Experimental Shark Pens at the Lerner Marine Laboratory

Abstract. A new facility has recently been added at the Lerner Marine Laboratory, Bimini, Bahamas, which makes it possible for the first time to work experimentally with large elasmobranchs up to 15 feet in length.

The Lerner Marine Laboratory, generous gift of Michael Lerner and now in its 12th year, is operated by the American Museum of Natural History in New York as one of the Museum's five field stations. Situated on the east side of the Gulf Stream on the island of Bimini, only 53 air miles due east of Miami, the laboratory has become an important center for the study of semitropical marine fauna and flora of the Caribbean area. With the addition of three shark pens, constructed with funds provided by the Office of Naval Research, investigators may now study several species of large elasmobranchs (*1*) under excellent conditions for observation and experiment.

Two of the pens (holding and observations pens) measure approximately 40 by 80 feet and are 7 feet deep at mean high tide (Fig. 1). Between the two large pens and connected with them by gallows gates, is a smaller operating pen 16 by 40 by 7 feet. All three pens are enclosed in chain-link fencing made of stainless steel 11-gauge wire stapled to pressure-treated wood pilings. A dock 10 feet wide surrounds the three pens and a 2-foot wide catwalk extends along the north and south side of the central operating pen. Over the operating pen is a monorail carrying an electrically driven 2-ton hoist and above this is a viewing platform 15 by 20 feet. Since the water is of unusual clarity at Bimini, it is possible to observe in considerable detail, from the platform, the behavior of normal and experimental sharks as they swim over the white coral sand bottom of the observation and holding pens.

When a shark in the holding pen is selected for experiment it is separated from the others by a net having a 4-inch mesh, and guided through the gallows gate into the operating pen, where it is confined by stout netting spread over rectangular metal frames. By means of the electric hoist the netting on the floor and side of the operating pen may be elevated, further confining the shark and raising it to the water's surface alongside the dock. In this position the shark is anesthetized by spraying MS222 into its mouth and over its gills with a pump-type hand sprayer attached to a 4-foot brass delivery tube (*2*). Ordinarily 1 liter of MS222 (1:1000 dilution) can be delivered in 6 to 10 seconds into the mouth of the shark. It takes only 60 to 90 seconds for the MS222 to anesthetize a 400- to 500-lb. shark, after which it may be raised to the dock on a canvas-strap stretcher and operated on with safety for as long as 20 minutes. After the operation the shark is allowed to recover in the operating pen and then is directed through the gallows gate into the observation pen for subsequent study. In addition to experiments on the visual and olfactory organs now in progress, sharks are currently being conditioned for an investigation of hearing and the influence of various sounds on behavior patterns.

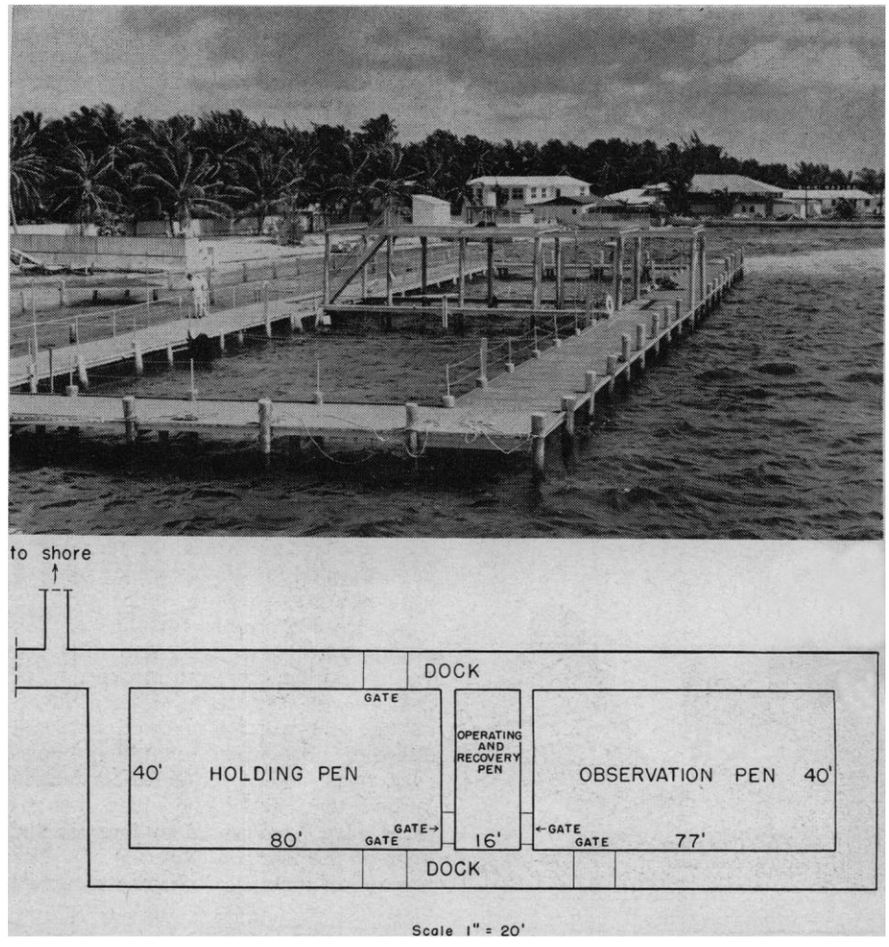

Fig. 1. (Top) View of the shark pens at the Lerner Marine Laboratory, looking north. [Photograph by Langley Wood]. (Bottom) Diagram of shark pens showing relative sizes and positions of the pens.

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References and Notes

1. Species readily available include: lemon shark (*Negaprion brevirostris*), dusky shark (*Carcharhinus obscurus*), brown shark (*Carcharhinus milberti*), bull shark (*Carcharhinus leucas*), reef shark (*Carcharhinus falciformis*), tiger shark (*Galeocerdo cuvier*), and nurse shark (*Ginglymostoma cirratum*).
2. P. W. Gilbert and F. G. Wood, *Science* **126**, 212 (1957).

23 May 1960