

T U E S D A Y — N O V E M B E R 17

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Handling Shrimp Aboard Fishing Vessels and At the Dock

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The procedures described in this paper refer exclusively to the handling of shrimp boats operating from the Mexican Pacific Coast, and especially to those operating from the port of Mazatlan. In order to understand the operations of such shrimp boats it would be helpful to know something of the region and of certain characteristics of the fishing there. On the Mexican Pacific Coast the shrimp season starts on October 1st and ends between July 1st and July 15th. The shrimp grounds are located at distances between 50 and 600 miles from the home port of fishing vessels. The average fishing trip is from 10 to 12 days duration. During the months of October, June and July, the average temperature goes as high as 90 to 95° F., with relative humidity readings almost as high. During the balance of the season the average temperature is about 70° F. The surface water temperature during the same months of October, June and July, averages 80° F., and during the balance of the season an average of about 65° F. This aspect is of great importance because of its direct relation with the icing of the shrimp on the boats.

The boats have an average size of between 55 to 65 feet, are Diesel powered, and are either of the regular shrimp trawler design, or are purse seiners adapted to shrimp fishing. They carry between 20 and 30 tons of crushed ice, in cork-insulated holds. The nets used (about 90 feet long on the average) are of the regular "flat" Texas design. These have been in use for the past two years, replacing the Japanese designed wing-type net with which our industry operated for almost 10 years. The other boards are about 12 feet long. Winches are the regular "Strousburg" type, and all the boats are radio-telephone equipped.

Only lately have the boats begun to be equipped with depth recorders. Fishing is done at depths between 5 and 15 fathoms. Some fishing has been done as deep as 50 fathoms, mostly for brown shrimp.

The average crew is of eight men, composed of a captain, machinist, cook, and five fishermen. The cook also works as a fisherman when not facing his stove. The reason for such a large crew in comparison with the number of men manning the boats in the United States fishery is an official Mexican regulation but also is required to handle the large catches, as we shall see later.

Before beginning a description of the actual handling of the shrimp on board the boats, two facts of interest are mentioned: (1) The boats in Mazatlan are disinfected (for rats, cockroaches, etc.) some two or three weeks before each season starts, the holds being thoroughly washed with

detergents and fresh water after the disinfection. This disinfection includes not only the holds, but the cabins, galley and engine room. (2) In our own company's boats we have been using purified ice, made with filtered and chlorinated water. It may be only an impression on our part, but "black spot" seems to have diminished on our shrimp since we started using such purified ice. Of course, the ice produced by other plants, and made directly from city water, is not polluted since Mazatlan, Guaymas, and other cities have purifying installations in their water systems. What we do in reality is to treat the water twice, for better results.

The most interesting characteristic of this operation, in connection with the actual handling, is that all the shrimp are beheaded on board the boats. This is one of the principal reasons for such a large crew. Many hands are required to behead two or three tons of shrimp per 10-15 day trip, in the shortest possible time. This practice of beheading shrimp on the fishing grounds is one which causes concern. Because of the length of trips it would be dangerous to hold the shrimp with heads on, since they spoil faster in this state. Yet the throwing of the heads back into the ocean, usually on the shrimp grounds, is considered harmful for the development and conservation of the fishery. While some of the shrimp heads are eaten by fish, instances have been noticed when shrimp have apparently left an area because of the heads thrown back. After a few days all that the nets picked up were shrimp heads, in a decomposed state. In such locations shrimp have never again been found in large volume. Various solutions have been suggested, one of them being to unload the heads onto a floating reduction plant. So far no suggestion has proved to be economically feasible.

The actual process of handling the shrimp has six main aspects. 1. The bag of the net is opened and the contents are spilled onto the deck. This should be done at a height of no more than two feet to avoid damaging the shrimp. On steel boats, because of the high prevailing temperatures and the hardness of the deck, it has been found necessary to cover the deck either with lumber or cement. Cement has proven to be much more durable and effective than lumber. Once the bag has been unloaded its contents are washed in salt water with pressure hoses. Immediately afterwards all inedible fish and other kinds of marine life caught in the net are separated from the shrimp and thrown back into the ocean. 2. The shrimp, now separated from the rest of the catch, are again washed with a pressure hose. 3. The beheading process is begun immediately after the second washing. After the heads have been taken off the shrimp are placed in 100 pound wooden boxes, mixed with a small amount of crushed ice. The men use canvas gloves on top of rubber gloves for the beheading. These gloves last only a short time, several dozen being used on every trip. 4. Once the shrimp has been beheaded it is removed from the wooden boxes and placed in straw baskets which are half filled. In these baskets the shrimp are again washed with a pressure hose, more thoroughly than the two previous times. They are now ready to go into the hold, being first placed back in the wooden boxes. 5. These wooden boxes are now lowered into the hold. The shrimp remain in the boxes until one half a ton or more has been collected. At that time the shrimp are taken out of the boxes and placed in the bunkers, mixed with the ice. A layer of ice is alternated with a layer of shrimp, care being taken that the bottom layer is never less than six inches deep. This thickness is

sufficient if the hold is well insulated; on boats with deficient insulation the bottom layer of ice should be considerably thicker. 6. From time to time, especially during the last part of the trip, the first loaded bunkers are turned out and re-iced. This is done with perforated shovels. These cause some breakage of the shrimp even if handled carefully. As soon as the boat docks the shrimp are taken out of the bunkers with the same shovels and placed into straw baskets. Outside the holds they are loaded into wooden boxes and trucked to the freezing plants. In all of these movements, of course, the shrimp are mixed with ice from the bunkers. The wooden boxes are generally steam-washed after use.

Handling Shrimp In the Packing and Freezing Plant

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In order to present a bird's eye view of the general procedure in a shrimp freezing plant, the passage of the shrimp from the boat or truck will be traced through various procedures to the refrigerated truck or railway car in which it leaves the plant in its frozen form.

Briefly, the steps in the freezing process are as follows: 1. unloading, 2. washing, 3. quality grading, 4. heading, 5. size grading, 6. packing, 7. freezing, 8. glazing, 9. mastering, 10. storage.

Care must be exercised in *unloading* the boats or conveyances which bring raw material to the packing plants, to prevent breakage of the shrimp and to keep separate for close inspection, or discard, any material which appears decomposed. Where "pockets" of decomposed shrimp are mixed with good material the sorting job becomes increasingly more difficult.

In *washing*, most plants utilize either tanks from which the shrimp are brailed, or a combination tank and conveyor belt. If insufficient attention is paid to frequent changes of water in the wash tank, the water becomes a soupy mass which adds to the bacterial load of the shrimp. A constant intake and overflow helps alleviate this situation.

Quality grading begins with a careful scrutiny of the raw material received at the plant. If this job is carelessly done it will result in decomposed material getting into the pack.

For practical purposes there are three types of decomposition which occur in shrimp, and this material should be discarded on the inspection belt:

(a) "Heated" shrimp which can usually be detected instantly. In the white and brown varieties such decomposition may be easily distinguished by color changes, but in the pink shrimp it is much more difficult to see.

(b) Blackening or melanosis, often called "ice burn."

(c) "Stinkers," or shrimp which show no visual signs of decomposition, yet which possess a foul and oftentimes putrid odor of decomposition.

Heading must be done manually, and in this operation care should be exercised to prevent breakage of the tail section while removing all of the cephalothorax and the walking legs.

In a number of plants, especially in the United States, *size grading* is