scribed the B_{12} study as "breaking the sound barrier," leading to new horizons in the field, namely the possibility of using heavy atoms to determine the structures of biological macromolecules, as had been suggested by J. Monteath Robertson in 1939. Since Dorothy's method worked for B_{12}, people were encouraged to tackle the crystal structures of proteins.

Dorothy took the first x-ray diffraction photographs of insulin in 1935, and from then until the crystal structure was solved 34 years later, she was confident that the molecular structure could be determined from the x-ray diffraction pattern. The structure of 2Zn insulin was reported by Dorothy and her coworkers in August 1969. Chinese crystallographers, led by Tang You Chi, also worked on the crystal structure of insulin, and Dorothy traveled to China to compare the electron density maps of the two structure determinations. The diffraction patterns for insulin extended to very high resolution. After her retirement Dorothy, with Guy Dodson and his colleagues, published a definitive monograph on insulin.

Dorothy's influence on our understanding of biological structures has been unique, both through her firm belief that x-ray diffraction of crystals would give highly significant structural results and through her encouragement of young scientists who have gone on to expand the field themselves.

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William A. Higinbotham

William A. Higinbotham, a pioneer in nuclear instrumentation and nuclear safeguards and a founder of the Federation of American Scientists, died on 10 November 1994 in Gainesville, Georgia, where he had retired with his third wife, Edna. The term "unique" more than applies to Willy, who devoted a long and distinguished career to science, technology, politics and humanity.

Willy was born in Bridgeport, Connecticut, in 1910. He attended Williams College, graduating from there with a BS in physics in 1932, and continued on to graduate study at Cornell. There he developed an interest in electronics. With the onset of the Second World War he joined the Radiation Laboratory at MIT to work on the development of radar.

When research on the atomic

bomb began at Los Alamos, Willy became head of the electronics group there. This group designed and constructed all of the electronic equipment used in research at Los Alamos, including that for the Trinity test and the Hiroshima and Nagasaki bombs.

Willy was deeply troubled by the atomic bomb and strongly concerned about its possible future use. He became active in the formation of the Federation of Atomic Scientists, which later became the Federation of American Scientists, and he was the first chairman of that body. He devoted two years immediately after the war to the early politics of atomic energy and was deeply involved in passage of the Atomic Energy Act, which provided for civilian control of atomic energy. Willy remained active in the federation for the rest of his life. He never shirked an opportunity to tell others of the need to control the arms race, even when to do so ran the risk of identification with leftist groups during the McCarthy era.

In 1947 he joined another newborn organization, Brookhaven National Laboratory, where he became head of the instrumentation division. In the 20 years he devoted to that position, his division produced the innovative electronics equipment used at Brookhaven's particle accelerators and research reactors and in addition did pioneering work on digital computers.

Willy was creative and original in designing electronic circuits, usually accomplishing the important function in the simplest possible way. For example, in the days before operational amplifiers and transistor switches, he made a "bootstrap sawtooth generator," a linear sweep (time base) circuit that was widely used in oscilloscopes to observe random pulses, with two vacuum triodes and one diode! The Higinbotham "scale of two" was created simply by adding two diodes as input to the Eccles–Jordan flip-flop circuit, permitting fast and reliable counting of random pulses from radiation detectors. In 1958 Willy also designed what was perhaps the world's first video game. The players were able to control tennis-like action on a 5-inch oscilloscope display. A steady stream of budding electronics engineers flowed to Brookhaven from around the world to work with Willy.

In 1968 Willy joined with several colleagues to found the Technical Support Organization at Brookhaven, a new think tank devoted to nuclear materials safeguards and nuclear nonproliferation. He came to direct the TSO and continued working with it until his retirement.

In his later years, only failing health slowed him in his many interests and activities. Until then his energy had seemed boundless and his determination had no limit.

While at Williams, Willy had learned to play the accordion, and all his life he delighted people with an endless supply of music. This is a memory many of his many friends will cherish. We miss him deeply.

HERBERT KOUTS
Brookhaven, New York

Robert Walder Thompson

Robert Walder Thompson died on 15 April 1994 in Chicago of complications from lung disease.

Thompson was born in Minneapolis, Minnesota, on 28 December 1919. He attended the University of Minnesota, graduating in 1941 with a BA in physics. Thompson began his graduate work at Princeton University in the fall of 1941, but interrupted his studies to join the Manhattan Project at Los Alamos. His work there included assembling a precision mass spectrometer and performing the first isotopic assay of plutonium, as well as the invention of a proportional chamber.

In 1946 Thompson resumed PhD studies at MIT with Bruno Rossi, studying energetic cosmic rays. Thompson completed his doctoral thesis in 1948 and accepted a position as an assistant professor in the physics department at Indiana University.

At Indiana he designed and built a 12-inch Wilson cloud chamber with electromagnetic pole pieces designed to produce a very uniform magnetic field over the chamber's active volume. He took great pains to stabilize the chamber temperature and minimize distortion caused by chamber expansion. The chamber detected record-high momenta.

Thompson's Indiana group photographed thousands of chamber events and studied and cataloged the data. Thompson developed an ingenious geometrical analytical method, the "*Q* surface" technique, for determining particle masses. These efforts led to his discovery of the neutral K meson in 1951–52.

In 1959 he went to the University of Chicago as a full professor, where he embarked on a project to study high-energy cosmic rays with a very large (36-inch) cloud chamber. Thompson retired from Chicago as an emeritus professor in 1976.

Thompson found great pleasure in a rigorous approach to physics and pursued his own research in the same manner. He became highly skilled in the laboratory arts of experimental physics, personally doing