mental rigor that have been associated with the activities of this great government institution.

Upon his return to Hopkins in 1911 he plunged into his long planned project of the exact measurement of the vapor pressures of aqueous solutions of non-volatile solutes. He selected the direct approach, *i.e.,* static measurements under conditions of exact temperature and freedom from permanent gases. His results still stand as a model of careful measurement. Once G. N. Lewis singled out Frazer's values as being not entirely accurate because of the fact that they did not obey a particular subjective method of thermodynamic graphic plotting. Lewis did not appreciate the important role of hydration of the solute, but this point did not escape the notice of Frazer, who took the position that the method of measurement was exact within the limit stated.

The vapor pressure work was interrupted by the advent of World War I, and inasmuch as the chemical war work originated in the Bureau of Mines it was an obvious choice to enlist the services of the Chemistry Department of the Johns Hopkins. Frazer selected once more an important problem, and also, characteristically, solved the same completely. Never was the nature of the man better illustrated than in his action in the ensuing years. He was a full professor and director of the Chemical Laboratories at this time, and positions of power and authority in the council of the men of science at war work were his for the asking. Yet he never turned aside from the pursuit of his immediate experimental goal, he never strove for high administrative office, he never tried to gain stature by any manifestation of showmanship, he remained his cool, contemplative self, always thinking of his experimental problem. The task selected by Frazer was the old one of low temperature oxidation of carbon monoxide. Since many minds were working on the problem, the history of the final conquest must therefore be complicated. All the other investigators firmly believed that the catalyst manganese dioxide would not function alone, but required the addition of promoters. To Frazer belongs the credit of being first to realize that *pure* manganese dioxide was the active agent, and was alone sufficient to bring about the oxidation. As soon as his initial period of investigation put him on the correct path, he proceeded forthwith to the final solution of the problem by a series of brilliant and highly ingenious experiments. The conclusion of the investigation produced the catalyst Hopcalite, named by Frazer and Bray (of the University of California) after their respective universities.

This outstanding experimental achievement turned Frazer definitely toward the baffling problem of heterogeneous catalysis in general. While this field was highly suitable for the display of his prodigious knowledge of inorganic chemistry, it is unfortunate that he did not turn his discerning experimental talents toward the solution of a problem not involving the extremely uncertain interpretation of kinetic measurements. Most great chemists have labored with the desire of correlating time with chemical changes of state, but up to the present the proper frame of conception has eluded them. Frazer was keenly aware of the imperfect state of our fundamental knowledge of catalysis and was constantly probing for a crucial opening wedge in the problem. He read and sifted all the theories, he studied many related phenomena, such as adsorption, surface energy, crystal structure and complex compounds. During all this time he contributed many important experimetal data.

At the time of his death he was deeply engaged in private experimental work of fundamental significance, as subsequent revelations will prove, and also had been for more than two years directing an N.D.R.C. investigation.

He was a man of few words, never having, as he was wont to say, the "gift of gab," but his words were always to the point at issue, and it seemed as if he distilled from his ever present pipe a subtle emanation that was clarifying and soothing. In his day he had been an outstanding athlete, but in his later years he remained closer to his laboratory where he taught and toiled. He loved the spirit of research which has always permeated Hopkins and was fond of quoting a remark of Professor F. G. Donnan, who once told Frazer that the Hopkins Chemistry Laboratory was one of the world's great experimental centers. Frazer's honesty was of such a caliber that he never fooled even himself; he knew the exact nature of his training and therefore his own capabilities. In fact, as he modestly put it, scientific research is only "a peep into the future."

WALTER A. PATRICK
THE JOHNS HOPKINS UNIVERSITY

RECENT DEATHS

DR. FRANK BLAIR HANSON, associate director of the Division of Natural Sciences of the Rockefeller Foundation, died on July 21 at the age of fifty-nine years.

DR. FREDERIC E. CLEMENTS, of Santa Barbara, Calif., from 1917 until his retirement in 1941 associate in ecological research of the Carnegie Institution, died on July 26. He was in his seventy-first year.

DR. ROSCOE GILKEY DICKINSON, professor of physical chemistry and dean of the Graduate School of the California Institute of Technology, died on July 13 at the age of fifty-one years.

DR. RICHARD PRAGER, research associate in astronomy at Harvard University, an authority on variable stars, died on July 21. He was sixty-one years old.

DR. GEORGE W. RAIZISS, professor of chemotherapy at the Graduate School of Medicine of the University of Pennsylvania and director of the department of chemical dermatological research of the Abbott Laboratories, died on July 16 at the age of sixty-one years.

DR. FRANK WILLIAM DOUGLAS, professor of chemistry and head of the department of Colorado College, died on July 19 at the age of sixty-six years.

DR. H. B. ARBUCKLE, from 1913 to 1937 professor of chemistry of Davidson College, North Carolina, died on July 19 at the age of seventy-four years.

DR. E. W. ENGLE, research and consulting metallurgist for Carboloy Company, Inc., an authority on tungsten and tungsten carbides, died on April 26 at the age of fifty-seven years.

DR. HEINRICH CARL REDEKE, of the department of hydrobiology of the University of Amsterdam, died on April 10 at the age of seventy-one years.

DR. CHAUNCEY D. LEAKE, dean of the School of Medicine at Galveston of the University of Texas, writes: "You may be interested in a news item recently sent to me by Dr. Raymond L. Cahen, one of the former associates of Dean Marc Tiffeneau. Dean Tiffeneau, of the Faculté de Médecine of Paris, died suddenly in June from a heart attack. Dean Tiffeneau was born in 1875 and was head of the department of pharmacology and dean of the Faculty of Medicine. He was a leader in the development of synthetic organic chemistry in France and well known for his studies on the mechanism of cellular sensitivity to poisons. He was largely responsible for the introduction of ouabain in medicine and was responsible for the introduction of bioassay standards for France. His 'Annual Reviews of Pharmacology' were long a feature of French clinical journals. He was a member of the Académie des Sciences and of the Académie de Médecine. He was the representative for France on the International Committee of Narcotics Control and on the International Pharmacopoeia."

SCIENTIFIC EVENTS

ORDNANCE RESEARCH LABORATORIES AT THE PENNSYLVANIA STATE COLLEGE

THE U. S. Navy has completed arrangements for the establishment of two permanent ordnance research laboratories which will be in operation by fall at the Pennsylvania State College under a Bureau of Ordnance contract. The establishment of these laboratories is in keeping with the policy of forming research affiliations with educational institutions to further development of naval weapons and for educational purposes in such military problems during the postwar period.

The Ordnance Research Laboratory, dealing with underwater ordnance, will be housed in a new building now under construction. The work will be a continuation of the research formerly carried on by the Underwater Sound Laboratory at Harvard University which has been sponsored by the Office of Scientific Research and Development, with technical direction from the Bureau of Ordnance. Dr. Eric A. Walker, who was in charge of the Ordnance Research Division at Harvard, will direct the new laboratory and also will be the head of the department of electrical engineering.

Assistant directors of the laboratory will be A. N. Butz, Jr., who formerly operated a private electronics research laboratory; R. R. Thompson, formerly associated with the Bell Telephone Laboratories and the Humble Oil and Refining Company, and Dr. Harvey Brooks. All these men are now affiliated with the Harvard University Laboratory. A staff of approximately one hundred and twenty-five scientists, technicians and clerks will be transferred from the Harvard Laboratory to the new unit. In addition to the work that will be carried on in the Ordnance Research Laboratory, this laboratory will also operate a calibration station at the Black Moshannon Lake, approximately twenty miles from State College, and a test station at Fort Lauderdale, Fla.

The Petroleum Refining Laboratory has been in operation for approximately sixteen years. During the present war emergency, it has also been under sponsorship of the Office of Scientific Research and Development. The plan is for this laboratory to continue with the petroleum research under a direct contract with the Bureau of Ordnance, including special work for and technical reports to the other services. Dr. M. R. Fenske will continue as director, a position that he has held since the laboratory was established. Assisting Dr. Fenske is Dr. Dorothy Quiggle and R. A. Rush. The staff of the laboratory includes more than fifty chemists, chemical engineers and technicians.

The Ordnance Research Laboratory has been placed under the School of Engineering (H. P. Hammond, *dean*), and the Petroleum Refining Laboratory is under the School of Chemistry and Physics (F. C. Whitmore, *dean*). Most of the scientific and technical personnel will hold academic appointments on the faculty of the college.