

The discussion indicated that Federal standards and regulation for breaded shrimp would be preferred, as being more effective than industry regulations. Air shipments are being used for breaded shrimp and parcel post would be satisfactory if delivery was prompt. Instances of excessive retail markup are a deterring factor. A 10 oz. package is currently the smallest successful size.

The market for shrimp is down somewhat at present, according to Mr. Swartz, who discussed the problem of "The Outlook for Shrimp Production." At present there are relatively large cold storage inventories. Prices should improve after the end of the Florida season in February, but should not skyrocket in view of probable steady production from other areas. Shrimp should, however, follow upward trend of other food commodities if these prices increase.

The discussion brought out that a new devicing machine handling 1,650 pounds per hour may have some effects on processing costs. It was also evident that there probably are large inventories of shrimp in private cold storages, for which no good records are available.

"What does the future hold for the individual boat owner?" was the problem posed by John S. Robas. Mr. Robas stated that the individual owner was faced with problems in assembling and keeping efficient crews, with financing and credit, and with reducing production costs. He also stated that assistance was needed from the Government in the way of biological research and exploratory fishing. The discussion indicated that individual boat owners produced fish more efficiently than company owned boats, and at a lower cost. Higher costs and lower returns were a problem for both vessel owner and processor. RFC loans are time-consuming to obtain. Annual crew wages in the menhaden industry are relatively low and possibly a bar to more effective work. Sometimes it is difficult to sell catches in some areas because processors utilize catches from company-owned vessels only. State regulations in at least one area prevent free movement along the coasts.

In "The Outlook for Continued Shrimp Production in Louisiana." Mr. Chauvin stated that he believed the outlook was as good now as it had been in the past. There was no serious damage to the nursery grounds and no evidence of overfishing.

Discussion brought out the fact that imports are beginning to be of some concern. The price of shrimp is high to the consumer but production costs are high too. Individually owned boats are the best producers.

What Are The Most Pressing Requirements In Research In Inshore And Shell Fisheries?

Summary by W. W. ANDERSON, Chief, Gulf Fisheries Investigations, U. S. Fish and Wildlife Service, and WALDO L. SCHMITT, Head Curator, Department of Biology, U. S. National Museum, Washington, D. C.

IN DISCUSSING the most pressing requirements in research in the inshore and shell fisheries, almost without exception all speakers in the Inshore and Shell Fisheries Session stressed the need for more comprehensive, long-time, continuous records of salinity and temperature. In more than one paper it was rather effectively demonstrated that temperature and salinity have a profound influence on the spawning and feeding of oysters, their health and well-being.

and their food supply, as well as on the distribution of shrimp. At the same time, the physiology, pathology, and, if the term may be used, "sociology" of populations as well as of individual species, should be studied as completely as possible. Species do react differently in the aggregate than as individuals. Investigations into "climatic" and physiological species and races of oysters and shrimp should be undertaken, and transplantation experiments with oysters systematically carried out. The problem of the culture of oyster spat is worth investigation. Also, information is needed on the growth rate and natural mortality of shrimp and oysters.

Perhaps the paramount requirement at the moment for advancing inshore and shell fisheries research is the standardization of methods of investigation, observation, and reporting, and of apparatus and gear used. Unless the studies and results from different areas and similar projects can be directly compared much time and effort is lost, if, indeed, the work, past or present, may not prove to be useless to other researchers.

In extension of the foregoing recommendations a broader general knowledge of plankton, both qualitative and quantitative, is needed for the Gulf and Caribbean area. What is known so far about plankton is based largely on studies made in northern waters. Planktonic forms should also be studied as individual species. Investigators of the plankton need to know more about animals and plants from the lowest (bacteria and protozoa) to the highest (phanerogams and vertebrates).

The necessity for more taxonomic work is imperative. Physiological as well as distributional studies are only as good as the systematic determinations of the organisms involved. The reliability of these determinations depends more on competent systematic workers than on existing manuals. There is a serious shortage of workers who know how to deal with the organisms in question and who know where to find and how to use the pertinent literature. Good and conveniently accessible library facilities must be provided. These, in turn, should be extensive, constantly expanded, and kept up-to-date. The progress of specific as well as general, fishery and biological problems is all too often hindered for want of sufficient basic research information and the availability of previous records. Most fish and shellfish are planktonic at some stage of life. Oceanographic and plankton observations must be made if we are to keep in touch with fluctuations of environmental factors and the number and kinds of the different stages in the life histories of species and populations.

Correlation of oceanographic and other environmental factors is highly desirable and holds great possibilities for accomplishing the solution of vital problems. For example, do temperature, plankton, or some other factor determine the migration and the "fatness" of menhaden? Further, may there not be other members of the planktonic communities besides *Gymnodinium* which could be as destructive in times of great abundance as the Red Tide of the west coast of Florida?

Comprehensive programs of the sort here advocated have been too long delayed. There is altogether too little background or past information available, and the sooner this dearth of information is overcome the more certain and productive will be the results of future work. To achieve the objectives of these programs, this Institute must strive to bring about closer cooperation and better exchange of ideas between individuals and agencies carrying on research on the inshore and shell fisheries.

To accomplish this there should be established some practical machinery for assembling, correlating and reproducing existing and future data. This is now widely scattered in the publications of highway, bridge, harbor, and other construction engineers, Federal, state, river-basin and defense agencies, fishery and biological establishments, industrial plants, and oil companies.

Attention may here be called to the serious effects that the improvement of harbors and ship channels has on the life of the waters concerned. Dredging, fills, and the construction of sea walls inevitably bring about changes in character of bottom, the direction and force of currents, the elimination or destruction of beaches, marshlands, and mangrove swamps. Many species are deprived of food and shelter, breeding grounds, and nurseries. Such radical changes in environment create a real need for ecological investigation in order to learn what to do about "improvements" on the one hand, and the preservation of natural conditions, upon which depend the continued existence of useful and commercially valuable species, on the other.

It was further suggested that some means for the prompt dissemination of information regarding work being done in the inshore and shell fisheries field be instituted. Progress reports, if only in the form of a mimeographed newsletter, are of inestimable value in keeping all interested parties posted as to developments throughout the area. The responsibilities of the Institute members should include the providing of material for at least a quarterly report to be issued by some agency to be selected or established.

The Institute should consider arousing a wider interest among college students, the teaching profession, and the lay public than at present prevails. In this connection it is recommended that all institutions conducting fisheries schools or giving courses of study in marine biology or oceanography require for full credit in such courses that some time be devoted to the acquiring of actual operational experience on some fishing vessel or with some seafood processing plant. A course of practical navigation should also be required, or, in its place, a demonstration of ability to navigate a reasonably sized craft. Equally essential are practical English composition, report writing and competency in public speaking.

The existing biological and marine laboratories and state agencies within their present means and facilities, are doing commendable work. However, if they are to advance their programs there are several urgent material needs that must be met:

First, suitable vessels with proper equipment. The continuous work of the *Pelican* in the Gulf of Mexico discovered the wintering grounds of shrimp and the potentialities of the Gulf shrimp fishery that led to their further exploitation and present great development. Vessels are of prime importance to all marine research. Together with reasonable additional facilities, they would make possible highly desirable, concerted, simultaneous observations that could be directly compared.

Second, adequate and competent personnel for these vessels.

Third, additional or improved laboratory and library facilities, and

Fourth, substantial financial support for the broader programs outlined in this summary of the most pressing requirements in research in inshore and shell fisheries.