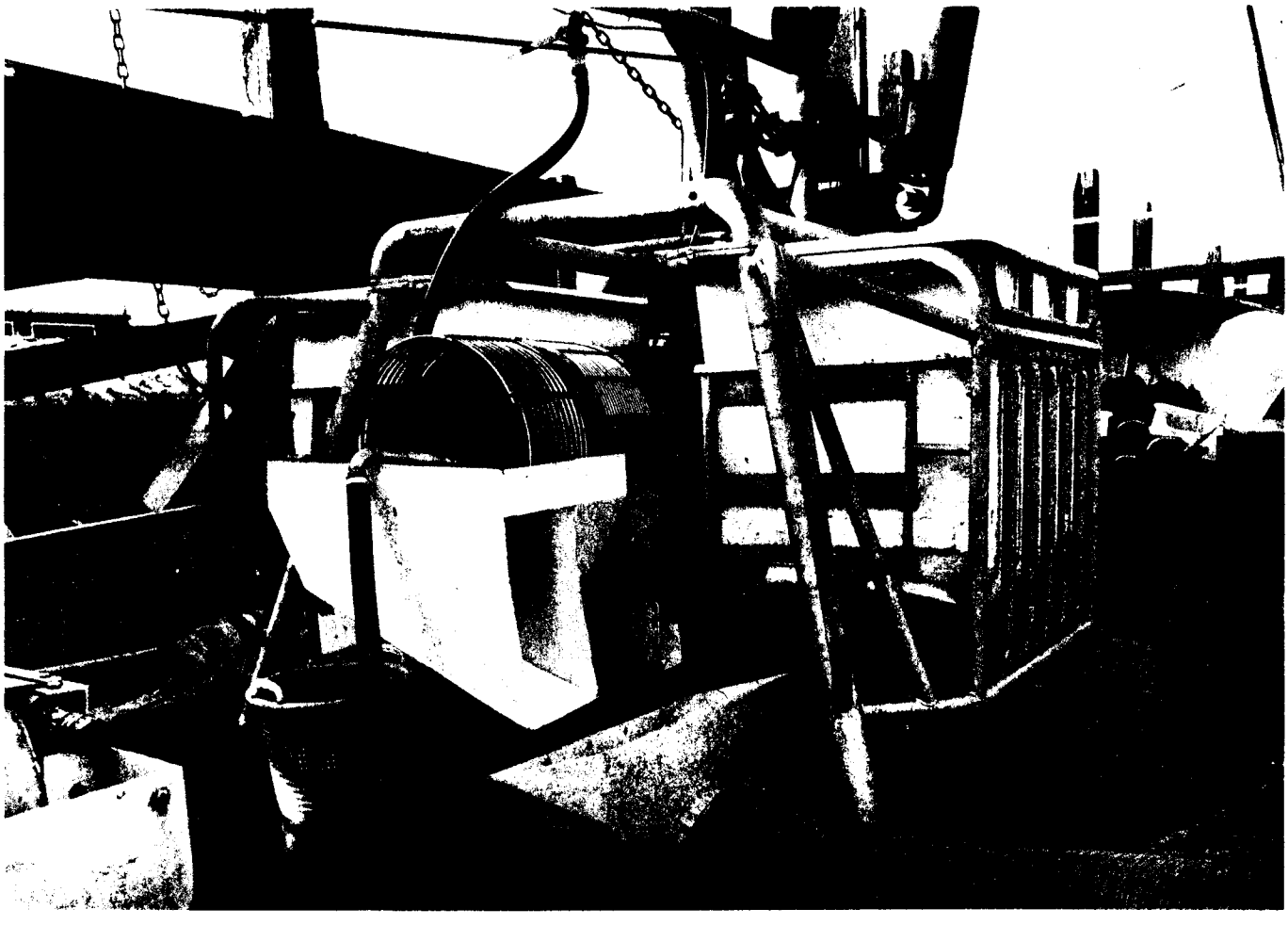


Fig. 3

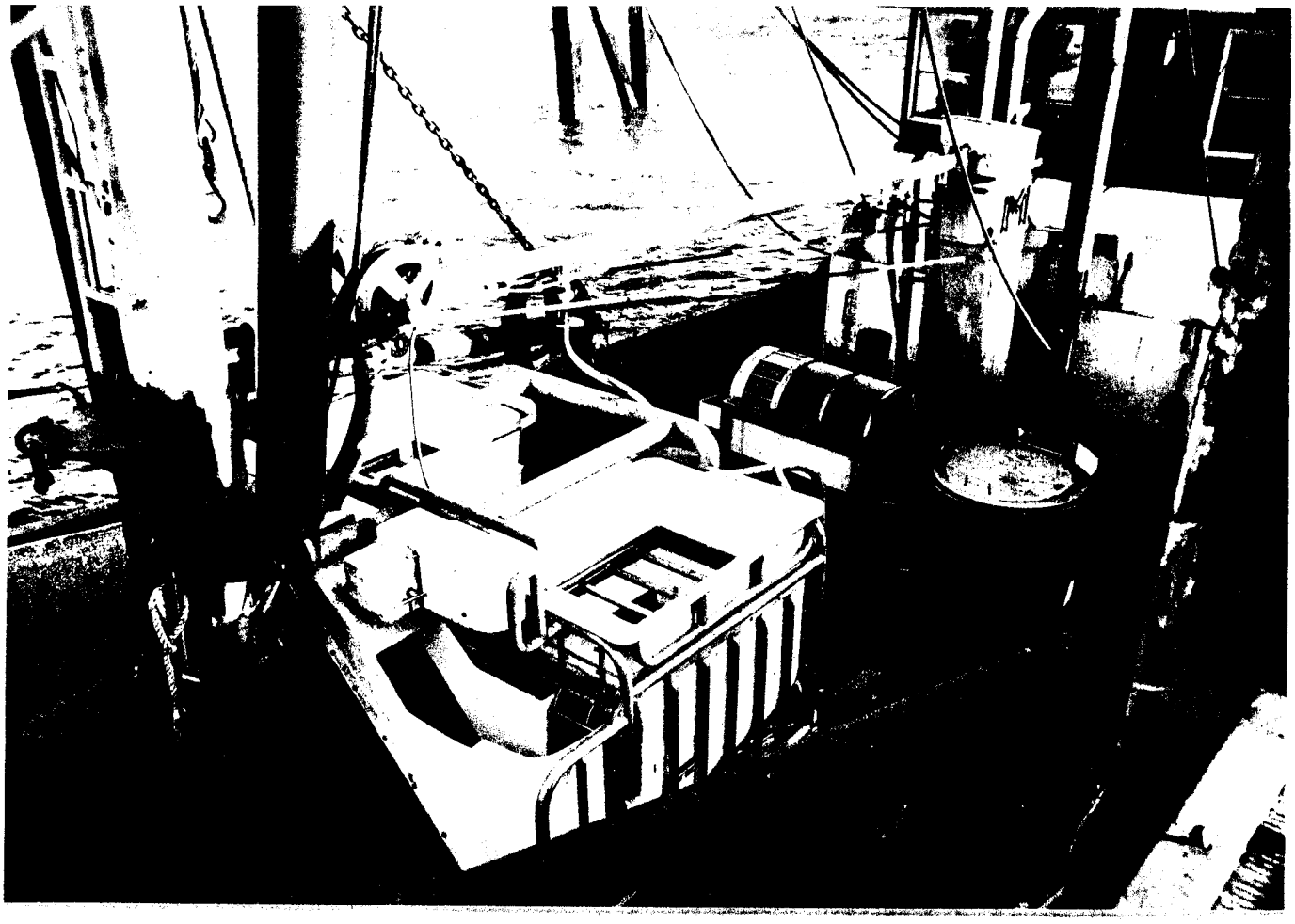


Fig. 4

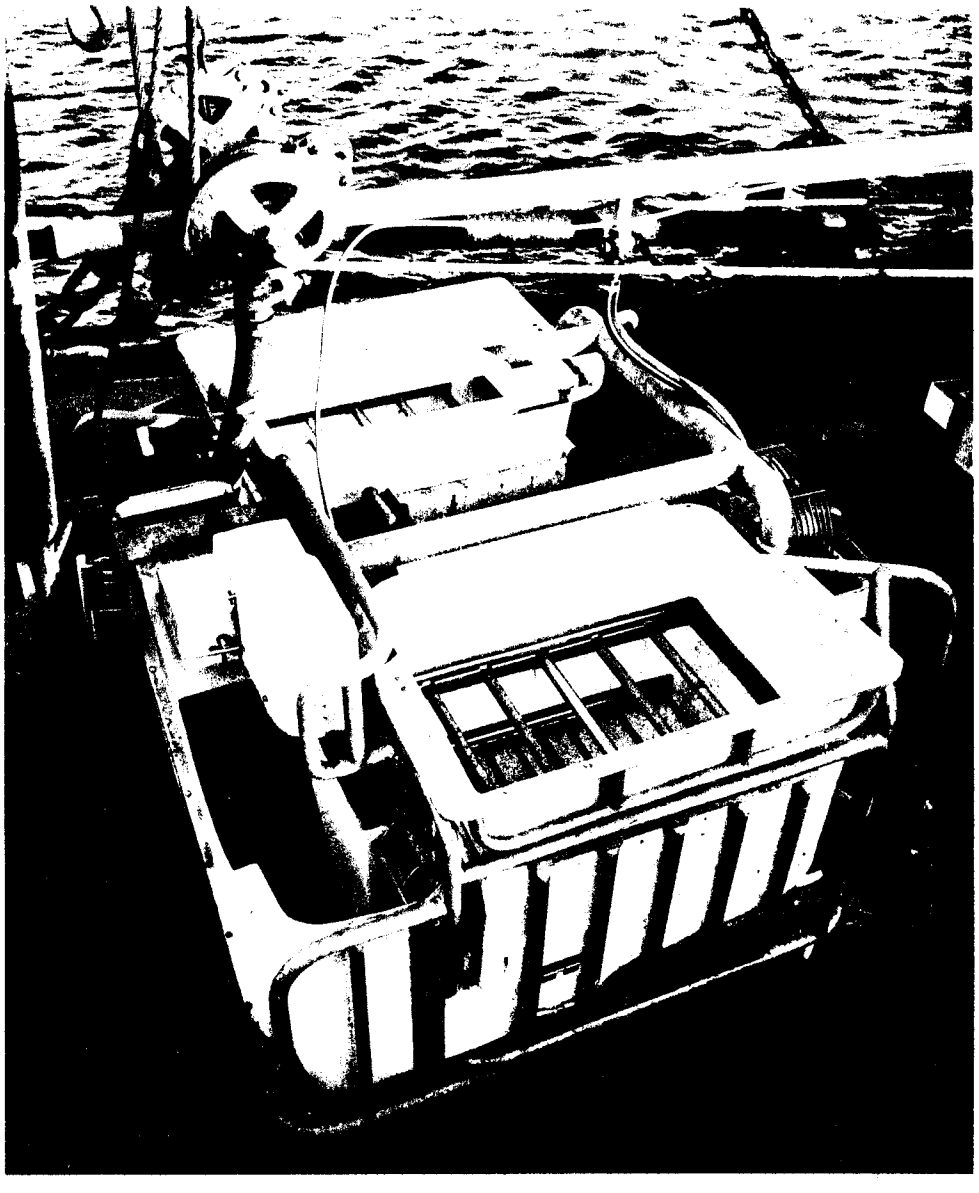


Fig. 5

Fig. 6

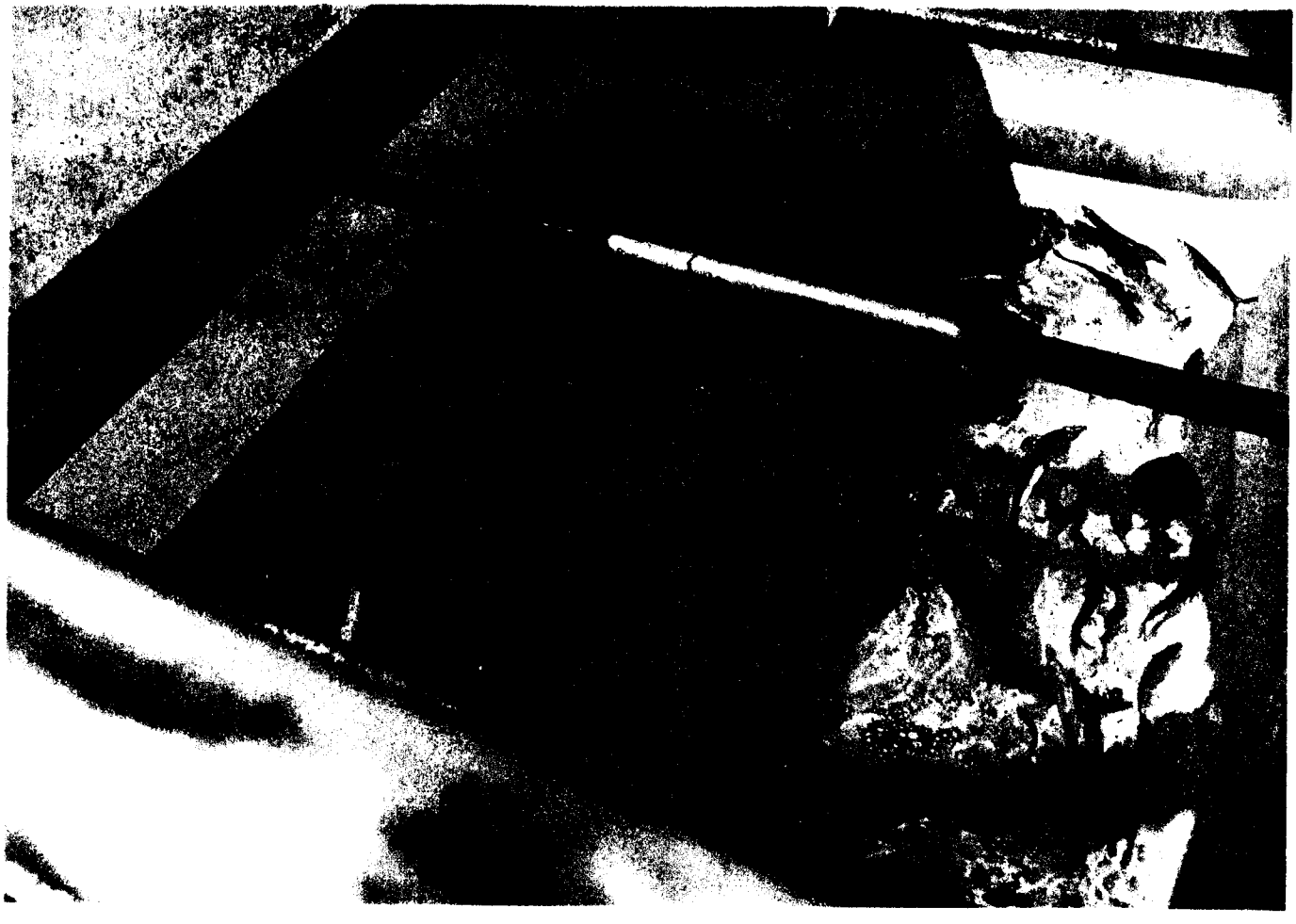


Fig. 7