

Edward Teller Is Dead at 95; Fierce Architect of H-Bomb

Edward Teller, who was present at the creation of the first nuclear weapons and who grew even more famous for defending them, died yesterday at his home on the Stanford University campus in Palo Alto, Calif., according to the Lawrence Livermore National Laboratory, which Dr. Teller once headed. He was 95.

Physicist for Nuclear Age

By **WALTER SULLIVAN**

Few, if any, physicists of this century have generated such heated debate as Edward Teller. Much of it centered on his decade-long effort to produce the hydrogen bomb, his ardent promotion of nuclear weapons in general, his deep suspicion of Soviet intentions and his opposition to curtailment of nuclear testing.

His frustrations in seeking to win support for development of the hydrogen bomb led to his testimony that helped deprive J. Robert Oppenheimer, who directed the development of the first atomic bomb, of his security clearance. The result in much of the scientific community was a backlash against Dr. Teller that clouded the rest of his life.

Nevertheless, he continued to exert important influence on government policy.

While many colleagues did not share Dr. Teller's political views, to some scientists his was a voice of realism crying out in a wilderness of liberal naveté. But Dr. Teller's critics were as impassioned as his supporters. During the Vietnam War, Dr. Teller was the target of unrelenting vilification from antiwar activists. He was seen as the model for Dr. Strangelove, the motion picture character with an artificial arm who "loved the bomb" and spoke with a Central European accent.

Dr. Teller's English, though fluent and eloquent, revealed his Hungarian roots, and he had an artificial replacement for the foot he



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Edward Teller, in his office at the Lawrence Livermore National Laboratory in 2000, was a hero to conservatives, but not to liberals.

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lost in 1928 as a student when he jumped from a moving Munich streetcar.

(Sept 26, 1945)

Edward Teller was born in Budapest on Jan. 15, 1908, the son of Max Teller, a lawyer, and Ilona Deutsch Teller, an accomplished pianist.

As an infant Dr. Teller, like Einstein, was slow to begin speaking, but as he developed he displayed amazing mathematical ability. When he told his father that he wanted to study mathematics, his father discouraged him, saying that he would not be able to make a living as a mathematician. In a compromise, young Teller agreed to study chemistry, but he later said that he "cheated" by studying mathematics too.

When he was about 20, a new subject captured his imagination. He began to hear of advances in atomic theory and "a whole new world" opened up to him, he later said in an interview.

After receiving his doctorate from the University of Leipzig in 1930, he joined the faculty of the University of Göttingen, where he remained until 1933. But it became clear that, as a Jew, he would have to leave Nazi Germany. He joined the faculty of George Washington University as a physics professor in 1935 and became a United States citizen six years later.

The idea for a hydrogen bomb, based on the fusion of atoms, apparently originated with Enrico Fermi, the Italian physicist, in 1941, a year before Dr. Fermi's team achieved the first fission chain reaction at the University of Chicago, opening the way for developing the atomic bomb.

The energy of the atomic bomb derives from the splitting of very large atoms like uranium or plutonium. In contrast, the hydrogen bomb depends on the fusion of various forms of hydrogen atoms.

In 1941, a few weeks before the Japanese attack on Pearl Harbor, while Dr. Teller had a temporary appointment at Columbia University, Dr. Fermi suggested at lunch that an atomic bomb explosion might create conditions sufficiently close to those inside a star to induce the fusion of heavy hydrogen (deuterium) nuclei, releasing an enormous burst of energy.

At first Dr. Teller doubted that fusion could be induced in this way. Nevertheless, when Dr. Oppenheimer called a meeting of top physicists a year later at the University of California in Berkeley, Dr. Teller proposed that they consider building a hydrogen bomb.

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When the Los Alamos Scientific Laboratory was secretly set up in 1943 to develop an atomic bomb, Dr. Teller, by then at the University of Chicago, agreed to give up pure research and join the project.

Early in 1943 Dr. Teller boarded a train for Los Alamos with his wife, the former Augusta Maria Harkanyi, who died in 2000, and their son, Paul, born only six weeks earlier. His hope, to design a hydrogen bomb, or "super" led to early friction with Dr. Oppenheimer, the laboratory's director, who insisted that they concentrate on the atomic bomb, which, in any case, would be needed to ignite the hydrogen bomb.

The situation, after the first Soviet atomic bomb was detonated in 1949, considerably sooner than expected, changed drastically. Teller saw in the hydrogen bomb the one hope for survival and his warnings of a Soviet menace began to reach receptive ears.

While many — probably most — scientists opposed the H-bomb, Dr. Teller had the support of such distinguished figures as Dr. Ernest O. Lawrence and Dr. Luis W. Alvarez at the University of California, both later Nobel Prize winners.

In addition to Lewis L. Strauss, a member of the Atomic Energy Commission who became a strong ally of Dr. Teller, Senator Brien McMahon, chairman of the Joint Committee on Atomic Energy, and others worked to persuade President Truman to press forward with the hydrogen bomb. On Jan. 31, 1950, Truman announced that he had directed the Atomic Energy Commission "to continue its work on all forms of atomic weapons, including the so-called hydrogen or super bomb." It was a major victory for Dr. Teller.

Teller then pressed for creation of a laboratory, independent of Los Alamos, that would focus on the hydrogen bomb. The proposal was rejected by Dr. Oppenheimer's General Advisory Committee, adding to Dr. Teller's resentment. He was able, however, to persuade his friends in the Pentagon — ultimately in a meeting with Secretary of



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Defense Robert A. Lovett — of the merits of his proposal and the Lawrence Livermore Laboratory came into being east of San Francisco Bay. Dr. Teller served as its director from 1958 to 1960.

(Sept 26, 1945)

The first American fusion, or "thermonuclear," explosion occurred at Eniwetok Island in the Pacific on Nov. 1, 1952. The device was a cumbersome assemblage weighing 65 tons. The Soviet Union achieved such an explosion three years later.

The hearings on Dr. Oppenheimer were held in 1954 after J. Edgar Hoover, the Director of the Federal Bureau of Investigation, received a long letter from William Liscum Borden, a member of Senator McMahan's staff, explaining why he believed Dr. Oppenheimer was an agent of the Soviet Union.

The accusation led President Eisenhower to order the Atomic Energy Commission to review whether Dr. Oppenheimer's security clearance should be revoked. Hearings were held by the commission's Personnel Security Board, which asked Dr. Teller to appear.

Asked if he considered Dr. Oppenheimer disloyal to the United States, Dr. Teller said no. He was then asked whether he regarded him as a security risk. He replied that he often found Dr. Oppenheimer's actions "hard to understand."

"I thoroughly disagreed with him in numerous issues and his actions frankly appeared to me confused and complicated," Dr. Teller told the panel.

A large part of the scientific community, dismayed at the witch-hunting of the McCarthy era, aware of long-standing friction between Dr. Teller and Dr. Oppenheimer, and loyal to the leader of the original atomic bomb project, turned its back on Dr. Teller. "By old friends we were practically ostracized," he reported later. His wife "was very badly hurt" and became ill.

In contrast to his negative testimony in 1954 Teller in the 1980's was warm in his praise of Oppenheimer. "He knew how to organized, cajole, humor, soothe feelings — how to deal powerfully without seeming to do so. He was an exemplary of dedication, a hero who never lost his humanness. Los Alamos' amazing success grew out of the brilliance, enthusiasm and charisma with which Oppenheimer led it."

Dr. Teller continued to be highly regarded in many quarters and his role as scientific leader and adviser to those in high places increased. After the first Soviet Sputnik was launched in 1957 he was featured on the cover of Time magazine as a symbol of American scientific vigor.

On July 23, President Bush presented Dr. Teller with the Presidential Medal of Freedom, the country's highest civilian award.

In addition to his son, Dr. Teller is survived by a daughter, Wendy.

While, unlike many atomic scientists, Dr. Teller did not argue against dropping the bomb on Japanese cities, he repeatedly said afterward that doing so had been a mistake. Far better, he maintained, would have been to fire a bomb in the evening high enough above Tokyo to spare the city but to flood it in blinding light

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city out to flood it in blinding light.

"If we could have ended the war by showing the power of science without killing a single person," he said, "all of us would now be happier, more reasonable and much more safe."

Walter Sullivan, a science writer and editor for The New York Times, died in 1996.

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