

= Samuel King Allison =

Samuel King Allison (November 13 , 1900 ? September 15 , 1965) was an American physicist , most notable for his role in the Manhattan Project , for which he was awarded the Medal for Merit . He was director of the Metallurgical Laboratory from 1943 until 1944 , and later worked at the Los Alamos Laboratory ? where he " rode herd " on the final stages of the project as part of the " Cowpuncher Committee " , and read the countdown for the detonation of the Trinity nuclear test . After the war he was involved in the " scientists ' movement " , lobbying for civilian control of nuclear weapons .

= = Early life = =

Samuel King Allison was born in Chicago , Illinois , on November 13 , 1900 , the son of Samuel Buell Allison , an elementary school principal . He was educated at John Fiske Grammar School and Hyde Park High School . He entered the University of Chicago in 1917 , and participated in varsity swimming and water basketball , while majoring in mathematics and chemistry . He graduated in 1921 , and then embarked on his PhD in chemistry under the supervision of William Draper Harkins , writing his thesis on " Atomic Stability III , the Effects of Electrical Discharge and High Temperatures " , a topic closely related to experimental physics .

Allison was a research fellow at Harvard University from 1923 until 1925 and then at the Carnegie Institution from 1925 until 1926 . From 1926 until 1930 he taught physics at University of California , Berkeley as an instructor , and then as an associate professor . While there he met and married Helen Campbell . They had two children , a son , Samuel , and a daughter , Catherine .

= = X @-@ Rays = =

In 1930 Allison returned to the University of Chicago , where he became a professor in 1942 , and the Frank P. Hixon Distinguished Service Professor of Physics in 1959 . He studied the Compton effect and the dynamical theory of x @-@ ray diffraction . At the time x @-@ rays were an important means of investigating atomic structures , but the concept that light had both wave and particle properties , as demonstrated by Arthur Compton , was not universally accepted . William Duane from Harvard spearheaded an effort to prove that Compton 's interpretation of the Compton effect was wrong , and Allison became part of this effort . Duane carried out a series of meticulous experiments to disprove Compton , but instead found overwhelming evidence that Compton was correct . To his credit , Duane conceded that this was the case .

One outcome of this was that he co @-@ authored a textbook with Compton , X @-@ rays in Theory and Experiment (1935) , which became widely used . He developed a high resolution x @-@ ray spectrometer with a graduate student , John Harry Williams . In 1935 , Allison won a Guggenheim Fellowship to study at the Cavendish Laboratory at the University of Cambridge in England , where he studied under John Cockcroft . He published a paper in the Mathematical Proceedings of the Cambridge Philosophical Society on his " Experiments on the Efficiencies of Production and the Half @-@ Lives of Radio @-@ Carbon and Radio @-@ Nitrogen " . He was so impressed by the Cavendish Laboratory 's Cockcroft ? Walton accelerator that after returning to Chicago he built one .

= = Manhattan Project = =

During World War II , Allison became involved in defence @-@ related work . He was a consultant to the National Defense Research Committee (NDRC) from October 1940 to January 1941 . In January 1941 the NDRC let him a contract to study the possibility of using beryllium as a neutron moderator . The team he assembled in Chicago would grow into the Manhattan Project 's Metallurgical Laboratory .

In September 1941 , Allison joined the S @-@ 1 Uranium Committee , which coordinated the early

investigations into the feasibility of an atomic bomb . He began building a reactor in the squash courts under the disused stands of Stagg Field . He became head of the Metallurgical Laboratory 's chemistry section in January 1942 , and in March , his small experimental reactor using beryllium came closer to criticality than the graphite @-@ moderated design of Enrico Fermi 's group at Columbia University . During 1942 , Compton brought all the research groups working on plutonium and nuclear reactor design at Columbia University , Princeton University and the University of California together at the Metallurgical Laboratory in Chicago . Allison was placed in charge of the experimental work .

By October 1942 , the Metallurgical Laboratory had to consider how it would proceed with designing large production reactors when they had yet to get an experimental reactor to work . Fermi favored taking small steps , while Allison and Eugene Wigner argued that larger steps were necessary if atomic bombs were to be developed in time to affect the course of the war . The Director of the Manhattan Project , Brigadier General Leslie R. Groves , Jr . , told them that time was more important than money , and if two approaches looked promising , they should build both . In the end , this was what was done . Allison was one of 49 scientists who watched the project take a leap forward when Chicago Pile @-@ 1 went critical at Stagg Field on December 2 , 1942 . As Compton 's reactor project began to spread outside Chicago in 1943 , Allison became director of the Metallurgical Laboratory in June 1943 .

By late 1944 , the locus of the Manhattan Project had shifted to the Los Alamos Laboratory in New Mexico , and Allison went there in November 1944 as the chairman of the Technical and Scheduling Committee . He was able to inform Groves in March 1945 that an implosion @-@ type nuclear weapon would be ready for testing in July . Allison formed part of the " Cowpuncher Committee " that " rode herd " on the implosion project , ensuring that it stayed on track and on schedule . Fittingly , he was the one who read the countdown over the loudspeakers at the Trinity nuclear test in July 1945 . Groves presented Allison with the Medal for Merit for his work on the Manhattan Project in a ceremony at the University of Chicago on January 12 , 1946 .

= = Later life = =

After the war , Allison was director of the Enrico Fermi Institute of Nuclear Studies from 1946 until 1957 , and again from 1963 until 1965 . He was the chairman of the Physics Section of the National Research Council from 1960 to 1963 , and chairman of its Committee on Nuclear Science from 1962 to 1965 . He was active in the " scientist 's movement " for the control of atomic weapons . The scientists successfully lobbied for nuclear weapons to be under civilian rather than military control , which was eventually written into the Atomic Energy Act of 1946 . He was a strong opponent of secrecy in science , and , in an influential speech announcing the creation of the Enrico Fermi Institute said :

We are determined to return to free research as before the war . If secrecy is imposed on scientific research in physics , we will find all first @-@ rate scientists working on subjects as innocuous as the colors of butterfly wings .

Allison rebuilt his accelerator , which he called the " kevatron " , because it could accelerate particles to energies of 400 KeV . The name was a reference to the massive bevatron being built at the Lawrence Berkeley Laboratory , which was planned to accelerate particles to billions of electron volts . Allison still believed that there were useful results still to be found with low energies . He became a pioneer of what became known as " heavy ion physics " , accelerating protons and deuterons , and using lithium and beryllium as targets . The data on these reactions of light elements would subsequently prove useful in the study of stellar nucleosynthesis .

Later , Allison acquired a 2 MeV Van de Graaff generator , and he recalled an old paper on producing lithium ions from minerals like Eucryptite . This allowed him to produce a 1 @.@ 2 MeV lithium ion beam . He created hitherto unknown isotopes of boron and other light elements , and measured their neutron capture cross sections . A side effect of this work was a method to analyze surface materials where chemical analysis was unavailable . His colleague Anthony L. Turkevich subsequently used this to analyze the makeup of the Moon on the later Surveyor program missions .

Allison continued to take on Ph.D. candidates , some of whom , such as James Cronin went on to distinguished careers .

Allison died of complications following an aortic aneurism on September 15 , 1965 while attending the Plasma Physics and Controlled Nuclear Fusion Research Conference in Culham , England . His papers are kept at the American Institute of Physics .