

# SEAMOUNTS: A BIOLOGICAL CONCOURSE IN THE OPEN SEA An Introductory Statement

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In 1883, Sir Thomas Huxley expressed a view that river fisheries can be exhausted by man, but the seas held almost unlimited supplies of food (Foster and Lankester 1903). He noted that the important marine resources such as cod, herring, and mackerel were inexhaustible. A caveat in his inaugural address, which was given at the Fisheries Exhibition in London in 1883, was that these resources were inexhaustible "... in relation to our present modes of fishing." In the late 1800's it was not difficult to view the sea resources as very large and that man's fishing effort would only contribute a small fraction to the total mortality. However, today, after 100 years of fisheries exploration and expansion in the world's oceans, we know that the resources are not inexhaustible and that they can be overfished. Classic examples include the Peruvian anchovy and the Pacific sardine.

While history is proving Sir Thomas Huxley wrong on man's impact on the sea resources, his views on management of the river resources are certainly applicable to the high seas resources. He noted that river resources which have been exhausted by man's exploitation can usually be prevented because man's operations can be controlled. Thus, to optimize our harvest of the ocean resources we need to understand the dynamics of the system. This draws us to the reasons which led us to organize this workshop, "Environment and resources of seamounts in the North Pacific."

The bulk of the world's ocean resources comes from the coastal zones and the adjacent continental shelf. A small fraction comes from the pelagic areas and includes species such as the tunas, billfishes, sharks, and offshore squids. Until the 1960's seamounts were not considered of any consequence in fisheries. This changed in the late 1960's when Soviet trawlers were reported to land substantial quantities of finfishes from seamounts located in the central North Pacific (Sakiura 1972). A short while later references to a "phantom" fish began appearing in Japanese fisheries trade publications. These fish, whose scientific identity could not be ascertained because they were gutted and gilled at sea, were being caught by Japanese trawlers operating in the mid-Pacific. In the United States of America we were puzzled by the Soviet trawler activity in the waters just beyond the Hawaiian Archipelago and by the reports of "phantom" fish appearing in Japanese markets. Enlightenment on the subject came about during a talk given in Tokyo by Dr. Tokiharu Abe in 1970 when he described the "phantom" fish as the armorhead, *Pentaceros richardsoni* (= *Pseudopentaceros wheeleri*) (Abe 1972). Based on Dr. Abe's report it became apparent that the seamounts were the focus of a new fishery. Of interest is that until the development of the fishery, the armorhead was considered a rare species (Welander et al. 1957).

In comparison with the resources of the continental shelf and the open ocean, the seamounts are a direct source of only a small fraction of the world's marine catch. Details of the historical catch and present knowledge of seamounts will be presented during this workshop. It will suffice at this time to provide a brief description of seamounts.

A seamount is defined as an elevation rising 1,000 m or more from the sea floor, and of limited extent across the summit (U.S. Board of Geographic Names 1981). Although an accurate count of the number of seamounts in the Pacific is not available, the total number ranges in the tens of thousands (Scott and Rotondo 1983). Darwin suggested that the formation of islands, atolls and submerged reefs was the result of uplifting, subsidence, and coral growth (Hesse et al. 1937). Recent research in plate tectonics has provided the basis for a new explanation on the formation of seamounts (Scott