the attraction of the solid dies off rapidly, it extends to somewhat more than 5 molecular layers.

Table 1 indicates that it requires 6,550 calories more to vaporize a mole of water from the first monolayer of water on the surface of anatase than from water itself. For the second layer the excess is 1,380 calories and for the third, 220 calories, and none of these is negligible.

A nitrogen film attains a thickness at −195.6° C. of 10 molecular layers, or 36 A, butane 64 A, and heptane from 50 to over 100 A, depending upon the subphase.

Thus, experiment decides in favor of the polymolecular nature of adsorbed films, and, contrary to the views of a certain group of scientists, in a film or liquid on a solid the attractive interaction extends much farther than to the adjacent molecules. However, it does not agree with the views of those who believe the film to be very thick.

VII. Phases and Phase Changes in Adsorbed Films on Solids

Five phases have been discovered in films on solids. These seem to be: (1) gas, (2) expanded, (3) intermediate, (4) condensed, (5) second condensed. These designations are those used for films on liquids.

Solid films on water melt without the adsorption of heat. Thus, there is no latent heat of fusion. Such changes are considered to be of the second order, and phase changes of the second order are much more common in films on either solids and water than first order changes, which exhibit a latent heat. Certain oil films on water which are in the liquid state vaporize without the absorption of any heat (second order), while others involve a heat of vaporization (first order). In three dimensions isothermal vaporization is always accompanied by the absorption of heat, and, contrary to the opinion of experts on adsorption that such first order changes do not occur in films on solids, we have recently discovered such changes, both on metals and non-metals.

On account of the great importance of surface films on solids in both industry and agriculture, the subject discussed in this lecture should advance rapidly, since some of the fundamental relations have now been developed.

OBITUARY

GEORGE ARGALE HARROP, JR.

Eheu fugaces, Postume, Postume

The years slip away and our friends are lost to us, but they will live forever in our hearts and memories.

Born in Peru, Illinois, in 1890, George Argale Harrop enjoyed a world-wide reputation as a scientific investigator, particularly in metabolism and nutrition. In such work lay his greatest delight and happiness, and the achievements in the brief span allotted to him were so great that little need be said here.

He had a very large circle of friends and acquaintances throughout the scientific world. This was due not only to his repute but also to the extent of his wanderjahra. Following two years in the University of Wisconsin he went to Harvard and received an A.B. in 1912. Going thence to the Johns Hopkins University to study medicine, he obtained his M.D. in 1916 and became in succession interne, resident and instructor in medicine. One of the happiest years of his life followed when he went to Europe and studied in Copenhagen under Professor Krogh. His admiration for his teacher was very great, and he was delighted when Professor Krogh came to the United States in 1938 to take part in the dedication of the Squibb Institute. On his return to this country, he spent two years at Columbia University and then went to China as associate professor of medicine in the Peking Union Medical College.

While in China, in 1924, he married Esther Caldwell. To one who knew Dr. Harrop in later life there was no more outstanding characteristic than his deep affection for his wife and for the four children—three boys and a girl.

Returning to the United States in 1924, Dr. Harrop was appointed associate professor of medicine at Johns Hopkins. Here he carried on his studies on nutrition and metabolism and took a leading part in the work of the department of medicine, where one of his greatest pleasures was his contacts with the internes and students.

He made two trips to South America. One of these in 1921–22 was a purely scientific expedition with the Royal Society to Peru and the high Andes, and the other was in 1939 when he paid a visit to all the medical centers in Mexico and South America. These trips added to the evergrowing circle of scientific friends. They left him with a deep interest in the countries he had visited and he would frequently recall, with enthusiasm, his experiences.

During his eight years in New Brunswick many of his old friends—from Europe, from Asia, from Mexico, from South America and from the United States—visited him there or at his home in Princeton to his delight. Old friendships were renewed, old scientific discussions reopened and the new work and surroundings critically examined.

After the founding of the Squibb Institute for

Medical Research in 1937, although he endeavored to continue his own studies through the Division of Internal Medicine, it soon became apparent that this was not possible. It is perhaps one fault of modern life that scientists so often are rewarded by administrative positions rather than by the removal of whatever fetters may prevent fuller accomplishment. But in this case what science lost on the one hand it gained on the other and to his colleagues and assistants the gain was immeasurable. His time and quiet kindly counsel were always available and the accomplishments of the Squibb Institute in chemistry, in chemotherapy, in microbiology and in pioneer work on penicillin in the United States are a part measure of his scientific wisdom and human encouragement.

The Squibb Institute represented for the late Theodore Weicker, chairman of the Squibb Board, the dream of a lifetime. Through the untiring efforts of Dr. Harrop this dream was realized. The successful demonstration that fundamental research can proceed within an industrial pharmaceutical organization will be a memorial to his vision and energy, and he would have wished none better.

Dr. Harrop belonged to the following societies: The American Scandinavian Foundation, the American Medical Association, the Association of American Physicians, the American College of Physicians, the Society for Clinical Investigation, the American Society of Biological Chemists, the Society for Experimental Biology and Medicine, the Société Biologique of Paris, Cosmopolitan Clinical Clubs, the New York Academy of Medicine, the American Clinical and Climatological Association, Phi Beta Kappa Society, Alpha Omega Alpha, Phi Kappa Psi, Nu Sigma Nu and Sigma Xi.

Dr. Harrop was shy on first acquaintance but, when one knew him well, showed that none could be a truer friend or more congenial companion. He would amaze one by the warmth of his sudden boyish enthusiasm. Those who knew him in relaxed and philosophical mood can testify to the pleasant conversations which would last late into the evenings. He was above all a kindly man. Perhaps one of the greatest of his trials as an administrator lay in those situations in which a reprimand of greater or lesser degree was necessary. The reprimand would be given in gentle and apologetic terms, and it was often the director who was most embarrassed while the culprit sat unhappily wondering how to shorten the painful episode for his inquisitor.

He died on August 4, 1945, after an ordeal of many months. Those who knew him best realized that his health had worried him for several years and that he had seen what lay in store. But, because of his intense desire for an early ending of the war and his scientific urge, he drove himself until the last illness slowed his body but not his mind. He died for his country as truly as any soldier, and his loss is a grievous one to all who loved him.

GEOFFREY W. RAKE
JOHN F. ANDERSON

NEW BRUNSWICK, N. J.

RECENT DEATHS

DR. FRANCIS B. SUMNER, professor of biology emeritus of the Scripps Institution of Oceanography of the University of California, died at La Jolla, Calif., on September 6 at the age of seventy-one years.

DR. CLEMENT R. JONES, of the School of Dentistry of the University of Pittsburgh, died on September 3 at the age of seventy-four years.

DR. I. PAUL MAIZLISH, professor of physics at the Eastern Kentucky State Teachers College, died on September 4 at the age of forty-seven years.

DR. JAMES THOMAS WILSON, emeritus professor of anatomy of the University of Cambridge, died recently at the age of eighty-four years.

ROBERT BRINTON HARPER, formerly vice-president of research and testing of the Peoples Gas Light and Coke Company, Chicago, a fellow of the American Association for the Advancement of Science, died on August 29. He was born on February 28, 1882. Among the many distinctions awarded him were the Beal Gold Medal of the American Gas Association, 1931; the Walton Clark Gold Medal of the Franklin Institute, Philadelphia, 1938, and the Annual Citation of the American Institute of Chemists, October 6, 1944. He was chairman of the Blackout Committee in the Organization of Techniques, Office of Civilian Defense for the Metropolitan District of Chicago.

SCIENTIFIC EVENTS

THE MEXICAN MATHEMATICAL SOCIETY

THE annual meeting of the Mexican Mathematical Society was held this year during the week of May 28th at Guadalajara. Five American mathematicians were in attendance: Nelson Dunford, S. Lefschetz, F. D. Murnaghan, Rufus Oldenburger and Norbert Wiener. There were sections devoted to both pure and applied mathematics with many papers presented in each, among them one from each of the American visitors.

The first evening of the congress was devoted to a memorial to the late G. D. Birkhoff, a great friend