OBITUARY NOTICE.

FRANK CLIFFORD WHITMORE.

1887—1947.

FRANK CLIFFORD WHITMORE died suddenly at his home in State College on June 24th, 1947. He was research professor of organic chemistry and dean of the School of Chemistry and Physics at the Pennsylvania State College. He was an outstanding and versatile leader, an inspiring administrator and teacher, a tireless and skilful scientist, and a kind and helpful adviser. In addition to publishing more than 200 scientific and technical papers he was the author of two books : " Organic Compounds of Mercury " (1921) and " Organic Chemistry " (1937).

Whitmore was an authority on many phases of organic chemistry. His more recent work was in aliphatic and hydrocarbon chemistry and in molecular rearrangements. His electronic conception of intramolecular rearrangements and related reactions is now generally accepted; his ideas not only explain, as part of an orderly scheme, the hundreds of apparently random rearrangements which occur during the simplest replacement reactions, but they also predict the products which form as a result of a seemingly complicated series of organic reactions.

Fellow scientists honoured Whitmore in many ways. In 1938 he was awarded the William H. Nichols Medal for outstanding chemical work. The American Chemical Society elected him its president in 1938. The highest chemical honour in the nation, the Willard Gibbs Medal, was awarded him in 1945. In 1946 he was elected to the National Academy of Sciences. Four colleges honoured him with Doctor of Science degrees : Franklin and Marshall (1937), University of Delaware (1937), Allegheny (1938), and the Philadelphia College of Osteopathy (1943). He did both his undergraduate and graduate work at Harvard University, receiving his Ph.D. degree in 1914.

Whitmore was an inspiring and thorough teacher. He maintained rigid scholastic standards while holding the respect and goodwill of his students, and was always sympathetic toward the student who was making a real effort to learn. He was an excellent teacher of inorganic chemistry and showed great interest in inorganic work. Before coming to Penn State in 1929 he taught at Williams, Rice Institute, and the University of Minnesota, and he was chairman of the chemistry department at Northwestern University. At Penn State he taught freshmen, seniors, and graduate students, and conducted many seminars. He gave numerous talks to local sections and national meetings of the American Chemical Society, and did valuable work on the Society's unemployment, professional, and economic status committees. Between 1936 and 1940 he was an associate editor of the *Journal of the American Chemical Society*. For many years he was on the editorial board of *Organic Syntheses*, and was editor-in-chief of Volume VII (1927) and Volume XII (1932). He was an associate editor of " Science of Petroleum," and author of an article on molecular rearrangements for the 1946 " Encyclopaedia Britannica."

Whitmore was one of Penn State's great Deans. Despite greatly increased instructional and administrative duties during his deanship, he never lost any of his zest for life, for research, and for helping people. Under his administration the work in chemistry was accredited by the American Chemical Society, and that in chemical engineering by the American Institute of Chemical Engineers. He followed closely the progress in college of returning war veterans, and devoted a great deal of time to their scholastic programmes.

During the First World War, Whitmore worked at Rice Institute on poison gases and mercury compounds. During the Second World War he organized and supervised a group of 35 full-time instructors for the Army Specialized Training and Navy V-12 programmes of his School. The entire extensive research facilities of his School were made available to the armed forces. His own war-time research related to aviation fuels, special lubricants, super-explosives, antimalarials, synthetic rubber, penicillin, silicones, and camouflages. In all, he supervised in his School more than 30 war-time research projects and a staff of about 150 full-time workers. In addition, he served as consultant to many industrial groups and federal agencies, including the War Production Board, War Manpower Commission, National Defense Research Committee, Office of Production Research and Development, and Office of the Quartermaster General. Outstanding was the timely and vigorous, if unofficial, support that he gave wholeheartedly to those who tried to keep the Selective Service System really selective by putting chemists, physicists, and chemical engineers where they could do the most good in winning the war. He had strong convictions as to the need for training these scientists and retaining them in war-production and research work. This involved attending many meetings, writing many letters,

and filing many forms. In all, he personally wrote or filed more than 7,000 letters and forms which were sent to draft boards, government officials, and others interested in and responsible for the operation of the Selective Service System. This prodigious effort, more than any other factor, contributed to his untimely death.

Whitmore had long been interested in petroleum. Before coming to Penn State he had studied the sulphur compounds in petroleum, and his work in aliphatic chemistry was applied in many ways to new petroleum products or refining methods. While at Penn State he and his colleagues synthesised approximately 300 different hydrocarbons : these pure materials were invaluable as reference standards in many entirely new petroleum developments. He was director of the work being done at Penn State for American Petroleum Institute Research Projects 42, 43B, and 46 which were concerned respectively with high-molecular-weight hydrocarbons, the origin of petroleum, and hydrocarbons for spectrometer calibrations. His work on the rearrangement of organic compounds was very important in the manufacture of special high octane super-fuels for military aircraft. From 1929 he and his colleagues in the Petroleum Refining Laboratory had been carrying out a comprehensive research and development programme, as a result of which more is now known about the composition of Pennsylvania petroleum than any other crude oil in the world. He was active in helping the Pennsylvania petroleum industry to obtain methods for characterising and identifying Pennsylvania lubricants in order to protect the public from unfair trade practices, and was a vigorous proponent of the application of scientific and technical developments to the efficient utilisation of Pennsylvania petroleum. He guided the Schools' research and development work towards the modernisation of the state's oil industry, the adaptation of new processes to the refining of Pennsylvania petroleum, and the use of chemicals and additives for improving the quality of the products.

Apart from the fraternity organisations, a number of learned and professional societies honoured Dean Whitmore. The American Association for the Advancement of Science elected him vice-president in 1932. He was a member of the American Institute of Chemical Engineers, the Chemical Society of London, Deutsche Chemische Gesellshaft, American Academy of Arts and Sciences, the American Institute, the National Institute of Social Sciences, the Franklin Institute, the Cosmos Club of Washington, D.C., and the Chemists Clubs of New York and Chicago. He was elected president of the Pennsylvania Chemical Society in 1940, and in 1928 was appointed a director of the Institute of Chemistry.

His spontaneity, enthusiasm, sense of humour, and boundless energy made him the best of companions. He was always cheerful, inspiring, and even-tempered. His friends will always remember him for his unfailing interest in and continual devotion to their welfare.

Whitmore was born in North Attleboro, Mass., on October 1st, 1887. He was the son of Frank Hale and Lena Avilla Thomas Whitmore. In 1914, he married Marion Gertrude Mason of Cambridge, Mass., who survives with four children.

M. R. FENSKE.