

OBITUARIES

Hans Halban

Hans Halban, retired professor of physics at the Sorbonne and director of the Linear Accelerator Laboratory of the Ecole Normale Supérieure, died in Paris on November 28, 1964, at the age of 56.

He was born in Leipzig, Germany, and was a student at the University of Frankfurt and later at the University of Zürich, where he received his PhD in physics. After earning his doctorate, he went to the Radium Institute of the Collège de France in 1935 and spent the year working with Irène Joliot-Curie and Pierre Preiswerk on the experiments then in progress in artificial radioactivity. He spent the following year at Bohr's Institute for Theoretical Physics in Copenhagen, and in 1937 returned to Paris with an appointment as chargé de recherches at the Collège de France.

Early in 1939, news of the discovery of nuclear fission caused the same burst of activity in F. Joliot's research group in Paris that was occurring in physics laboratories throughout the world. Joliot, Halban, and L. Kowarski quickly found that secondary neutrons were emitted in uranium fission, and then published experimental evidence that more than one neutron was emitted per fission, which implied that a nuclear chain reaction was possible. In the months that followed, the Paris group was prominent in the race to achieve a self-sustaining chain reaction. In September 1939, with the outbreak of hostilities on the Continent, Halban, Joliot, Kowarski, and F. J. Perrin reported that a chain reaction (but not a self-sustaining one) had been produced in a water-moderated natural-uranium system activated by an external neutron source. Since it appeared that the water absorbed too many neutrons to allow the reaction to continue, the group turned its attention to other possible moderating materials and became particularly interested in deuterium oxide. At that time, the only plant in the world capable of producing appreciable amounts of heavy water was the Nor-

wegian Hydroelectric Company. As a result of some swift and effective negotiating, the firm's entire stock of heavy water was acquired by the French government and was turned over to Joliot and his group early in 1940. During the spring the group rushed to complete an experiment using uranium oxide and heavy water, but the rapid advance of the German army brought the experiment to an abrupt end and the system had to be dismantled. In June, with the fall of France, Halban and Kowarski left for England, taking with them the forty-odd gallons of heavy water then constituting almost all of the world's supply.

After arriving in England, Halban and Kowarski were sent by British authorities to the Cavendish Laboratory at Cambridge University, where they continued the work begun in France and produced experimental evidence indicating that the uranium and heavy-water system would produce a chain reaction maintained by slow neutrons. They also experimented with systems using other moderating materials and geometries, and they carried out various cross-section and neutron-multiplication measurements. By 1942, the work of the slow-neutron group at Cambridge had progressed to a point where it was felt that a full-scale uranium and heavy-water reactor was a necessary next step. It was proposed that the Cambridge group be transferred to the United States where it would be closer to supplies of the necessary materials and to the slow neutron work of Fermi's group in Chicago. Negotiations for such a move fell through, however, and at the end of the year the Cambridge slow-neutron group, led by Halban, was established in temporary quarters in Montreal. It was subsequently decided that the Anglo-Canadian project at Montreal be strengthened and reorganized as a joint American-English-Canadian effort. That plan became effective in 1944, with J. D. Cockcroft as director of the Montreal Laboratory.

After the war, Dr. Halban went

to Oxford University where he had been invited to join the Clarendon Laboratory. He was appointed a fellow of St. Anthony's College at Oxford in 1950 and was named to a professorship four years later. He returned to France in 1955 to accept an appointment as professor at the Sorbonne. In 1959, he was named director of the Linear Accelerator Laboratory of the Ecole Normale Supérieure, one of the research laboratories of the Faculty of Science at Orsay.

Dr. Halban was a member of the American Physical Society, the Physical Society of London, the Société Française de Physique, and the Schweizerische Physikalische Gesellschaft.

Victor F. Hess

Victor F. Hess, Nobel laureate in physics and professor emeritus at Fordham University, died of pneumonia on December 17 at the age of 81. Dr. Hess was corecipient (with Carl D. Anderson of the California Institute of Technology) of the 1936 Nobel Prize in Physics for his work in determining the origin of cosmic rays.

Dr. Hess' research on cosmic radiation began in 1910, when he was teaching in Vienna. In the next two years, he conducted ten balloon ascents designed to determine the source of ionization in the atmosphere. He reached the conclusion, as



Victor F. Hess

he described in his Nobel lecture, that the source of ionization lay "in a hitherto unknown radiation of extraordinarily high penetrating power which entered the earth's atmosphere from space and was still able to produce noticeable ionization in the air at the surface of the earth". After World War I, he continued his research in this area and, in 1931, established a small observatory on the Hafelekarr mountain near Innsbruck, Austria, in order to record fluctuations in the intensity of cosmic radiation.

Dr. Hess was born in Waldstein, Austria, and was educated at the Universities of Graz and Vienna. He received his PhD from Graz in 1906 and spent the following year as an assistant in the Department of Mineralogy at the University of Vienna. In 1908, he became a lecturer in medical physics at the Vienna Veterinary Academy and, in 1910, assumed two additional posts as an assistant in the Vienna Institute for Radium Research and as associate privatdozent of physics at the University of Vienna. Ten years later, he resigned from all three positions to become associate professor of experimental physics at the University of Graz.

In 1921, while on leave of absence, he spent two years in the United States. He served as chief physicist for the US Radium Corporation, where he established and directed the Corporation's research laboratory. He returned to Graz in 1923 and was named professor two years later. In 1931, he joined the faculty of the University of Innsbruck with the same title and the additional position of director of the University's Institute for Radium Research. Six years later, he returned to Graz once more for a brief period as head of the Physics Department and director of the Physical Institute, but left in 1938 to come to the United States permanently. He joined the physics faculty of Fordham University where he remained as a professor until his retirement in 1956. He continued to work in the University's laboratories until a year before his death.

Dr. Hess was a fellow of the American Physical Society and a member

of the American Geophysical Union and the Austrian Academy. Two years ago he received an appointment to the Pontifical Academy of Sciences in Rome. Prior to receiving the Nobel Prize, Dr. Hess was awarded the Vienna Academy of Science's Lieben Prize in 1919. In 1932, he received the Carl Zeiss Foundation's Ernst Abbe Prize for physics.

Raymond A. Heising

Raymond A. Heising, a pioneer in radio communication technology and for many years a member of the staff of Bell Telephone Laboratories, died on January 16 at his home in Summit, N. J. He was 76.

Mr. Heising was born in Albert Lea, Minn., and studied at the University of North Dakota, where he received a bachelor's degree in electrical engineering in 1912 and a master's degree two years later. He joined the Western Electric Company in 1914 as a radio research engineer and continued as a staff member of Bell Telephone Laboratories when the Laboratories were incorporated in 1925. He retired from Bell Laboratories in 1953 and became an independent consulting engineer.

Mr. Heising's research interests included radio communications, vacuum-tube circuits, radio-wave propagation, and oscillators. He was involved in the construction of the early radio-telephone transmitters and was instrumental in the development of transatlantic radio-telephone communications, ship-to-shore communications, and communications between airplanes in flight and ground operators. He was a fellow of the American Physical Society and a past president and treasurer of the Institute of Radio Engineers. He received the IRE's Morris Liebmann Memorial Prize in 1921 and the IRE Founder's Medal in 1957.

H. Horton Sheldon

H. Horton Sheldon, professor of physics and former acting dean of faculties and vice president of Roosevelt University in Chicago, died on December 23 at the age of 73.

Dr. Sheldon was a well-known spe-

cialist in electronics, where his principal interests lay in conduction of electricity through crystals and photoelectric color measurement. He had been instrumental in developing an electronic coloroscope for color matching of textiles and served, in industrial circles, as a consultant in neon tube design. His research also included work on the absorption of gases by charcoal, ultrahigh radio frequencies, sound recording, and x rays.

He was born in Brockville, Ontario, and was graduated from Queen's College in Kingston, Ontario, where he also received a master's degree in 1917. He spent the next two years at the University of Chicago as a research associate and received a PhD in physics there in 1920. He next served as an instructor in physics at the University of Michigan and, in 1922, joined the faculty of New York University. He remained there for nearly 20 years progressing from assistant professor to professor. He served as chairman of the Physics Department in the University's Washington Square College from 1925 to 1927 and as director of the science education program in the University's Division of General Education from 1936 to 1941. During this period, he also spent three years as science editor of the New York Herald Tribune.

During World War II, he served as a consulting and research engineer to several firms, and, after the war, joined the faculty of the University of Miami as a research professor of engineering. He remained at Miami until 1953 during which time he also served, for two years, as dean of the University's Division of Research and Engineering. From 1953 to 1956, he worked with several industrial concerns and also served as a consultant to the Organization for European Economic Cooperation and to the Office of Saline Water in the US Department of the Interior. In 1956, he joined the Roosevelt faculty as a visiting professor of physics and was named professor a year later. He had been a trustee of the University since 1960.

Dr. Sheldon was a member of the American Physical Society and a fellow of the Acoustical Society of America.