

## OCEANOGRAPHY AND THE SPECIAL LIBRARY\*

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### Introduction

Scientists in the field of oceanography have unusually great dependence upon libraries. A major oceanographic cruise is something that may occur only once in the lifetime of a nation. The results of such a cruise may not be completely worked up until ten to twenty years after the ship has returned to port. If library reports of past expeditions and other similar materials were not readily available oceanographers would have great difficulty in carrying on their work, since such reports cannot be replaced and are essential to further progress in the science.

### Existing Oceanographic Libraries

Two of the important oceanographic libraries in the United States are those of the University of California's Scripps Institution of Oceanography at La Jolla, California and of the University of Washington Department of Oceanography at Seattle, Washington. Others are the Oceanographic Library at Woods Hole, Massachusetts, the library of the U. S. Navy Hydrographic Office in Washington, D. C., and the library of the Allan Hancock Foundation at the University of Southern California. As an example of the size of these libraries, the Scripps Institution Library may be considered. It contains some 24,800 volumes, 50,000 reprints, and 535 journals.

New oceanographic libraries are being developed at the University of Miami Marine Laboratory, Coral Gables, Florida; the Johns Hopkins University, Chesapeake Bay Institute, Annapolis, Maryland; the Marine Laboratory of the Texas Game and Fish Commission, Rockport, Texas; the Southwest Research Institute, San Antonio, Texas; and the Texas A. & M. College Department of Oceanography at College Station.

### Classification and Collection of Oceanographic Library Materials

In considering the need for special libraries it may be well to define the field of oceanography and to discuss what a library in such a field might contain. Briefly, oceanography is a study of the oceans in all their aspects. From this point of view there are only three other subject matter fields - these being the studies of the land and of the air - corresponding to the study of the sea - and astronomy. These would all, then, be object sciences and all library material could be classified as falling under one or more of these four fields since they together include the whole universe. Thus, it would seem logical that the development of special oceanographic libraries might lead to the development of similar libraries for "land"-ology or geology, and "air"-ology or meteorology. This probably would not be the most ideal subdivision of library material. A more logical subdivision may be defined after a more extensive examination of the subject matter of the field of oceanography.

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Oceanography may be divided into five different aspects: the biological, the chemical, the geological, the physical, and the physical and meteorological. Each of these aspects may be broken down into three components. If the biological aspect is taken as an example, there is first the part of basic biology which pertains to all plants and animals including those in the sea; second is marine biology which pertains specifically to the plants and animals of the sea; and finally there is that part of oceanography which considers the various organisms in the sea and involves consideration of the ocean currents, the nature of the bottom, the chemical reactions taking place in the sea, and the weather. Each aspect of oceanography has its engineering emphasis as well as the scientific one. In the case of biological oceanography, fisheries or marine wildlife management constitutes the engineering portion.

Standard university libraries would have nearly all of the material in the first of these components and most of that in marine biology, the second. Also, many of such libraries have some of the oceanographic works. Thus, in order to become a full-fledged oceanographic library they need only add the remainder of the oceanographic material. The largest quantity of material relative to the biological phase of oceanography is probably that in the basic science, with the amount which is specifically oceanographic being relatively small. Thus, the standard library would have the greater percentage of the over-all oceanographic material pertaining to the biological phase. The situation is similar for the other phases.

On the other hand, suppose it is decided to establish an oceanographic library at a relatively isolated location such as at some shore station. It then becomes a major task to collect the necessary library materials since those in all three categories, the basic, the marine, and the oceanographic, must be obtained. Nevertheless, this has been the way in which nearly all oceanographic libraries have been developed.

It is interesting to take several of the recent periodic accession lists for major oceanographic libraries and to examine the type of material included. Taking three such lists from different institutions and arbitrarily listing the first selection under "new books" the following are found:

Library No. 1 Ashbel, D., Bio-climatic atlas of Israel. 1948

Library No. 2 Australian Journal of Marine and Freshwater Research, Vol. 2, No. 1, Melbourne, June 1951 (Studies in Australian Estuarine Hydrology.) Introductory and Comparative Features by D. J. Rochford, PP. 1-116.

Library No. 3 Canadian Hydrographic and Map Service, British Columbia Pilot (Canadian ed.), Vol. 1, 4th Ed., Vol. 2, 2nd Ed. Issued by the Hydrographic and Map Service. Surveys & Engineering Branch. Ottawa. Edmond Cloutier, 1946.

These are publications which would be of general interest and quite likely found in most university libraries. Of the fourteen books listed in one accession list, not one was truly oceanographic in nature. This is not an uncommon situation.

## Disadvantages of Many of the Existing Oceanographic Libraries

The major oceanographic libraries which now exist are relatively isolated. They have had to duplicate materials which are already available in the larger standard university libraries. A further study of accession lists of these oceanographic libraries shows that materials of the standard type constitute a very large percentage of accessions. The thoroughly oceanographic materials which are of more than casual interest are but few in number on these lists.

In addition to the disadvantage of having to duplicate materials which are already available elsewhere, there is another disadvantage which the present isolated oceanographic libraries have. This is that the libraries are not readily accessible for the use of large groups of students and scientists. Many persons who would wish to use the facilities are students of the basic sciences and the marine sciences who want to refer to oceanographic materials but who may not wish to specialize in this field nor to work or study at an oceanographic institution.

There would be a great advantage in having oceanographic libraries located on university campuses. Libraries in such locations would tend to arouse the interest in oceanography of highly qualified persons from various fields who might aid greatly in the development of the science.

## Recommendations for the Establishment of Oceanographic Libraries

### Difficulties Encountered

The establishment of a library in oceanography leads to many problems of classification. The various materials may fall under classifications of natural science, basic science, marine science, geophysics, and so forth. Since a large percentage of all scientific information has application in the ocean, it would seem that a large well-rounded library using a standard classification system but paying particular attention to the materials specifically and uniquely classified as oceanographic would comprise the best overall oceanographic library.

The establishment and development of the oceanographic section of the library is unusually difficult for several reasons. For example, the field of oceanography is a relatively new but rapidly expanding one in which present day research activities are adding rapidly to the subject matter. Many contributions appear in the form of mimeographed reports having limited distribution but yet having great importance to all research activities in the field. Reports of this type present many difficulties to the librarian in regard to procurement, classification, and reference work. Most oceanographic activities have series of such reports which are given limited distribution. The distribution lists are constantly growing and it is almost impossible for agencies newly added to these lists to obtain copies of back reports.

At any given time there is but limited demand for preliminary reports produced in oceanographic research so that the research agency cannot justify the reproduction of a large number of copies. In cases where materials are printed, available copies are soon used up and a large percentage of published information in purely oceanographic work is now out of print.

Another difficulty faced by the oceanographic librarian is that both in the past and at the present time considerable work has been done in foreign countries particularly in the USSR, Japan and Germany. It is difficult to keep lists of such materials up to date and to make them available for interested scientists.

The difficulties just mentioned would make it seem desirable that the chief effort in the United States toward the development of oceanographic libraries should be concentrated at a few strategic locations. If libraries at such locations were supplemented in each region by a series of closely cooperating special libraries with specialized collections in certain limited marine subject matter fields, the situation would seem almost ideal.

There are a few standard basic works which are available and which will provide a nucleus of general information useful in each special library. There is, for example, *The Oceans*, by Sverdrup, Johnson and Fleming, Prentice Hall, 1942, which is a comprehensive analysis of the field of oceanography and which lists some 1000 basic references in this field. Another useful book is *International Aspects of Oceanography* by T. W. Vaughan, National Academy of Sciences, 1937. This work lists many of the oceanographic research centers of the world and their facilities and summarizes the data available from the various oceans at the time that the book was written.

Two widely distributed journals which include considerable oceanographic material are *The Journal of Marine Science* and the *Transactions of the American Geophysical Union*. The latter contains a bibliography of new papers in oceanography and other related subjects.

#### The Texas A. & M. Libraries and Gulf Coast Oceanography

The preceding has been a general discussion of the countrywide situation in regard to oceanographic libraries. A consideration of the question as related to the Department of Oceanography at Texas A. & M. and to the Gulf Coast region may also be of interest.

Oceanographic work along the Gulf Coast and offshore in the Gulf of Mexico has unusual significance. Nowhere else is there a comparable oil and gas industry in the offshore waters; nowhere else is there a chemical industry so largely dependent on the adjacent waters for raw materials, fuel supply, water for use as a coolant, and transportation; nowhere else is the daily marine influence on the weather, or the occurrence of catastrophic events such as the Galveston flood in 1900, of such great importance. Then, too, there is a very large fishing industry (23,000,000 pounds of shrimp annually, for example, and other large fisheries such as the oyster and the blue crab). Also, the Gulf Stream, one of the major ocean currents, has its source in the Gulf of Mexico. The Gulf is a body of water as large as any ocean area which has been systematically observed and analyzed. Yet it is 90% enclosed and, therefore, has many advantages for the scientists who would analyze the characteristics of a large body of water. It is an area of great importance to marine navigation because of its ready access to a large portion of the United States. It has great military significance as can be seen by reports of activities offshore in this area during the last war. Meteorologically it is the source of the moist maritime air masses providing most of the rainfall in the United States.

These few comments may help to explain the tremendous interest in oceanography which has developed in the Gulf Coast Region, and which is shown by government, industry, research institutions and individuals. It can, therefore, readily be understood that the need for a major oceanographic library in this region, together with a cooperating group of special libraries, is especially great.

The oceanographic research program at Texas A. & M. which is conducted through the Texas A. & M. Research Foundation includes a hydrographic and meteorological survey of the Gulf of Mexico sponsored by the U. S. Navy Hydrographic Office and the Office of Naval Research and carried out in cooperation with the U. S. Fish and Wildlife Service; a study of the transfer processes operating at the ocean boundaries based upon complete series of observations at an offshore oil structure; and a study of atmospheric influence on the thermal structure of the oceans sponsored by the Office of Naval Research. There is a study of chemical sedimentation and physical oceanography in shallow waters conducted for the American Petroleum Institute through the University of California. A marine laboratory is maintained and operated for studies in biological oceanography by a group of seven major oil companies in the area. Another program concerns oceanographic influences upon offshore oil operations. Investigations relating to ocean wave forces, modification of air masses, marine instrumentation, and utilization of marine organisms as commercial products are being initiated.

Oceanographic research is also carried out in connection with the academic program which leads to the Master of Science or Doctor of Philosophy degree in any one of the five aspects of oceanography. Twenty full-time graduate students are now enrolled as majors in this field.

At Texas A. & M. work is already well underway to establish for the Gulf Coast region the type of central oceanographic library which seems to be needed. There is a complete file of bathythermograms for the Gulf furnished by the Navy; there is a full set of original data for the only complete oceanographic survey of the Gulf. There are files of materials classified for security reasons but available to persons who have suitable clearance. There are sets of volumes covering the cruises of many of the famous oceanographic vessels; there is an oceanographic research program sponsored by government and industry amounting to some \$300,000 annually; there is a good university library to provide the standard materials; there is a graduate teaching program in each of the aspects of oceanography; there is a special engineers library; there is a central location where a definite effort is made to make facilities available to all who may be interested, and there is close contact between the department and other oceanographic research activities throughout the country.

It is expected that the Texas A. & M. Library in conjunction with the other libraries mentioned above and with the cooperation of the special librarians throughout the region may develop the kind of organization which is required to help make more complete utilization of the marine assets available to the Gulf Coast states.

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The Scripps Institution of Oceanography Library at La Jolla, California, publishes an accession list called "The Babbling Bookworm" which should be of interest to some members.

Albert Washer's Fundamentals of General Refinery Practice has just been published and is available at \$10.00 per copy through the Engineering Extension Service, College Station.