= Philip Morrison =

Philip Morrison (November 7 , 1915 ? April 22 , 2005) was a professor of physics at the Massachusetts Institute of Technology (MIT) . He is known for his work on the Manhattan Project during World War II , and for his later work in quantum physics , nuclear physics and high energy astrophysics .

A graduate of Carnegie Tech , Morrison became interested in physics , which he studied at the University of California , Berkeley , under the supervision of J. Robert Oppenheimer . He also joined the Communist Party . During World War II he joined the Manhattan Project 's Metallurgical Laboratory at the University of Chicago , where he worked with Eugene Wigner on the design of nuclear reactors .

In 1944 he moved to the Manhattan Project 's Los Alamos Laboratory in New Mexico , where he worked with George Kistiakowsky on the development of explosive lenses required to detonate the implosion @-@ type nuclear weapon . Morrison transported the core of the Trinity test device to the test site in the back seat of a Dodge sedan . As leader of Project Alberta 's pit crew he helped load the atomic bombs on board the aircraft that participated in the atomic bombing of Hiroshima and Nagasaki . After the war ended , he traveled to Hiroshima as part of the Manhattan Project 's mission to assess the damage .

After the war he became a champion of nuclear nonproliferation . He wrote for the Bulletin of Atomic Scientists , and helped found the Federation of American Scientists and the Institute for Defense and Disarmament Studies . He was one of the few ex @-@ communists to remain employed and academically active throughout the 1950s , but his research turned away from nuclear physics towards astrophysics . He published papers on cosmic rays , and a 1958 paper of his is considered to mark the birth of gamma ray astronomy . He was also known for writing popular science books and articles , and appearing in television programs .

= = Early life and education = =

Philip Morrison was born in Somerville , New Jersey , November 7 , 1915 , the only son of Moses Morrison and Tillie Rosenbloom . He had a younger sister , Gail . The family moved to Pittsburgh when he was two . He contracted polio when he was four , and as a result wore a calliper on one leg , and spent his last years in a wheelchair .

Because of his polio , Morrison did not commence school until the third grade . On graduating from high school he entered Carnegie Tech , planning to major in electrical engineering . While there he became interested in physics . He earned his Bachelor of Science (B.S.) in 1936 . He then entered the University of California , Berkeley , where he earned his PhD in theoretical physics in 1940 under the supervision of J. Robert Oppenheimer , writing his thesis on " Three Problems in Atomic Electrodynamics " .

In 1938 , Morrison married Emily Kramer , a girl he had known in high school , and a fellow Carnegie Tech graduate . They divorced in 1961 . In 1965 he married Phylis Hagen . They remained together until Phylis died in 2002 .

= = Manhattan Project = =

After he finished his Ph.D. Morrison took a position as an instructor at San Francisco State College . In 1941 he became an instructor at the University of Illinois . In December 1942 , with World War II raging around the globe , he was recruited by Robert F. Christy to join the Manhattan Project 's Metallurgical Laboratory at the University of Chicago in January 1943 . There he worked with Eugene Wigner on the design of nuclear reactors .

Concerned about the danger from the German nuclear energy project , Morrison helped persuade the director of the Manhattan Project , Brigadier General Leslie R. Groves , Jr . , to initiate the Alsos Mission in order to gather information on it .

With the work in Chicago winding down in mid @-@ 1944 , Morrison moved to the Manhattan

Project 's Los Alamos Laboratory in New Mexico as a group leader . His first task was to help determine how much plutonium a bomb would require . He calculated that 6 kilograms (13 lb) would be sufficient . He then worked with George Kistiakowsky on the explosive lenses required to detonate the implosion @-@ type nuclear weapon .

Morrison transported the core of the Trinity test gadget to the test site in the back seat of a Dodge sedan . He was an eyewitness to the test on July 16 , 1945 , and wrote a report on it . A month later , as leader of Project Alberta 's pit crew , he helped load the atomic bombs on board the aircraft that participated in the atomic bombing of Hiroshima and Nagasaki . After the war ended , Morrison and Robert Serber traveled to Hiroshima as part of the Manhattan Project 's mission to assess the damage .

= = Activism = =

Morrison returned to Los Alamos , where he remained until 1946 . He turned down an offer from Ernest O. Lawrence to return to Berkeley , and instead accepted an invitation from Hans Bethe to join him at the physics faculty at Cornell University .

After surveying the destruction left by the use of the atom bomb in Hiroshima , Morrison became a champion of nuclear nonproliferation . He wrote for the Bulletin of Atomic Scientists , and helped found the Federation of American Scientists and the Institute for Defense and Disarmament Studies . He testified before Congress on the need for civilian control of nuclear energy , and participated in the Civil Rights Congress in New York and the Cultural and Scientific Conference for World Peace in 1949 . That year , Life magazine included his image in a gallery of " America 's 50 most eminent dupes and fellow travellers " .

Morrison had joined the Communist Party while he was at Berkeley . The House Un @-@ American Activities Committee devoted four pages of a 1951 report to his activities , and in 1953 , he was called before the Senate Internal Security Subcommittee . Theodore Paul Wright , the President of Cornell , was put under great pressure from board members and alumni to fire Morrison , but Bethe remained supportive , and Robert R. Wilson declared that Morrison had " demonstrated his patriotism by the distinguished role he played in the wartime development of the atomic bomb . "

Deane Malott , who became president of Cornell in 1951 , was much less sympathetic , and instructed Morrison to curtail all activities beyond his academic field . Morrison agreed to do so in 1954 . Nonetheless , he was one of the few ex @-@ communists to remain employed and academically active throughout the 1950s .

In 1999 , writer Jeremy Stone alleged that Morrison had been the Soviet spy Perseus , a charge that Morrison strongly and credibly rebutted . Stone accepted his rebuttal .

= = Academic work = =

Morrison co @-@ wrote a paper with Leonard I. Schiff in 1940 in which they calculated the gamma rays emitted by the process of K @-@ electron capture . Initially at Cornell after the war , Morrison continued working in nuclear physics , collaborating with Bethe on a textbook , Elementary Nuclear Physics (1952) , one of the early treatments of the relatively new field .

Following his political stances , Morrison 's attention began drifting towards the stars . In 1954 , he published a paper with Bruno Rossi and Stanislaw Olbert in which they explored Enrico Fermi 's theory of how cosmic rays travel through the galaxy . Morrison followed this up with a review of theories of the origins of cosmic rays in 1957 . A 1958 paper in Nuovo Cimento is considered to mark the birth of gamma ray astronomy .

In collaboration with Giuseppe Cocconi , Morrison published a paper in 1959 proposing the potential of microwaves in the search for interstellar communications , a component of the modern SETI program . This was one of the first proposals for detecting extraterrestrial intelligence . He conceded that " The probability of success is difficult to estimate , but if we never search , the chance of success is zero . "

Morrison remained at Cornell until 1964 , when he went to the Massachusetts Institute of

Technology (MIT) . He remained there for the remainder of his career , becoming Institute Professor in 1976 , and Institute Professor Emeritus in 1986 . In 1963 , working in collaboration with a student of his , James Felten , Morrison had investigated the effect of inverse Compton scattering , an important source of cosmic x @-@ rays and gamma rays . At MIT , Morrison teamed up with Bruno Rossi 's x @-@ ray group there , and also with Riccardo Giacconi 's group at nearby American Science and Engineering . Morrison became deeply involved in the exploration of the cosmos through its x @-@ ray and gamma ray emissions . In a 1960 paper , he noted the similarities between pulsars and quasars . He returned to this in 1976 , applying his model to the radio galaxy Cygnus A.

= = Media work = =

Morrison was known for his numerous books and television programs . He produced 68 popular science articles between 1949 and 1976 , ten in issues of Scientific American . He provided the narration and script for Powers of Ten in 1977 . With his wife , Phylis , they turned the same material into a coffee table book in 1982 . He also appeared as himself in the science documentary film Target ... Earth ? in 1980 . In 1987 , PBS aired his six part miniseries , The Ring of Truth : An Inquiry into How We Know What We Know , which he also hosted . In addition , he was a columnist and reviewer of books on science for Scientific American starting in 1965 .

In later life he was a critic of the Strategic Defense Initiative . He authored or co @-@ authored a number of books critical of the Cold War and the nuclear arms race , including Winding Down : The Price of Defense (1979) , The Nuclear Almanac (1984) , Reason Enough to Hope (1998) Beyond the Looking Glass (1993) .

= = Recognition = =

Morrison was a fellow of the American Physical Society , and chairman of the Federation of American Scientists from 1973 to 1976 . He was also a member of the National Academy of Sciences , the International Astronomical Union , the American Association of Physics Teachers , the American Academy of Arts and Sciences and the American Philosophical Society .

Over his lifetime , Morrison received numerous honors and awards . He delivered the 1968 Royal Institution Christmas Lectures on Gulliver 's Laws : The Physics of Large and Small , and the 1982 Jansky Lectureship before the National Radio Astronomy Observatory . He was awarded the Presidential Award and Pregel Prize of the New York Academy of Sciences , the Babson Prize of the Gravity Foundation , the American Association for the Advancement of Science 's Westinghouse Science Writing Award , the American Association of Physics Teachers 's Oersted Medal , the Dickinson College Priestly Medallion , Minnesota Museum of Science Public Science Medal , the American Institute of Physics 's Andrew Gemant Award , the Astronomical Society of the Pacific 's Klumpke @-@ Roberts Award , the John P. McGovern Science and Society Award , the William Procter Prize for Scientific Achievement. and , with his wife Phylis , the Wheeler Prize by the Boston Museum of Science .

= = Death = =

Morrison died in his sleep of a respiratory failure at his home in Cambridge , Massachusetts , on April 22 , 2005 . He was survived by his stepson Bert Singer .