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SCIENCE

Marine Science and Technology

In the past several years, Congress and the Executive Branch have made increasingly urgent efforts to improve federal activity in oceanography. This has resulted in part from prodding by academic oceanographers and in part from recognition of the undersea threat to national security, the emergence of science and technology as an instrument of world affairs, and increased international interest in the exploitation of marine resources. The status of our nation's effort in this area has been documented recently in two valuable reports.* One of these, *Oceanography 1966*, was prepared by academic scientists. The other, *Marine Science Affairs*, was issued by President Johnson.

The White House report was prepared by the new National Council on Marine Resources and Engineering Development, of which Vice President Humphrey is chairman and Edward Wenk, Jr., is executive secretary. The council already has selected nine targets for initiative or increased emphasis. Two of these are "food from the sea" and "deep ocean technology."

The Food from the Sea program calls for the United States to provide world leadership in exploiting the oceans for protein for the undernourished. The potential value of fish protein concentrate is well known. What is new is a proposal to help at least one underdeveloped nation master the necessary technology to produce its own requirements.

The *Thresher* catastrophe in 1963 dramatized the fact that this nation had virtually no capacity to find and recover objects from depths of more than 120 meters. In 1966 the recovery of an unarmed nuclear weapon from 850 meters of water near Spain required 3 months, dozens of ships and aircraft, thousands of people, and millions of dollars. A new program has funds to start development of a small manned submersible capable of operating eventually at depths down to 6000 meters. Only 2 percent of the world's oceans are deeper. In developing vehicles to probe the depths, the government will have no monopoly. The Marine Science Affairs report lists a number of undersea research vehicles owned and operated by private enterprise.

In *Oceanography 1966*, the scientists make an excellent presentation on the subjects they know best—scientific accomplishments and challenges. The sections devoted to physical and biological oceanography are particularly strong. Progress in oceanography will help in attaining many practical goals—for instance, food from the sea. With the development of improved sound gear, oceanographers are acquiring the ability to assess directly populations of fish and other large organisms. Commercial fishing records and echo-sounder surveys of anchovy populations off the west coast of South America show that immense numbers of anchovy live in recently upwelled waters of the Peru Current. The fish are most abundant in waters in the temperature range 14° to 18°C. The population shifts in distribution, both vertically and laterally, with the shift of water having this temperature range.

Today marine science is in an especially favorable period of development. Support is increasing as many national goals touching on the sea become urgent. At the same time, new tools and new concepts are expanding the opportunities for research. Sensing this climate, some of the best graduate students are turning to the sea. If such trends continue, the next decade could belong to the oceanographers.—PHILIP H. ABELSON

* *Oceanography 1966, Nat. Acad. Sci.–Nat. Res. Council Pub. 1492* (1967); *Marine Science Affairs—A Year of Transition* (Government Printing Office, Washington, D.C., 1967).