"Any discusion of the effect of Apartheid on science," the report continues, "therefore must be concerned not only with the training of a scientific elite—although this is important in any industrialized society—but also with the ways used to ensure that the non-elite understands, to some extent, the type of development which is going on around him. This type of information is given both at school and by the mass media. Here the effect of Apartheid on science is clear.

"With restricted science facilities in non-White schools, restricted mass media as well as the restrictions placed on non-White participation in scientific creation, the non-White population is almost completely deprived from taking part in the scientific developments of today's world."—ELINOR LANGER

Marine Sciences Council Reports Priorities of Executive Branch

With a light tap of the ceremonial bottle, President Johnson recently launched the Administration's newly constructed marine sciences program. The President may have christened a relatively small craft but he seemed to offer the hope of larger vessels in the future as he announced that the nation would encounter the ocean environment "with the same conviction and pioneering spirit that propelled ships from the Old to the New World."

The most pleased spectators at the event were the chief architects—Vice President Hubert H. Humphrey, chairman of the Marine Sciences Council, and Edward Wenk, Jr., the council's executive secretary. The symbolic launching came in the form of the first report of the council, an interagency coordinating group created last summer by a Congress impatient of Executive Branch fragmentation and delay in the development of U.S. oceanography. The Congress also established a companion Commission on Marine Science, Engineering, and Resources to provide advice on program and organization.

The council's report, entitled *Marine Science Affairs—A Year of Transition*, was sent by Humphrey* to the President who then relayed it to Congress. Although the council outlines several specific marine programs, the report's main importance may well be that such a document could be written at all. According to Wenk, the report is the first major policy statement to receive the approval of all the sections of the national government concerned with marine science; 24 bureaus in 11 federal departments have responsibilities in this area.

It is well known that governmental agencies are jealous protectors and promoters of their own programs; the marine sciences area is no exception. Despite this bureaucratic possessiveness, the Marine Sciences Council was able to agree on a report which established governmental priorities and described activities by purpose rather than one which listed specific programs agency by agency. (By contrast, the annual report of the Space Council, the other intergovernmental group which Humphrey heads, focuses on activities of individual departments.)

Marine Council's Budget Efforts

In the time since the council was created last summer, the group has spent much of its energy protecting and expanding the funds available for federal programs in the marine sciences. The budget for oceanographic activities proposed for fiscal year 1968 is $462 million, $53 million more than last year. Most of this increase is in areas marked for priority spending by Humphrey and the Marine Sciences Council. In an interview, Wenk said that he looked on this increase with satisfaction, in light of the council's late entry into the budget-making process last fall in a time of a "no new starts" atmosphere caused by the heavy spending for the Vietnam war. The report notes that the nation as a whole allots only about 3 percent of its technical spending to marine science activities. Council officials, however, indicate that they do not anticipate any "crash" oceanographic program in coming years. "We're not in a race to see how much money we can spend," Humphrey explained at a press conference.

The whale's share of the 1968 federal marine sciences budget, $258.7 million, is scheduled for the U.S. Navy. Despite the fiscal importance given to military activity, the council's report is civilian in tone. (On the other hand, "Effective Use of the Sea," last year's PSAC report, gave greater stress to the military significance of the oceans.) The report of the Marine Sciences Council gave proportionately little space to an account of military uses of the seas and noted that "in fiscal 1968, civilian activities will increase more rapidly than defense activities, reflecting the increasing emphasis on utilizing marine sciences to meet industrial, economic, and social goals."

By implication, the report even seems to chastise the Navy for inadequate development of deep-ocean search and retrieval capability, one of the areas which the council concluded was deserving of special emphasis. The report states that the 1963 *Thresher* catastrophe demonstrated that "this nation had virtually no capability" in search and retrieval in water more than 400 feet deep.

The council noted that, when a nuclear weapon was lost in 2850 feet of ocean off the Spanish coast in 1966, the nation demonstrated that it had acquired "some capability, embryonic

*The other members of the council are the heads of departments and agencies concerned with marine sciences affairs: Navy, Interior, Commerce, Transportation, HEW, State, Atomic Energy Commission, and National Science Foundation. The leaders of NASA, the Smithsonian, AID, the Budget Bureau, the Council of Economic Advisers, and the Office of Science and Technology also attended meetings of the council as observers. The report can be obtained for $.60 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

though it might be, in the three intervening years. The task, however, required 3 months, dozens of ships and aircraft, thousands of people, and millions of dollars." The council stated that the deepest important recovery was from 3000 feet, "Yet more than 80 percent of the world seas exceed that depth." The council pointed out that the Navy program for fiscal 1968 contains funds to begin development of a small, manned submersible which eventually could operate at a depth of 20,000 feet, a diving capacity which would enable it to work in 98 percent of the world's oceans.

Among the nine priority items which the council established for Federal action, the report seems to devote special attention to three civilian programs—food production, weather forecasting, and international cooperation.

One of the areas listed as a new initiative by the council is "an intensified, long-range program to exploit the oceans as a source of food to help feed the undernourished people of the world." The report noted that the Bureau of Commercial Fisheries had refined a relatively simple process for producing a fish protein concentrate

Edward Wenk, Jr., executive secretary of the Marine Sciences Council.

(FPC) which could provide a child's protein needs for less than a penny a day. Two pilot plants for FPC production are to be built in the United States. To encourage use of this concentrate, the council proposed a 5-year FPC demonstration program which includes development of commercial process for producing FPC, bilateral selection of three protein-deficient countries to survey the fishing potential and market feasibility of FPC products, and selection of one of these countries in which to foster development of a local capability to produce and distribute FPC. The proposed program is designed to multiply the "presently used food resources of the ocean by a factor of perhaps five." In a press conference, Humphrey waxed enthusiastic about FPC: "It may be the greatest boon to mankind in helping to give him a sound body and a sound mind since, I guess, the beginning of time."

One of the accomplishments of the Marine Sciences Council has been to assign "lead agency responsibility" for a number of marine programs, thus helping to prod future action. With a smile, Wenk referred to this process as "trying to pin the tail on the donkey." In the area of utilizing marine food resources and developing FPC programs, the Agency for International Development (AID) has been designated as the lead agency, with technical support to come from the Bureau of Commercial Fisheries and the Department of Health, Education, and Welfare (HEW).

While noting that a large part of the federal effort in marine sciences

Oceanography 1966—NAS Report

"It is often said that the ocean bottom is far less well known than the moon's surface," states the Committee on Oceanography of the National Academy of Sciences–National Research Council. The sentence is contained in a report entitled *Oceanography 1966: Achievements and Opportunities* which was released earlier this month. Milner Schaefer of the Scripps Institution of Oceanography serves as chairman of the committee, which produced its first oceanography report in 1959.

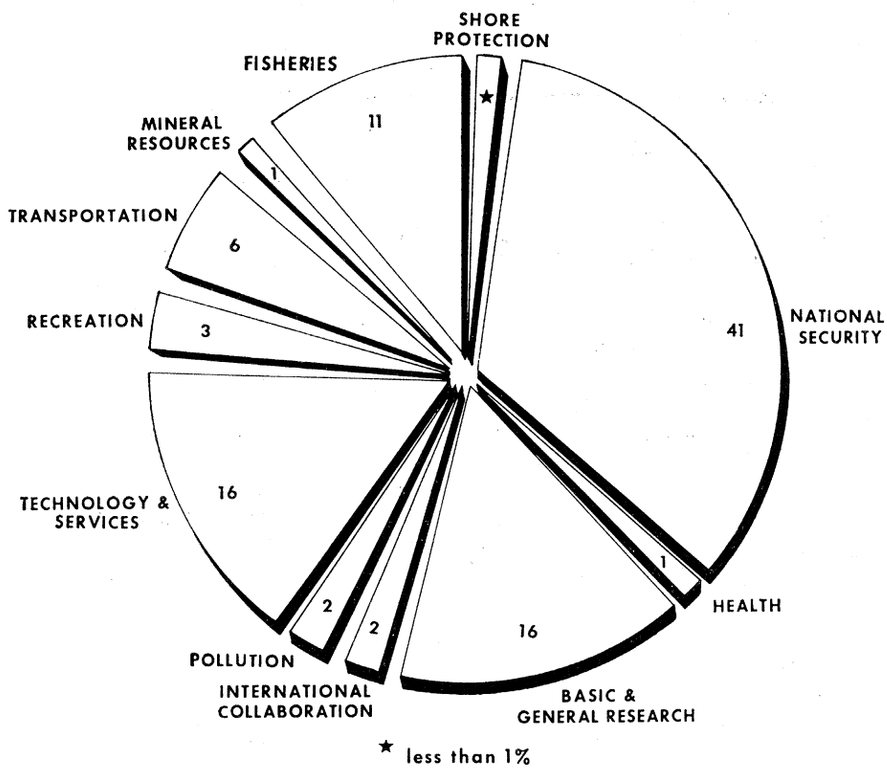
In *Oceanography 1966* the committee recommends that "the United States adopt (*a*) a comprehensive national ocean policy calling for increasing our understanding and use of the ocean at as rapid a rate as is consistent with other national goals, (*b*) a national ocean program for the implementation of that policy, and (*c*) a national ocean budget adequate to fund the program." The committee also calls for revision and strengthening of the existing management structure for the national oceanographic program.

In addition to its major recommendations, the committee also proposes:

- Provision of four new laboratories in the next decade for the study of the survival requirements of young fish and shellfish.
- Construction of 60 oceanographic ships during the next 10 years, the majority of which would be used to replace old ships.
- Expenditure of at least $36 million in the next 5 years for the construction of additional marine science laboratories on shore.
- Continuation of work on identification of the causes of failures of deepwater buoys to survive for a year.
- Increase of expenditure by 20 percent in basic research on the effects of artificial radioactivity on the marine environment.
- Establishment of a world oceanographic organization within the United Nations.
- Performance of basic oceanographic research in university-affiliated laboratories. "We do not believe in the establishment of nonmission-oriented federally operated national laboratories whose sole function is discipline-oriented ocean research," the committee stated.

The committee's remarks on federal organization for oceanography are somewhat dated in view of the fact that the Marine Sciences Council and the Commission on Marine Science, Engineering, and Resources have been established by Congress since the writing of *Oceanography 1966*.

**Oceanography 1966* can be obtained for $5 from the Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.



Proportionate spending in the marine science dollar for fiscal year 1968. The figure is reprinted from the recently released report of the Marine Sciences Council.

has been devoted to observation of the ocean environment, the council commented that the civilian need for improved environmental prediction had been "relatively undersupported." The council observed that its suggested improvements could help reduce the damage from both droughts and ocean storms, and pointed out that the United States had suffered $4.03 billion in economic loss from hurricanes in the years from 1955 to 1966.

In its report, the council gave first listing to the priority of promoting international cooperation in utilization of the oceans. It said that intensified use of the sea could stimulate national rivalries which could eventually thwart the development of marine resources and thus defeat the purpose of U.S. policy. The Council said that it was giving high priority to studying methods of encouraging cooperation between countries and promotion of "scientist-to-scientist exchanges, including multinational use of research ships." The group also concluded that "the experience of Antarctic cooperation deserves study to determine whether it can be extrapolated to areas of the seas beyond polar regions." Government officials have indicated that two committees to explore international marine agreements have already been established under the direction of high-ranking State Department officers; areas for possible agreement seem to be in the internationalization both of the ocean beds and of fishery resources.

Another priority area listed by the council is implementation of the National Sea Grant College and Program Act, which is scheduled to end in fiscal year 1968. The council recommended that this legislation be extended beyond 1968 for "another finite interval of at least two years." The National Science Foundation has been charged with administering the programs under this act and has developed criteria for the judging of grants. According to these criteria, applicant institutions should have "a substantial ongoing program" in the marine sciences area, necessary physical facilities, a capacity for interdisciplinary activities, and a willingness to become regional centers for marine resources utilization. The council stated that "scientific leadership should continue to come from the universities" in the marine sciences area, but added that more university collaboration with industry and government was likely as projects continued to grow in cost and complexity.

Other priorities established in the council report are:

- Initiation of a comprehensive study of data acquisition and use in the marine sciences. "Studies have shown evidence of serious deficiences in the Nation's oceanographic data handling," the report stated.
- Building of a $12-million replacement Coast Guard ship which will be especially equipped to expand oceanographic research in subpolar latitudes.
- Concerted federal and local initiatives "to arrest further shoreline degradation." The report specifies use of the Corps of Engineers hydraulic model of the Chesapeake Bay as "a focal point for a multiagency, multidisciplinary approach" to be correlated with pollution studies of other federal departments.
- Acceleration of activity to assist industries extracting mineral resources on the Continental Shelf.

The marine sciences program outlined in the report is not characterized by dramatic new departures. The council, for instance, has requested no additional legislation from Congress to implement its desires. What the council has been able to do, however, is to articulate a coherent account of existing agency activities and to suggest directions for future programs.

One effect of the council's existence and the writing of its report has been to stimulate high-level concern and interest in marine science affairs. Nothing unlimbers the tentacles of the bureaucratic octopus quite so much as the fear that another denizen of the deep is going to invade its domain. At present, many governmental agencies have acquired a newly founded passion for oceanographic research.

By law, the Marine Sciences Council is scheduled to last only through the middle of 1968. Perhaps the most important task of the council during the next few months will be its proposed consideration of "the optimum Federal organization for developing and implementing marine science policies and programs." Last year's report of the PSAC panel on oceanography recommended the creation of a civilian oceanographic agency which would combine the marine programs of several government departments. Whether the council and the appointed Commission on Marine Science, Engineering, and Resources will agree with the PSAC proposal remains to be seen. What seems likely, however, is that current high-level attention to the problems of U.S. utilization of the oceans will result in an eventual reorganization of federal marine science programs.

—BRYCE NELSON