



Symposium on Problems of the Ocean

Among the dozen or more symposia to be held during the Centennial Celebration of the AAAS is one on Problems of the Ocean. Oceanography, which includes the study of the physical, chemical, and biological conditions of the ocean, and which overlaps allied fields such as meteorology, geology, etc., has made rapid progress in the last decade. These advances range from those that have immediate and important practical application to those that aim primarily at adding to the sum total of human knowledge. However, there is need for a much better understanding of the phenomena of the oceans. This is emphasized when, in the present state of the world, these great bodies of water must be considered as connecting links rather than separating barriers, and when it is also clear that the rapid rate of increase in human populations requires an expanding dependency on marine resources, *i.e.* the resources of perhaps the only major area which is not yet fully exploited.

Early oceanographic expeditions obtained empirical information on currents, temperature, waves, and other phenomena. There followed notable advances in devising physical and chemical theories to explain the distribution of properties found in the ocean, but at the present time these fall far short of actually accounting for existing conditions. Theory and experiment will undoubtedly provide explanations and methods for predicting time changes and for extrapolating knowledge into the depths and other areas thus far essentially unexplored. However, this goal is still far in the future. Because of the complicated nature of the interrelationships that exist in the ocean it is at present necessary in many cases to turn to empirical correlations to meet immediate demands.

Although fundamentally unchanging, the oceans are never at rest, nor is the distribution of properties ever twice exactly the same. Within limited areas and over short intervals of time, conditions change to a degree that exerts great influences on the organisms living in the sea, on the atmosphere, and on the coasts and sea bottom. Because of these facts the close

interrelationship between the various phases of oceanographic research, and their mutual dependence on related fields of endeavor, have long been recognized.

The themes of the three speakers at this symposium represent the major bases on which the science of oceanography rests. Carl Eckart, director of the Scripps Institution of Oceanography at La Jolla, California, will discuss the theory of stirring and mixing; it is ordinarily thought that stirring and mixing can occur only in turbulent motion, but closer examination shows that relatively simple motions also result in stirring. Richard H. Fleming, chief of the Division of Oceanography, Hydrographic Office, U. S. Navy Department, will describe the requirements for surveys and the various applications of oceanographic information. Daniel Merriman, director of the Bingham Oceanographic Laboratory, Yale University, will talk on the biological problems of the ocean. The symposium will conclude with comments from the floor by several principal discussants and such members of the audience as are interested.

Symposium on Sources of Energy

This symposium will include "Energy From Fossil Fuels," by M. King Hubbert, of the Shell Oil Company; "Atomic Energy," by Eugene P. Wigner, of Princeton University; and "Solar Energy," by Farington Daniels, of the University of Wisconsin.

The material progress of civilization depends largely on the energy which man can make available to do his work. The energy of the sun over past ages has been abundantly stored and conveniently packaged for our use—but we are using up these resources at an alarming rate. We know that the sun's energy comes from reactions of atomic nuclei, and we have just learned how to produce atomic energy under controlled conditions from uranium which is found on earth. We are not sure that the world can be trusted with this new source of energy, but we must carry forward vigorously our research programs to determine how our resources of uranium and thorium can best be utilized for peaceful purposes.

Finally, we have the energy of the sun with us always, and we are now utilizing only a small fraction of it. Sunlight falling on the earth's surface does not give temperatures high enough to be attractive for the direct production of useful power. Our most common method of utilizing this energy is to carry out a photochemical reaction in which carbohydrates are produced which can then be burned with oxygen of the air to release this stored energy at higher temperatures. What are the facts regarding a greater utilization of the sun's energy, and what are the chances that an increasing world population, in its insatiable desire for more energy, can, in the future, obtain still more from the sun?

Most of the energy running man's machines comes from coal or oil or water power. Mr. Hubbert, associate director of exploration and production research of the Shell Oil Company, whose special interests have been in the field of geophysics, will discuss all three of these sources and will review briefly the evolution of the fossil fuels and show that many geological ages were necessary for nature to accumulate enough fuel for man to use up in a few generations. He will emphasize the point that the exploitation of fossil energy is irreversible and that the historical events associated with the exploitation of this energy are without precedent and incapable of repetition. Mr. Hubbert will give a summary of the approximate magnitudes and distributions of the various classes of fossil fuels over the surface of the earth. He will endeavor to project the time sequences into the future and will show that the rates of consumption of these fuels after passing one or several maxima must ultimately decline asymptotically to zero.

Prof. Wigner, whose special field is mathematical physics, has been associated with the development of atomic energy from its beginning and has played an important part in the successful design of the nuclear chain-reacting pile. He will discuss the possibilities for utilization of the uranium and thorium resources which are found in the earth.

Farrington Daniels, who for a number of years has been working in the field of physical chemistry and chemical kinetics and for several years has carried on research on the energy relations in photosynthesis, will point out the enormous amounts of energy which fall on every acre of the earth's surface during a year. He will emphasize the very efficient way in which nature makes use of this radiation for the production of carbohydrates and other organic material in the growth of plants. Summarizations will be given of recent views and new laboratory experiments designed to understand better the mechanism by which carbon

dioxide and water are brought together by means of sunlight working through the agency of chlorophyll, and of what is now known concerning the possible efficiency in the number of tons of carbohydrate which can be produced per acre per year with different kinds of plants. Dr. Daniels will also discuss some of the speculations which have been directed toward a greater utilization of sunlight for the production of fuel and food, particularly in areas where the soil and water conditions are not conducive to agriculture. Other proposals that have been made for utilizing sunlight to supply the energy requirements for future civilization after the fossil fuels have been exhausted will be outlined briefly.

AAAS Summarized Proceedings and Directory

It is a pleasure to report that the *Summarized Proceedings and Directory of Members* of the Association is now nearing completion and is scheduled to be ready for distribution in August. The long delays in its appearance have been due entirely to the difficulties of getting such books printed.

The forthcoming volume is more than a report on a century of activities of the Association. It includes corresponding information about the Pacific and Southwestern Divisions of the Association. Still further, it contains important statistical data about each of its 203 affiliated and associated societies: names and addresses of their secretaries, dates of organization, objects, membership dues, total memberships, divisions and branches, meetings, journals and subscription prices, prizes and medals, and libraries. Together these data present a summary of the present status of a large part of American organized science.

As a background for the activities of the Association and its affiliated and associated societies from the respective dates of their organization to the present time, the dates of the founding of the principal academies of science and universities throughout the world are recorded from the year 983 A.D. to about 1600. In order to illustrate how far the organization of scientific societies has advanced in the past 100 years, a review is presented of the attempts to establish them in this country in the decades immediately preceding the founding of the Association.

Scientific progress has been so rapid and revolutionary during the life of the Association that it is difficult now to understand and appreciate the great adventures and achievements of our predecessors a few decades ago. To assist in the orientation of readers, the historical sketch of the Association is divided into five 20-year periods, and a few of the greatest scientific discoveries in each of them are enumerated. In these reminders of the great achievements of the past

such names as Lyell, Darwin, Kirchoff, Mendel, Mendeléeff, Hertz, Maxwell, Planck, DeVries, and Bateson appear.

The Directory part of the book, about 1,500 pages, contains approximately 40,000 names, alphabetically arranged. The name of each member is followed by the year of his birth, his address, the university from which he received his highest degree, his field of specialization or chief scientific interest, his professional position, the year he became a member of the Association, the year he became a fellow, and the section or sections of the Association with which he is affiliated.

The volume closes with an unusual and valuable section, a Geographical Index of the names and sectional affiliations of all members of the Association as of December 31, 1947. That is, the names of all members who are residents of the United States are grouped, first by states in alphabetical order, then by cities and towns within the respective states, also in alphabetical order, and, finally, the names of members in each city or town are arranged in alpha-

betical order. The names of members who are residents of foreign countries are similarly arranged alphabetically in sequence by continents, countries, cities, and individuals. The Association has members in 76 foreign countries.

It frequently happens that a librarian or scientist wishes to obtain the names of chemists, zoologists, or specialists in some other field of science who are residents of a particular city, such, for example, as Urbana, Illinois. With the new Directory before him he will turn to Illinois in the Geographical Index and then to Urbana. Probably to his surprise he will find that 77 members of the Association are residents of Urbana. To the right of each name is a letter indicating the sectional affiliation of the member, C for chemistry and F for zoology. By counting the Cs and Fs he will learn that, of the 77 members of the Association who are residents of Urbana, 33 are chemists and 29 are zoologists. If he should desire information about any chemist or zoologist in the list he would turn back to the General Directory. (F. R. MOULTON.)

NEWS and Notes

William J. Youden, for many years a member of the staff of the Boyce Thompson Institute for Plant Research, where he developed a type of experimental design known as Youden Squares, has been appointed to the staff of the National Bureau of Standards. Dr. Youden, in addition to being assistant chief of the Statistical Engineering Section, will serve in an active liaison and advisory capacity to the various test boards of the Army Field Forces.

C. D. Lowry, Jr., an organic chemist and a member of the staff of the Universal Oil Products Company, has been named executive director of the Research and Development Board's Panel on Petroleum. This Panel assists in carrying out the functions of the Board in the petroleum field, coordinating service research with reference to petroleum products, their utilization, containers, and handling equipment.

Howard H. Kendler, at present an assistant professor of psychology at the University of Colorado, has been appointed associate professor at University Heights College of Arts and Pure Science, New York University, beginning with the 1948-49 academic year.

William V. Cruess, professor of food technology at the University of California College of Agriculture, has retired as head of that division and will be replaced by **E. M. Mrak**, one of his former students. Dr. Cruess will continue his research. Since 1911 he has been a member of the staff, and in 1935 he was named first chairman of the Food Products Division, later renamed Food Technology, a post he has held ever since.

G. E. MacGinitie, director of the Kerckhoff Marine Laboratory of the California Institute of Technology at Corona Del Mar, will go to the Arctic Research Laboratory at Point Barrow, Alaska, the first week in July. He will be accompanied by his wife and another assistant, David J. McNett. Prof. and Mrs. MacGinitie will return to Corona Del Mar the last of October, and Mr. McNett will return the following summer.

Daniel D. Cubicciotti, Jr., who has been research assistant at the University of California Radiation Laboratory, has been appointed research assistant professor at Illinois Institute of Technology, effective September 1.

George J. Miller, professor of geography and chairman of the Division of Social Studies, State Teachers College, Mankato, Minnesota, has been appointed visiting professor of geography at Indiana University. The editorial offices of *The Journal of Geography*, which are headed by Dr. Miller, will be moved July 1 to Indiana University.

J. J. Runner and **Allen C. Tester**, both professors of geology at the State University of Iowa, will represent that university at the 18th International Geological Congress in London, August 25-September 1. Dr. Tester will present two papers entitled "Marine Terraces of the South Pacific Area" and "Laterites in New Caledonia." He will fly to England early in August to join a pre-Congress trip covering much of England and Wales. Following the Congress Dr. Tester plans to travel in north Scotland, where he will study the geomorphology of that region. Dr. Runner,

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