

MONDAY—NOVEMBER 26

Chairman—AGUSTIN DE LA BARRA, *President, Shrimp Association of the Americas, Mazatlan, Mexico*

## **Aims and Progress in Gulf Fishery Investigations' Shrimp Research**

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CONCENTRATED FISHING for small shrimp in inside waters may be beneficial to total shrimp production. In making this rather provocative statement it is necessary to underline the word *may*. Authority for this possibility is the recently published Fishery Bulletin 106 by Milton J. Lindner and William W. Anderson: "While we have suggested that it may be advisable to limit fishing for small shrimp, on the other hand heavy exploitation from inside waters may result in a more extended spawning success owing to reduced cannibalistic predation, with the obvious consequence of greater production." It is not the purpose here to pursue this hypothesis any further. It is used simply to focus attention on the present state of biological knowledge regarding our \$100,000,-000 shrimp fishery. Condensed into one phrase, "We know a little bit about a lot of things."

At Galveston the Fish and Wildlife Service has well under way a shrimp research program aimed at determining which factors govern the rather broad fluctuations in shrimp abundance year by year. We have nearly completed a review of literature pertinent to the penaeid shrimp. Since 1908 at least sixty-one authors have published work dealing with penaeids in this area, and naturally the studies and conclusions reached by all these scientists are being molded into our thinking as we design the program. Also, it is only fair to say that many features of our study are by no means original; many, perhaps most of the men who have studied Gulf shrimp, have pondered the question "What causes the marked fluctuations in abundance year by year?" Gunter and Hildebrand in their paper published in 1954 relating total rainfall to the catch of white shrimp bracket but do not definitely establish one possible primary factor. Some of Albert Collier's unpublished notes and data collected in the late twenties and early thirties follow this general thinking. He wanted to see what relationship, if any, existed between the prevailing southeast winds on the Texas coast and the entry of post larval penaeids into coastal estuaries. With all the field work that has been done to date, no author has done more than broadly speculate on how larval and post larval penaeids are able to move from the spawning grounds into estuaries. Austin Williams, of the University of North Carolina Institute of Fisheries Research, in a paper published last November gives some useful data bearing on this question. Probably more important is the question "What factors determine the percentage of recruits which successfully reach the so-called 'nursery grounds?'" The answer to this particular question may be a notable contribution toward our understanding of population fluctuations and we hope to make that contribution.

We have a dual research program. In the second phase of our laboratory work, we asked the obvious question "What are the most notable gaps in our knowledge of this animal?" Anatomical information was sparse and sketchy. We called upon Dr. Joseph Young at the University of Tulane, by contract, to furnish us the needed descriptive information. His very excellent atlas of *Penaeus setiferus* is nearly completed.

Data dealing with shrimp tissue were almost non-existent and we asked Dr. Jerome Stein of Texas A. and M. to begin the histological and histochemical studies required. His first rather extensive report will be completed next month. Shrimp tagging in the past has been confined to adults. There was obvious need for a method which would allow us to mark juveniles. The assignment to devise a method was given to Charles Dawson of the University of Texas, and he has developed a staining technique which appears usable for very small shrimp as well as for adults. In the Galveston laboratory we tested Dawson's methods on 25 mm penaeids. The stain was readily discernible two months after the original staining and probably the stain, properly applied, will last several months. It was interesting to note that considerably less mortality occurred in the stained shrimp than in the control group we held in an immediately adjacent tank. Perhaps the stain is a therapeutic agent as well as a marking tool. With this new staining technique we intend to do some field work early next year which could answer several "unknowns" regarding the movement of juveniles.

In the Galveston laboratory we have completed some precise studies relating shrimp growth to temperature. Projects also include a study of shrimp nutrition, of light and oxygen requirements and comparative studies of the particular requirements of brown and pink shrimp as compared to whites. Recently we completed a series of toxicity experiments. In one we found an insecticide (Benzene hexachloride) used extensively by mosquito control groups on the Gulf coast, is toxic to shrimp in dilutions of 1 to 20 million. Mr. Chin of our Galveston staff will report this work.

The crying need is for research designed to answer specifically some of the obvious questions and thereby establish a basis upon which further research may proceed. The Gulf Fishery Investigations, as a matter of policy, will make available in published form information which may be helpful to other researchers in the field, even when a final conclusion may not be possible on the particular subject under discussion. However, our goal is to see many of the basic problems through to a final unqualified conclusion.

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## **Intermittent Shrimp Sampling in Apalachicola Bay With Biological Notes and Regulatory Applications**

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ALTHOUGH THE EXACT VALUE has never been conclusively established, it has been frequently believed by laymen, administrators and biologists that the protection of young shrimp is desirable. Recently evidence has been presented (Gunter, 1956) which supports this position. Various methods have been