

A SPECIAL REPORT

New England Marine Resources Information Program
Narragansett Bay Campus, University of Rhode Island, Narragansett, R. I. 02882

Marine Career Series:
OCEANOGRAPHER

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Oceanographers study the ocean -- its physics and chemistry, the biology of organisms living in the ocean, the geology and geophysics of the ocean basins, and the interactions between the ocean, the atmosphere and the land. Because of its vast scope, oceanographers must have a very broad interdisciplinary background in science and mathematics and then specialize in one of the major areas of study.

REQUIREMENTS AND QUALIFICATIONS

You should have these:

- physical stamina
- interest and ability in science, math and engineering
- creativity and imagination

You must be able to:

- work alone and without supervision
- record and analyze data, write reports and papers and present reports and findings in talks to groups

You should know that:

- three of every four oceanographers engage in research and development activities
- frequently time is spent away from home
- diving skills are sometimes required

PREPARATION AND TRAINING

Education:

- high school education should include a strong background in math and science and study of the German, Russian, or French language
- the minimum educational requirement for beginning professional positions in oceanography is the bachelor's degree with a major in oceanography, biology, a geoscience, one of the other basic sciences, mathematics or engineering
- the employment field expands, both in civil service jobs and fellowships, for those who hold a master's degree
- the oceanographer who intends to go into research work or teaching should obtain a doctor's degree

Locations:

At the present time there are 46 institutions offering doctorates in some area of oceanography or ocean engineering and many more offering associate, bachelor or master's degrees in oceanography. Among these there are four to date which have been designated "Sea Grant Colleges" because of the breadth and depth of their programs. They are:

- The University of Rhode Island, Kingston, R. I. 02881
- Texas A&M University, College Station, Tex. 77843
- Oregon State University, Corvallis, Ore. 97331
- The University of Washington, Seattle, Wash. 98105

All of these have extensive marine advisory services and can provide information on programs at other institutions besides their own.

Special Entry Requirements:

- bachelor's degree is essential

OPPORTUNITIES: PRESENT AND FUTURE

Employment opportunities in oceanography are expected to be good through the 1970's. Those with advanced degrees will have the best opportunities for employment. Well-trained persons with bachelor's degrees in related sciences will find opportunities mainly as research assistants in routine analytical positions.

The outlook is for gradual growth of this small profession through the 1970's. Exploitation of the resources of the sea for food and minerals to support the expected population increase will grow gradually and will continue to be dependent on government funding. Efforts by man to control his environment by weather direction, control of pollution, and management of improvement of coastal resources and transportation, and the military need for technical knowledge, will require others.

The demand for oceanographers qualified to teach in colleges and universities also is expected to expand. As interest in oceanography grows and more courses in oceanography are offered, more teachers in the science will be needed.

EARNINGS AND WORKING CONDITIONS

Salary:

Pay ranges from the pre-doctoral fellowship stipend of about \$2,600 - \$3,000 a year for the graduate student and \$7,319 for the beginner in government employment, to \$12,000 to \$21,000 annually for the professor and the qualified research oceanographer. The maximum government salary is \$25,583 except for an occasional executive of unusual administrative ability.

Hours :

The oceans cover most of the earth's surface and the oceanographer may be called upon to work anywhere in the hydrosphere and at any hour. He must be willing to work to the completion of a task, regardless of the time involved.

Fringe Benefits :

Generally speaking, the following fringe benefits are available:

- social security and pensions
- paid vacation and holidays
- health and accident benefits
- life insurance

EMPLOYMENT OUTLOOK

There were approximately 1,350 oceanographers listed in the United States by the National Academy of Science in 1969. About three-fourths of these were employed by colleges and universities, research laboratories, and the federal government. Those federal agencies employing substantial numbers of oceanographers are the Naval Oceanographic Office, Department of the Navy and National Oceanic and Atmospheric Administration, Department of Commerce.

A growing number of oceanographers work in private industry for consulting or other firms that design and develop instruments and vehicles for oceanographic research. A few work for fishery laboratories of state and local governments.

JOB DESCRIPTION

Oceanographers plan extensive tests and observational programs and conduct detailed surveys and experiments to obtain information about the ocean. They may collect and study data on the ocean's tides, currents, and waves; its temperature, density, and acoustical properties; its sediments; its sub-bottom; its shape; its interaction with the atmosphere, and marine plants and animals. They analyze the samples, specimens, and data collected, often using electronic computers. To present the results of their studies, they prepare maps and charts, tabulations, reports, and manuals and write papers for scientific journals.

In developing and carrying out tests and observational programs,, oceanographers use the principles and techniques of the natural sciences, mathematics and engineering. They use a variety of special instruments and devices that measure the earth's magnetic and gravity fields, the speed of sound traveling through water, the oceans' depths, the flow of heat from the earth's interior, and the temperature and chemical composition of the water. Specially developed cameras with strong lights enable oceanographers to photograph marine organisms and the ocean floor; new research vehicles transport marine scientists to the floor of the sea. When their work requires new oceanographic instruments or analytical techniques, they usually develop them.

WHERE TO GO FOR MORE INFORMATION

American Society for Oceanography, 1730 M St., N.W., Washington, D.C. 20036
International Oceanographic Foundation, 1 Rickenbacker Causeway, Virginia Key,
Miami, Fla. 33149

New England Marine Resources Information Program, Narragansett, R. I. 02882
Oceanography Information Sources, Printing and Publishing Office, National Academy
of Sciences, 2101 Constitution Ave., N.W., Wash.. D.C. 20418

The marine advisory service of your state university if it is in a coastal state
Your high school or junior college counselor