= Boyce McDaniel =

Boyce Dawkins McDaniel (June 11 , 1917 - May 8 , 2002) was an American nuclear physicist who worked on the Manhattan Project and later directed the Cornell University Laboratory of Nuclear Studies (LNS) . McDaniel was skilled in constructing " atom smashing " devices to study the fundamental structure of matter and helped to build the most powerful particle accelerators of his time . Together with his graduate student , he invented the pair spectrometer .

During World War II , McDaniel used his electronics expertise to help develop cyclotrons used to separate Uranium isotopes . McDaniel is also noted as having performed the final check on the first atomic bomb prior to its detonation in the Trinity test .

= = Biography = =

Born in Brevard , North Carolina , McDaniel attended Chesterville High School in Ohio . After graduating in 1933 , he attended Ohio Wesleyan University , from which he graduated in 1938 with a Bachelor of Science . His initial postgraduate studies took place at the Case School of Applied Science , graduating with a Master 's degree in 1940 . McDaniel continued postgraduate studies when he moved to Cornell University , and in 1943 he completed his doctoral thesis , examining the absorption rates of neutrons in indium . The research was not classified , but McDaniel and Robert Bacher , his adviser at Cornell , marked it as " secret " on their own initiative . From Cornell , McDaniel moved to MIT where he held a postdoctoral position , studying " the rapidly evolving field of fast electronics " , which he applied to research in particle physics .

After the outbreak of World War II , McDaniel joined Bacher in Los Alamos , New Mexico to work for the Manhattan Project , where he became a part of Robert R. Wilson 's cyclotron research team . McDaniel was to have " a crucial role in helping to identify the amount of uranium @-@ 235 needed to ... detonate the world 's first nuclear bomb " . McDaniel is also noted as having performed the final check on the first atomic bomb prior to its detonation in the Trinity test .

McDaniel was one of many Manhanttan Project researchers to join the Cornell faculty after the war . He became an assistant professor in 1946 and became a full professor in 1955 . With his Ph.D. student Robert Walker , he invented the pair spectrometer , a device that measures gamma ray energies . He was a co @-@ founder of Cornell 's Laboratory for Nuclear Studies (LNS) and had a helped create the 300 megavolt (MeV) electron synchrotron , one of the first such accelerators in the world . He and Wilson , who was McDaniel 's predecessor as director of LNS , built three more electron synchrotrons of 1 GeV , 2 GeV , and 10 GeV , each of which enabled physicists to study phenomena in a new energy range . McDaniel quickly earned a reputation as a hands @-@ on designer as indicated by this episode in the construction of the 300 MeV synchrotron :

The magnet coil was wound incorrectly , a fatal flaw . To get it repaired by the manufacturer could take months . Mac made a toy model of the coil , studied it carefully for an evening , and discovered an ingenious but simple way to repair it , which he did in about a day , and defused the crisis .

He was a Fulbright research fellow in 1953 at the Australian National University and a Guggenheim fellow in 1959 at the University of Rome .

In 1967 , McDaniel became director of LNS and served until he retired from the Cornell faculty in 1985 . He research included important measurements with each of the series of LNS accelerators , including studies lambda @-@ meson photo production , K @-@ meson production , and measurements of the neutron electromagnetic form factors .

Wilson and McDaniel continued to collaborate at Cornell until Wilson left to head Fermilab in Batavia , Illinois in 1967 . In 1972 , Wilson invited McDaniel to serve as acting head of the accelerator section at Fermilab , and McDanield took a one year leave of absence from Cornell . Though the Fermilab accelerator had been placed into operation , it suffered from frequent component failures . When McDaniel left eight months later , he led the effort which increased the power of Fermilab 's accelerator from 20 GeV to 300 GeV and its beam density by a factor of 1000 . Of McDaniel 's contribution to Fermilab , Wilson said , " This bravura performance demonstrated Mac ? s skill for leadership as well as his celebrated sixth sense for finding sources of trouble and

fixing them . ? Upon returning to Cornell in 1974 , McDaniel proposed upgrading the then existing 10 GeV synchrotron with an 8 GeV electron @-@ positron storage ring , which would greatly increase the energy of particle collisions when the particles in the storage ring hit the particles traveling in the opposite direction in the synchrotron . When constructed in 1979 , the Cornell Electron Storage Ring became the world 's primary source of information about one of the fundamental building blocks of matter , the b @-@ quark . After the end of particle physics experiments 20 years later , CESR is now used as a test facility of damping rings for a future international linear collider . In 1981 , McDaniel developed a proposal for a new mile @-@ diameter electron @-@ positron collider called CSER II , but could not obtain the necessary $ 200 million in funding for it . In 1988 , McDaniel was Visiting Distinguished Professor at Arizona State University .

When interviewed in 1973 about his feelings on his work resulting in the dropping of atomic bombs on Japanese cities , McDaniel said :

It 's so difficult to assess these things today . I would have preferred to see a demonstration and am rather sad that it didn 't work out that way ... but I don 't know if it would have worked out as a useful venture . I have no idea what the Japanese would have done .

= = Honors = =

McDaniel was elected to the National Academy of Sciences in 1981 . He was a governing board member of Fermilab , a trustee of the Associated Universities , a member of the Department of Energy High Energy Advisory Panel , a trustee of the Universities Research Association and a board member of Brookhaven National Laboratory .

In 1993 , the McDaniels donated a farm to the Cornell Plantations , which named the 60 @.@ 6 acre property the Jane McDaniel Preserve .

McDaniel died of a heart attack in Ithaca , New York at the age 84 .