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Why an Oceanographer of the Navy?

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"... the sea will yield its bounty only in proportion to our vision, our boldness, our determination, and our knowledge."¹

Introduction

Why oceanography?

The recent establishment of an Oceanographer of the Navy can be identified with the recent upsurge of national interest in oceanography. The reply to "Why an Oceanographer?" should be apparent when the reply is found to "Why oceanography?"

The billet of the Oceanographer of the Navy was established in 1962. The responsibilities of the present Oceanographer, Rear Admiral O. D. Waters, were not assigned until 1967. His office, its history, purpose and relationship to the national effort are reviewed in this paper.

It seems plausible that the reader's motive has been instigated more by the rapidly expanding glamor field of oceanography than by curiosity about the Oceanographer of the Navy. However, since the Naval Oceanographic Program is about one-half of the total federal budget for oceanography, one can assume that this program is a weather vane for the national oceanographic program and for the future of oceanography.

The Naval Oceanographic Program

It might appear, since the Oceanographer of the Navy is only six years old, that the Navy had no previous interest in "oceanography". It is not a matter of "interest" so much as it is a matter of "semantics". The science "oceanography" achieved its present glamor within the past few years. Before then it was more or less the hobby of those individuals or institutions that could afford it. The Navy's main interest in the past was a portion of "oceanography" -- hydrography. (Calling hydrography a portion of oceanography might be considered a mortal sin but the fact is -- hydrography is a part of the Navy's Oceanographic Program.) The Navy also has supported for many years, through the Office of Naval Research and the Hydrographer of the Navy, the efforts of oceanographers and oceanographic laboratories.

The classical concept of "oceanography" considers it a science concerned with the ocean and its phenomena - a branch of geography dealing with the deep seas. This concept has been expanded, by popular acclaim, to encompass all the disciplines which can be applied to wresting knowledge out of the sea. The word "oceanography" then, as used in this paper, means this expanded concept.

In consonance with this concept the Naval Oceanographic Program has been defined as:

"... that body of science, technology, engineering, operations, and the personnel and facilities associated with each, which is essential primarily to explore and to lay the basis for exploitation of the ocean and its boundaries for Naval applications to enhance security and support other national objectives."²

Analyzing this definition discloses all the possibilities which have been popularized by imaginative and creative persons, institutions and industrial organizations. One can envision underwater habitats; vehicles for transportation into the water depths, manned and unmanned; survey vessels exploring the depths with coring rigs, dredges, cameras and a myriad of instruments; aircraft using sensors on and into the surface of the waters; and satellites sampling the environment of the Oceanographer's 70 per cent of the earth. Involved are: scientists of many disciplines; biologists, chemists, mathematicians, physicists and physicians; engineers, technicians, environmentalists and seafaring men. The broad sweep of the effort required and the importance of gaining the knowledge for exploiting the total environment of the oceans for the national security of the United States led to the establishment of a single Naval authority responsible directly to the Chief of Naval Operations - the Oceanographer of the Navy.

Historical Appreciation

An appreciation for "Why an Oceanographer of the Navy?" can be gained by a glimpse at the Oceanographer's historical background.

Although there was a Depot of Charts and Instruments back in 1830, the first plunge into oceanography was made by Lieutenant Matthew Fontaine Maury who organized the collection of oceanographic environmental data and put it to practical use by a series of charts and sailing directions for mariners. Maury's work and the interests of the Navy through World War II remained essentially Hydrography - that is, the study, description and charting of the surfaces of the oceans. After World War II, with the advent of the true submersible propelled by nuclear power, the Navy's interest in the ocean environment broke through the skin of the sea's surface into the depths. It was not until 1962 however, that recognition was given to the need for a strong Navy effort to acquire knowledge about the environment of the deep ocean. At this time, the 87th Congress enacted a public law which changed the name of the Hydrographer of the Navy to Oceanographer of the Navy.³

Although the name was changed, the new Oceanographer of the Navy had no unique or expanded responsibilities. It was not until August of 1966 that the Secretary of the Navy added to his responsibilities by defining the Naval Oceanographic Program and directing the Oceanographer to assume responsibility for it.

An appreciation for "Why an Oceanographer of the Navy?" also can be gained by examining the growth of the U.S. government interest in Oceanography.

As far back as 1927, the newly established National Research Council was concerned about the lack of U.S. leadership in the Marine Sciences. At that time, the United States had few or no institutional facilities for developing the scientists, engineers and technicians to provide U.S. leadership in the Marine Sciences.

Because of their concern, the National Research Council established the first Committee on Oceanography. The report of this Committee had a major impact upon the scientific community. It led to funding, from philanthropic sources, for institutions on both coasts; the presently well-known Scripps Institution of Oceanography and the Woods Hole Oceanographic Institution.

Again, in 1949, after World War II, the National Academy of Sciences became concerned about our slow progress into the science of the sea, and a Second Committee on Oceanography was appointed. Due to the Korean conflict no effective action resulted except an instigation of the National Science Foundation into making its first grant into the field of Oceanography.

A third National Academy of Science/National Research Council Committee in 1957 proposed a ten year plan for national oceanographic research requirements and expanded the meaning of oceanography to include many programs which had never before been considered oceanography in the classical sense. The report of this committee led to the establishment of the Interagency Committee on Oceanography in 1959.

The national program was coordinated by this Committee until 1966. Unfortunately the Committee was not provided any muscle. The chairman's only authority was the art of persuasion. The Committee was understaffed and under-budgeted. Members, who were from other government agencies, were not in a position to make commitments.

The present U.S. impetus in national oceanography was initiated when Congress enacted "The Marine Resources and Engineering Development Act of 1966". This Act established the National Council of Marine Resources and Engineering Development in the Executive Office of the President composed of the Vice President and other high ranking government officials. It authorized the President to establish a Commission on Marine Science, Engineering and Resources to be composed of individuals drawn from Federal and State governments, industry, universities, laboratories and other institutions engaged in Marine Science or technological pursuits. It also called on the President to develop a comprehensive, long-range and coordinated national program in marine science. The President's Commission has recently (Jan 1969) completed its report to the President. It

is anticipated that the action taken on this report will give the National Oceanographic program further impetus and coordinated direction.

The Role of the Oceanographer

Today the Oceanographer of the Navy and a purposely small staff directs the Naval Oceanographic Program at his "corporate" headquarters in Alexandria, Virginia from planning to budget to execution. This program is conducted under three broad management headings: Ocean Science, Ocean Engineering and Oceanographic Operations. Included in this program is the work of 27 field activities and 30 hydrographic and oceanographic ships.

A flag officer is authorized to assist the Oceanographer in each of these above three areas. At the present time the Chief of Naval Research has additional responsibility as Assistant Oceanographer of the Navy for Ocean Science. The Deputy Chief of Naval Material (Development) has additional responsibility as the Assistant Oceanographer of the Navy for Ocean Engineering and Development. The billet of Assistant Oceanographer of the Navy for Oceanographic Operations has not been assigned yet but is being managed by the Commander of the Naval Oceanographic Office.

The Ocean Science Program of the Navy concerns itself with projects which are largely scientific or in support of scientific inquiry. It is oriented toward university and institutional contracts which provide a broad base for the Navy's needs in the ocean environment.

The Navy has consolidated three research groups from the Naval Oceanographic Office, the Naval Research Laboratory and the Office of the Chief of Naval Research into a headquarters, the Mury Center for Ocean Science of the Navy. The Mury Center, many universities, institutions and private laboratories maintain direct contact between themselves on all matters pertaining to Ocean Science. For example; in the San Diego area, the Scripps Institution of Oceanography and the Naval Undersea Warfare Center work closely together and share some facilities. In the northeast, the Woods Hole Oceanographic Institution and the University of Rhode Island cooperate with the U.S. Navy Underwater Sound Laboratory at New London.

The Ocean Engineering Program of the Navy is concerned with major development programs which will give the Navy ever increasing capability to operate at any depth, location and time within the world's oceans; to conduct undersea search, rescue, salvage and construction; and to provide the necessary undersea vehicles and installations. To acquire these capabilities the Navy is developing new technologies for the undersea environment in materials and in structures; in energy conversion, engineering, communications and in all the sciences and technologies which will allow human beings to use their skills effectively in the hostile environment of the ocean depths.

The Oceanographic Operations program concerns itself with the collections of environmental data of all the oceans, their surface and their bottom boundaries, and translating this data into useful form for the conduct of Naval operations. The data collected provides useful

operational data, not only to Navy ships but to all users of the ocean, in the forms of charts, books, forecasts, atlases and special studies. Included in this data is precise information about the biology of the ocean; the movements of fish and ocean mammals; the meanderings of the ocean currents; a system whereby a ship's master may take a route across the oceans for maximum speed and economy by avoiding unfavorable weather and currents; and an undersea environmental prediction system.

All three of these programs, working closely together, support and enhance each other. All three are closely coordinated by the Oceanographer of the Navy.

Future Role of the Oceanographer

The question "Why an Oceanographer of the Navy?" is related to the question, "Why the recent upsurge of interest in oceanography?"

Seven years ago there was no Oceanographer of the Navy. Public interest in oceanography was practically non-existent.

Today, in addition to the Department of Defense, there are many agencies of ten federal departments, over 50 federal/civilian institutions, more than 25 state institutions and at least 25 private institutions directly involved in marine science and technology.

Seven years ago it was difficult to find a periodical devoted to oceanography. Today there are many periodicals and new ones continue to appear.

Seven years ago there were very few industrial organizations putting money into oceanography. Today there are at least 100 major industries and the list is growing by leaps and bounds.

Seven years ago there was one small submersible in the water for research purposes in the United States. Today there are over 30 small submersibles performing complicated missions at great depths.

Last December, when three astronauts were penetrating the environment of space in their historic flight around the moon, five aquanauts made history by living and working in the environment of a simulated depth of 1000 feet under saturation conditions for a period of 77 hours and 30 minutes in a Duke/Navy experiment. Just as a flight around the moon staggers the imagination so does the fact that human beings can live and function effectively in an environment where their entire body is exposed to ambient pressure of 450 pounds per square inch.

Within the past five years aquanauts have begun to live in the ocean assisted by underwater ambient pressure habitats. In addition to the U.S. Navy's Sealab which provides for aquanauts at 600 feet depth there is another habitat 50 feet down on the ocean floor in the Virgin Islands where three men will be living in this environment for 60 days. Also, in Hawaii, at Makapuu Point, Ohoa, aquanauts have been routinely operating a vertically mobile prototype habitat and performing useful work down to 200 feet. In a few months they will be operat-

ing a new habitat with a design-depth of 600 feet.

Is this upsurge of interest in Oceanography oversold by good publicity and glamorization?

Within the government, the recent report by the Commission on Marine Science, Engineering and Resources has emphasized the necessity for the United States to develop its capability to wrest knowledge from the sea in order to exploit the oceans for the benefit of our citizens and all mankind.

Within the Oceanographer's programs, another Assistant Oceanographer of the Navy has been authorized -- an Assistant for Environmental Prediction Services. This Assistant will have the responsibility for collating environmental data, processing it and providing forecasting of sea, swell, surf, ice, sonar conditions and any related environmental information in support of naval operations and for developing the Navy's long term requirements in the field of environmental predictions.

Also within the Navy, the Chief of Naval Operations has authorized the establishment of a Special Duty Officer category for environmental sciences. These officer/scientists will become a community of oceanographers, hydrographers, and meteorologists in the Navy who will increasingly assume responsibilities for the Naval Oceanographic Program.

All the foregoing are indications of the continued growth of oceanography.

There are, however, two factors which have caused and will continue to ensure a healthy interest in oceanography by the United States:

- the growing need of the human race to exploit the natural resources of the oceans and their seabeds
- the requirement for the United States to maintain an undersea operational superiority for our national defense.

A third factor is going to influence the other two -- the settlement of legal actions among nations with regard to the exploitation of the ocean environment. As it becomes increasingly apparent to humanity that they are going to turn more and more to the sea for natural resources, there could develop competition among nations for sovereignty over these resources. The position of the United States was made clear by President Johnson in July 1966 when he said:

"Under no circumstances, we believe, must we ever allow the prospects of rich harvest and mineral wealth to create a new form of colonial competition among the maritime nations. We must be careful to avoid a race to grab and to hold the lands under the high seas. We must insure that the deep seas and the ocean bottoms are, and remain, the legacy of all human beings."⁴

The continued development of our national knowledge of the ocean environment and our capability to adapt to that environment will

insure that this position of the United States can be supported. For this reason alone, if for no other, the future of oceanography in the United States is safely predicted as continued growth and development.

The United States has recognized the need for a national initiative in Marine Science, Engineering and Resources. The Navy has recognized and organized to support the military portion of this initiative and, because of its own expertise and capability, to provide major assistance to all non-military parts of this initiative. The Naval Oceanographic Program is a part of the National Oceanographic Program. The management of the Naval Oceanographic Program is the responsibility of the Oceanographer -- and that responsibility is the reason why there is an Oceanographer of the Navy.

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