pink shrimp netted measured between 14 and 17 centimeters (5½ to 6¾ inches). A smaller species, *Sicyonia typica*, of approximately 10 centimeters (four inches) in length were ten times more numerous than the pink shrimp. In none of the hauls were specimens of *P. duorarum* of very small size.

The conditions of the environment in the Batabanó-Hatiguanico area may be summarized as follows. The *bottom* is muddy and rather consolidated, with a certain amount of mollusk shell, but free from vegetation. *Depths* of between 2.5 and 3.5 fathoms are common in this zone. An extraordinary amount of small crustaceans, mostly copepods, and of diatoms composed the *plankton*. This source of food has made the Gulf of Batabanó one of the richest in Cuba for sponges, lobsters, mangrove snapper, and other marine life. It was to be expected that shrimp should be abundant there.

The shrimp caught live in an animal community composed mostly of bivalves of the genus *Pecten*, the Gastropod *Bulla occidentalis*, squid *Doryteuthis*, sea urchins *Lytechinus varigatus*, mantis *(Squilla empusa)* and fish. The latter include mojarra *(Oligoplites saurus)* and *(Opisthonema oglinum)*, "shad" or silver sides *(Eucinostomus pseudogula)*, and peacock flounder *(Platophrys lunatus)*, among others. All the species mentioned appeared consistently in the hauls.

Based on the results of these experiments, Mr. Thorwald Sanchez bought a typical American shrimper, completely equipped. This boat, named the "Ulda Velma", catches about 500 pounds of pink shrimp *(P. duorarum)* each night. The Cuban fishermen soon familiarized themselves with the new method of fishing, and it can now be said that they have mastered commercial fishing for shrimp. Shrimp had not previously been fished for in the Gulf of Batabanó, but since the arrival of the "Ulda Velma" a fortnight does not elapse without a new boat being equipped for this fishery. At this writing there are 11 shrimp boats working in this area and others are being made ready to enter this "pink gold" race. An average of seven to eight thousand pounds of shrimp of good size enter Cuban markets each morning, as a result of scientific contribution which was looked on at first with much skepticism. But enthusiasm has spread. Many fishermen are now preparing to carry on explorations on their own account, and there is already talk of new and richer fields. In midst of the satisfaction produced by success there is one concern, that in the enthusiasm the exploiting of this new fishery conservation may be ignored.

Migrations of the Common Shrimp *(Penaeus setiferus)* Along the South Atlantic and Northern Gulf Coasts of the U. S.

Abstract

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A description was given of the methods employed in catching, tagging and recovery of shrimp marked and released in a study of migration patterns. General migration patterns during the various seasons of the year were illustrated and discussed for the South Atlantic Coast from North Carolina to Florida. A general movement of larger shrimp from the northern and

central portions of the fishery to the southern portion of the fishery during the fall and early winter, and a northward movement from the southern portion of the fishery during the late winter and early spring was described. Migrations of shrimp in the northern Gulf of Mexico were discussed by sections: east of Mississippi River, in Louisiana west of the Mississippi River, and the lower Texas Coast. This presentation was in general terms; details will be presented in a paper to be published shortly and entitled "Growth, Migrations, Spawning and Size Distribution of the Shrimp, *Penaeus setiferus* (Linn.)," by Milton J. Lindner and William W. Anderson.

Evaluation of Five Pound Packages of Glazed and Unglazed Shrimp

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Because of the rapid growth of the shrimp industry during the last few years the need for additional information on the packaging requirements of frozen shrimp was found necessary. An investigation of the correct packaging conditions for several types of shrimp was started in December, 1951, by a review of the published literature and by discussions with several experts in the field. It was determined that the bulk of all frozen shrimp is sold as headless raw shrimp, which are packed in five pound packages and glazed with water. The glaze in this size package amounts to twelve to twenty ounces of water per package and serves to protect the shrimp during subsequent storage at 0°F. There has been considerable production of small "consumer" size packages of headless raw shrimp packaged without glazing, using a printed overwrap, and some five pound packages have also been made with overwrap. The experience of these packers and investigators has been that protection from the overwrap was apparently sufficient, and that there were no adverse effects on the quality of the shrimp (Anon. 1950; Fieger, 1950; Fieger, Green, Lewis, Holmes — DuBois, 1950; Divers, 1953). As a result of the recommendations of several authorities on shrimp processing and marketing the present tests were outlined, incorporating all of the suggestions which were obtained.

Shrimp are almost the only packaged frozen food now being glazed. Other frozen foods, including fish fillets, poultry, meat and vegetables, can be held for periods of at least one year when packaged without a glaze, but with a suitable water vapor barrier, such as an overwrap (Anon. 1951). Extensive packaging tests in this laboratory on all of these foods have shown that adequate protection is provided by a suitably waxed carton with a special overwrap which features a hard wax coating, designed for use at the low temperatures encountered in storage of frozen foods.

The glazing operation involves extra costs and problems, including the following:

1. Sharp freezing prior to glazing sometimes causes undesirable desiccation.
2. Shrimp packages must be opened after the initial freezing period and passed through the glazing line, involving extra labor.

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