= Robert Brode =

Robert Bigham Brode (June 12 , 1900 ? February 19 , 1986) was an American physicist , who during World War II led the group at the Manhattan Project 's Los Alamos laboratory that developed the fuses used in the atomic bombing of Hiroshima and Nagasaki .

A graduate of the California Institute of Technology , where he earned his doctorate in 1924 , Brode attended Oxford University on a Rhodes Scholarship and the University of Göttingen on a National Research Council Fellowship . During World War II , Brode worked at Applied Physics Laboratory at Johns Hopkins University , where he helped develop the proximity fuse , and then as a group leader at the Los Alamos Laboratory . In 1950 he was one of a dozen prominent scientists who petitioned President Harry S. Truman to declare that the United States would never be the first to use the hydrogen bomb .

After the war , Brode returned to teaching at Berkeley . Between 1930 and 1957 he supervised 37 graduate students . In addition to his research and teaching , he occupied a number of other positions . He was the academic assistant to two presidents of the University of California , and sat on numerous advisory panels and boards .

= = Early life and education = =

Robert Bigham Brode was born in Walla Walla , Washington , on June 12 , 1900 , the son of Howard S. Brode , a professor of biology at Whitman College , and his wife Martha Catherine née Bigham . He was the second of a set of triplets , being born between his brothers Wallace and Malcolm . They also had an older brother , James Stanley . All four attended Whitman College , and went on to earn doctorates and have distinguished careers as scientists and academics .

Brode graduated from Whitman College with his Bachelor of Science degree in 1921 , and then entered the California Institute of Technology . He was awarded his Doctor of Philosophy (Ph.D.) in physics in 1924 , the first year in which CalTech awarded this degree , for his thesis on " the absorption coefficient for slow electrons in gases " . He showed that molecules with similar arrangements of their external electrons have similar cross sections for collisions with slow electrons . These results could not be readily explained with classical physics , and their importance would not be realised until 1966 .

On graduation , Brode became an Associate Physicist at the National Bureau of Standards . He was awarded a Rhodes Scholarship to study at Oriel College , Oxford , in England in 1924 and 1925 , and then a National Research Council Fellowship , which he used to study at the University of Göttingen in Germany in 1925 and 1926 , and then at Princeton University from 1926 to 1927 . On returning to the United States , he married Bernice Hedley Bidwell on September 16 , 1926 . They had two sons .

Brode became an assistant professor of physics at the University of California , Berkeley , in 1927 , and a full professor in 1932 . He was awarded a Guggenheim Fellowship , which enabled him to return to England and study at Cambridge University and Birkbeck College , University of London , in 1934 and 1935 . While there , he became friends with the British physicist P.M.S. Blackett . He was impressed by Blackett 's cloud chambers , and set his graduate students to work on projects using them , starting with Dale R. Corson .

= = Manhattan Project = =

In 1941 , after the start of World War II , Brode went to work at Applied Physics Laboratory at Johns Hopkins University , where he helped develop the proximity fuse . In 1943 , he joined the Manhattan Project 's Los Alamos Laboratory , where was appointed the leader of the E @-@ 3 Fusing Group . This group consisted of 14 civilians , 12 military officers and 37 enlisted men of the Special Engineer Detachment . Its task was to develop a fuse that would detonate an atomic bomb at a specified height above the ground .

Normally , bombs are cheap and fuses are relatively expensive , but an atomic bomb is extremely

expensive , and any failure of a triggering device is unacceptable . On the other hand , for the same reason , fuses can be employed that would be prohibitively expensive in a conventional bomb . Brode 's E @-@ 3 group were tasked to develop a fusing mechanism that would have less than one chance in 10 @,@ 000 of failing to detonate within 200 feet (61 m) of the required height . The required height was not initially known , as it depended on the yield , which was uncertain . The group investigated both radar proximity fuses and barometric altimeter fuses . Testing was carried out at the Naval Proving Ground in Dahlgren , Virginia in August 1943 and Muroc Army Air Field in March 1944 using dummy drops from barrage balloons . In the end , a modified APS @-@ 13 Monica tail warning radar known as " Archie " was employed , and the fuses performed flawlessly in the atomic bombing of Hiroshima and Nagasaki .

= = Later life = =

After the war , Brode returned to teaching at Berkeley . In 1950 he was one of a dozen prominent scientists who petitioned President Harry S. Truman to declare that the United States would never be the first to use the hydrogen bomb . In 1951 he returned to England for another year , this time at Manchester University as a Fulbright Scholar . Between 1930 and 1943 , 15 graduate students conducted their research under his direction . He supervised another 22 between 1946 and 1957 . The 37 students included Corson , who became president of Cornell University , and William B. Fretter , who was vice president of the University of California from 1978 to 1983 .

In addition to his research and teaching , Brode occupied a number of other positions . He was the academic assistant to two presidents of the University of California , Clark Kerr from 1960 to 1965 , and Charles J. Hitch from 1972 to 1973 , and to Angus E. Taylor , the vice @-@ president for academic affairs , from 1967 to 1972 . He served on the selection panels for Rhodes , Fulbright and Kennedy scholarships , and for awards from the State Department , the Atomic Energy Commission and the Institute of International Education . He was chairman of the Advisory Board of the Naval Ordnance Test Station from 1948 to 1955 , a member of the National Research Council Committee on Data for Science and Technology (CODATA) from 1951 to 1957 , and chairman of the American Association of Physics Teachers and the American Institute of Physics ' Committee on Physics Faculties in Colleges from 1962 to 1965 .

At various times Brode was vice president of the International Union for Pure and Applied Physics and the American Association of University Professors , a member of the Council of the American Physical Society , president of the Pacific Division of the American Association for the Advancement of Science , chairman of the Physics Division of the National Research Council , associate director for research of the National Science Foundation , and the U.S. delegate to the International Council of Scientific Unions . He was acting director of the Berkeley Space Sciences Laboratory from 1964 to 1965 and director of its Education Abroad Program in the United Kingdom from 1965 to 1967 .

Brode became a professor emeritus at Berkeley in 1967 . He died at his home in Berkeley on February 19 , 1986 . He was survived by his wife Bernice and his son John . His papers are in the University of California 's Bancroft Library .