sea and which place a limit on the extent to which the sea can be exploited. At the Scripps Institution of Oceanography we shall for some time to come continue an intensive study of the productivity of the waters off southern California as one of our major objects.

Many of the conclusions which have been presented here are based on meager data, and many features of the picture which has been developed may have to be modified. Only the average state of the ocean has been dealt with because oceanography has not advanced far beyond the descriptive stage and because the understanding of the processes which maintain the average conditions is still incomplete. The field before us is enormous and it is my hope that in the future increasing efforts will be directed towards further exploration of the largest but least known of all oceans, the Pacific Ocean.

# OBITUARY

## DR. EDWARD KREMERS

ON July 9, 1941, Dr. Edward Kremers, director emeritus of the School of Pharmacy of the University of Wisconsin, died of a heart attack after having undergone some operations (intestinal cancer) with good success. He was seventy-six years of age.

Kremers was born at Milwaukee, Wisconsin, on February 23, 1865, as the scion of one of the German families coming to this country in order to escape the events around 1848. At the School of Pharmacy of the University of Wisconsin he earned his Ph.G. in 1886 and his B.S. in 1888. During his study at Madison Kremers enjoyed the fortune to have as his teacher one of the greatest scientists American pharmacy has presented to the world, Frederick B. Power. Working with Power on the chemistry of volatile oils he learned of the classical investigations executed in the field of phytochemistry by the German chemist Otto Wallach.

In the fall of 1888 Kremers went abroad and became a student with Wallach first at Bonn and later at Goettingen. In Bonn he attended also the lectures on structural chemistry delivered by Kekulé, of benzene ring fame. These two branches of chemistry, *i.e.*, phytochemistry and structural chemistry, have remained the two main fields of Kremers's scientific endeavor throughout his life, and it was in them that he gained world-wide reputation. The dissertation with which he fulfilled the requirements for his Goettingen doctor's degree in 1890 dealt with "The Isomerisms within the Terpene Group" and laid the ground for many later investigations. Returning to Madison, Kremers was instructor in pharmacy from 1890–1892, professor of pharmaceutical chemistry and director of the course in pharmacy at the University of Wisconsin from 1892–1935, succeeding Power.

Being a pharmacist by choice and by destiny Kremers attempted to make pharmacy a profession standing on the same educational level as the other academic callings and to give the pharmacist and the service rendered by him the advantage of special knowledge as well as of a broad general horizon. That is the reason for the fact that he already in 1902 introduced a four-year course in pharmacy, the first of this kind on American soil, and was likewise the first to establish graduate work for students of pharmacy in America leading to the Ph.D. with pharmacy as a major. In 1913 Kremers initiated the first "Pharmaceutical Experiment Station" in the United States, thus demonstrating the possibilities and usefulness of academic pharmaceutical research. Furthermore, it was Kremers who initiated the organization of a Historical Section of the American Pharmaceutical Association in 1902 and created in that way the first organized pharmaceutico-historical group not only in the U. S. A., but in the world. It is likewise very probable that the courses in history of pharmacy as well as of chemistry, announced by Kremers for the first time in 1907–08, were the first of their kind to be held as recognized subjects of instruction at an American university.

Finally, tribute has to be paid to the editor and the author Kremers. From 1896 to 1909 he edited, first together with Frederick Hoffmann and from 1901 alone, *The Pharmaceutical Review*. In 1898 Kremers created another journal restricted exclusively to the publication of scientific originals. This journal, bearing the title *Pharmaceutical Archives*, was discontinued in 1903 and revived in 1936. In 1912 Kremers published his classical brochure on "The Classification of Carbon Compounds," which was reprinted in 1924. He collaborated on the National Standard Dispensatory (1909) and translated Gildemeister-Hoffmann's work on "The Volatile Oils" from the German original into English (1900 and 1913). The pharmaceutico-historical collections of Kremers have formed the main basis for the "Kremers-Urdang History of Pharmacy" published in 1940, the first book containing a systematic survey on the development of American pharmacy.

Kremers served the United States Pharmacopoeia Committee as chairman of the Committee on Volatile Oils from 1900 to 1910 and the American Pharmaceutical Association as chairman of the Scientific Section and as historian. He refused the suggestion to become president of the association, but was made its

honorary president for 1933–34. He was president of the American Conference of Pharmaceutical Faculties in 1902 and of the Wisconsin Pharmaceutical Association in 1930. The National Association of Boards of Pharmacy made him an honorary president for 1939–40. He was, furthermore, an honorary member of the Société d'Histoire de la Pharmacie and of the Deutsche Pharmazeutische Gesellschaft and a corresponding member of the Gesellschaft fuer Geschichte der Pharmazie. He was awarded the Ebert Prize twice, in 1887 and in 1900, and received the degree of Sc.D.h.c. from the University of Michigan in 1913 and the Remington Honor Medal in 1930. Finally, the American Institute of the History of Pharmacy, founded in 1941 on the initiative of Dr. A. H. Uhl in the spirit of Kremers and as an attempt to perpetuate the work and the ideals of this pioneer, made him its honorary president.

On July 6, 1892, Edward Kremers married Miss Laura Haase, of Milwaukee. Of their children three, two daughters and one son, are living, the son, Roland E. Kremers, working with the General Foods Corporation, Hoboken, New Jersey, and a well-known research chemist.

A man of highest merit and achievements as well as of rare human qualities has left this world. In opening to his profession new ways to science and simultaneously giving to science a new group of adepts he not only has enriched but changed the world of his activities.

GEORGE URDANG

AMERICAN INSTITUTE OF THE HISTORY OF PHARMACY

## RECENT DEATHS

DR. RUDOLF SCHOENHEIMER, since 1933 assistant professor and since 1939 associate professor of biochemistry at Columbia University, died by suicide on September 11 at the age of forty-three years.

DR. ALLAN CAMERON FRASER, professor of plant breeding at Cornell University, died on Setember 17. He was fifty-one years old.

VELLORA M. FOSTER, a geologist in the U. S. Geological Survey assigned to ground-water investigations in Mississippi, died on September 2 at the age of thirty-seven years.

THE death is announced at the age of sixty-eight years of Dr. E. E. Maar, professor of the history of medicine in the University of Copenhagen.

# SCIENTIFIC EVENTS

## CHEMISTRY IN COLLEGE-GRADE DEFENSE TRAINING

CHEMISTRY is included in the new program of college-grade defense training of the U. S. Office of Education, which began on July 1. The new program, described in the *News Edition* of the American Chemical Society, called Engineering, Science and Management Defense Training (ESMDT), is successor to the Engineering Defense Training (EDT) of last year. Besides engineering and chemistry, it includes physics and production supervision (industrial management). The appropriation of $17,500,000 for defense training was divided as follows: chemistry and production supervision, $500,000 each; physics, $100,000; engineering, $16,400,000. Chemical engineering is included in engineering, and accordingly some types of chemical courses have been given under the old program, but it has not heretofore been possible to offer chemical courses that could not be classed under engineering—*e.g.*, the training of analysts.

Dr. Austin M. Patterson, who retired in June from administrative and teaching work in Antioch College, has been named senior specialist in chemistry education and becomes a member of the Washington staff. Professor Norris W. Rakestraw, of Brown University, has accepted appointment as a member of the National Advisory Committee to represent chemistry. Dr. Irvin H. Solt, formerly of the University of New Hampshire, will handle physics; Victor S. Karabasz, University of Pennsylvania, is consultant on business management. Dean Homer L. Dodge, of the University of Oklahoma, and Dean Clare E. Griffin, of the University of Michigan, have been appointed members of the National Advisory Committee to represent physics and production supervision.

Dean R. A. Seaton, of the Kansas State College, is director, and Dean George W. Case, of the University of New Hampshire, and Dean Harold M. Crothers, of the South Dakota State College, are the principal specialists in engineering education. Dean A. A. Potter, of Purdue University, is chairman of the National Advisory Committee.

The purpose of the defense training program is to provide, through various universities, colleges and technical schools, short practical courses of college grade to meet the shortage of trained persons in fields essential to the national defense. In most cases these are part-time courses, given in the evening and designed for in-service training, on or off campus, but pre-employment courses are also being given to persons wishing to prepare for a specific job. The Government pays the actual expense of the courses, including teachers' salaries, but the institution contributes its facilities.