

THE MEETING

Meridel Rubenstein
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Palladium prints, steel, single-channel video
Video assistance by Steina
Video run time 4:00 minutes
Tia Collection

The Meeting consists of twenty portraits of people from San Ildefonso Pueblo and Manhattan Project physicists—who met at the home of Edith Warner during the making of the first atomic bomb—and twenty photographs of carefully selected objects of significance to each group. In this grouping are Manhattan Project physicists and the objects they selected from the collections of the Bradbury Science Museum that are all related to the making of the atomic bomb.



6A NICOLAS METROPOLIS

Nicolas Metropolis was a physicist at Los Alamos. He worked with Edward Teller on the reactor project at the University of Chicago and joined the Manhattan Project in 1942 as a member of the Theoretical Division. He and Richard Feynman set up a repair shop to fix the Marchant and Friden hand calculators, which had broken down due to the enormous number of calculations necessary to the work at the Lab. By 1943 the overtaxed calculators were replaced by the IBM punch-card system. By 1948 Metropolis had become a leader of a Los Alamos team that designed and built the MANIAC, one of the first electronic digital computers. Metropolis ate dinner at Edith Warner's during the war and later helped build her new house. He recalled that Tilano Montoya made the curvature in the adobe wall by rotating a Campbell soup can on its axis from the floor upwards.

6B WIRE

(Bradbury Science Museum, Los Alamos National Laboratory) A manganese alloy wire, used to monitor the plutonium core of the Trinity device, Fat Man.

6C WILLIAM HIGINBOTHAM

William Higinbotham was an electronics expert. In 1945 he wrote to his mother from Los Alamos, "I'm not a bit proud of the job we've done ... the only reason for doing it was to beat the rest of the world to a draw. ... The alternative to peace is now unthinkable." Upon the Japanese surrender, he played his accordion while leading the victory parade at Los Alamos, seated on the shoulders of the procession's driver. He headed the Association of Atomic Scientists, which was founded shortly after the death of Harry Daglian on September 14, 1945 – the second radiation fatality at Los Alamos. Even though this "revolt" went against army regulations, 100 scientists immediately joined. Quotation from *Brighter Than a Thousand Suns*, by Robert Jungk (New York: Harcourt Brace Jovanovich, 1968)

6D SEISMOGRAPH

(Bradbury Science Museum, Los Alamos National Laboratory) This seismograph was used at Trinity test site to measure the direction and intensity of earth movements caused by the blast.

7A LOPO REACTOR

(Bradbury Science Museum, Los Alamos National Laboratory) The first water boiler reactor, a critical assembly, was nicknamed Lopo because it ran at low power. It produced the first man-made, self-sustaining nuclear reaction with enriched uranium (U-235).

7B PHILIP MORRISON

Philip Morrison was a theoretical physicist teaching at MIT. He studied with J. Robert Oppenheimer at UC Berkeley. At Los Alamos he worked on the critical assembly of the implosion bomb. He rode with the plutonium core in the back seat of an army sedan from the Hill to Trinity. While he had expected to be most impressed by the sight of the first atomic explosion, he always remembered its intense heat. He went on to Tinian to assemble the core for the Nagasaki bomb. Although Morrison worked on the hydrogen bomb after the war, he became increasingly outspoken in his opposition to the control of scientific research by the military. He later became well known as a science educator, for his book reviews in *Scientific American*, and for his appearances on the PBS NOVA series. Morrison ate dinner at Edith Warner's and was a summer visitor to Los Alamos after the war; he helped build her second house. He wrote: "Miss Warner, her home by the river, and her spirit of grace remain a part of everyone at Los Alamos lucky enough to have known her. ... Edith Warner stands in the history of those desperate times as a kind of rainbow ... a sign that war and bombs are not all that men and women are capable of building." From *The House at Otowi Bridge: The Story of Edith Warner and Los Alamos*, by Peggy Pond Church (Albuquerque: University of New Mexico Press, 1988).

7C BERYLLIUM COPPER ALLOY TOOLS

(Bradbury Science Museum, Los Alamos National Laboratory) These tools would not cause a spark on impact – important for working around high explosives.

7D ROBERT WILSON

Robert Wilson was an experimental physicist who received his PhD from UC Berkeley, working with Ernest Lawrence and J. Robert Oppenheimer. He was teaching at Princeton when Oppenheimer recruited him to go to Los Alamos, where he led the Cyclotron Program Group and, later, the Research Division. Forty-five years later, after a visit to the Trinity test site, Wilson said: "I have two guilty feelings: one that we didn't make it fast enough ... the other is that we made it at all." After Los Alamos, he taught at Cornell University and went on to direct the Fermi National Accelerator Laboratory in Chicago. Wilson remembered dining by candlelight at Edith Warner's place. He always carved the roast lamb, and upon the birth of his first baby, Tilano Montoya sent him an arrowhead with the note: "Before you can be a great carver, you must be a great hunter."

8A CARSON MARK

Carson Mark came back to Los Alamos from Canada in 1945 as part of the British Mission collaborating on the Manhattan Project. He managed the laboratory's theoretical physics work between 1947 and 1973 and served as a laboratory consultant and member of the Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards. He and his wife, Kay, worked on Edith Warner's second house.

8B COCA-COLA BOTTLE

(Bradbury Science Museum, Los Alamos National Laboratory) The green of this Coca-Cola bottle turned to gold when it was exposed to radiation.

8C HANS BETHE

Hans Bethe had to leave Germany because his mother was Jewish. In 1935 he arrived in the United States to teach at Cornell University. At Los Alamos he was head of the Theoretical Physics Division. Troubled by his part in producing the first atomic bomb, Bethe took a leading role in the Emergency Committee of Atomic Scientists. This group urged public awareness of the danger of atomic war and the necessity for international control. Resisting strong pressure to work on the thermonuclear (hydrogen) bomb, also known as the superbomb, he returned to Cornell after the war and was recruited by Edward Teller in 1949. Through his work he hoped to prove that a thermonuclear bomb couldn't be made. In 1967 he was awarded the Nobel Prize for explaining the production of energy in stars. Bethe ate dinner at Edith Warner's feeling that her home was "something of a lie to the world."

8D JEZEBEL REACTOR (1954)

(Bradbury Science Museum, Los Alamos National Laboratory) The Jezebel Reactor was a remote-control critical assembly used to conduct tests for the construction of a thermonuclear bomb.

9A MOLTEN GLASS FROM NAGASAKI

9B EDWARD TELLER

Edward Teller was one of the most controversial of the Manhattan Project scientists, many of whom found him difficult to work with. His unwavering commitment to nuclear weapons culminated in his design of the SDI (Strategic Defense Initiative). He received his PhD in 1930 but was forced to leave Hungary, then Germany, because he was Jewish. He studied with Bohr in Copenhagen, went to the US in 1935 to work at George Washington University, and began work at Los Alamos in 1943, where he worked under Bethe in the Theoretical Division. His project, the superbomb, was not realized until 1954. Teller was so preoccupied with his work that he couldn't recall many details of his dinners at Edith Warner's, except for a "seemingly indestructible [fireplace] log that burned and burned and never seemed to get smaller."

9C FAT MAN (1945)

(Bradbury Science Museum, Los Alamos National Laboratory) Fat Man was an implosion-type plutonium bomb tested at Trinity on July 16, 1945 – the world's first nuclear explosion. A weapon based on that design was detonated 1,700 feet over Nagasaki, Japan, on August 9, 1945. It was 128 inches long and 60 inches in diameter, weighed 10,800 pounds, and had a yield of 23 kilotons.

9D KENNETH BAINBRIDGE

Kenneth Bainbridge, an experimental physicist, worked under Ernest Rutherford at the Cavendish Laboratory in England. He designed and built the Harvard cyclotron and then worked on radar at MIT before going to Los Alamos in 1943. He first headed an instrumentation group in the Ordnance Engineering Division, then in March 1944 was put in charge of organizing the first atomic test at Trinity. He chose the site and was in charge of arming the bomb. His response to the test: "No one who saw it could forget it, a foul and awesome display." His often quoted comment after its success: "Now we are all sons of bitches." He returned to teach at Harvard after the war until his retirement. He ate dinner at Edith Warner's many times and had many vivid memories.

10A DAVID HAWKINS

David Hawkins received his PhD in philosophy from UC Berkeley in 1940 and taught there for two years before going to Los Alamos. He was a very close friend of J. Robert Oppenheimer and had been active in leftist circles before the war. At the lab he was the administrative officer in charge of security and draft deferment, the liaison between the community and the army, and was in charge of military personnel. In 1945 he became the project historian, writing Project Y: The Los Alamos Story. After the war he taught philosophy at the University of Colorado at Boulder. In the 1950s, the University of Colorado stood behind him during the McCarthy hearings. In the 1960s, with his wife, Frances, he founded the Mountain View Center for Environmental Education, where he held workshops for teachers and published the popular magazine *Outlook*. He continued to be involved with science education in elementary schools, sharing with the late Frank Oppenheimer a concern for engaging children's interest in science. For this work he was awarded a MacArthur Fellowship. He was an outspoken critic of the proliferation of nuclear weapons.

10B PROJECT Y STAMP

(Bradbury Science Museum, Los Alamos National Laboratory) Project Y was the code name for the Manhattan Project. This was their work stamp seal.

10C ROBERT CHRISTY

Robert Christy was a theoretical physicist. He received his PhD from UC Berkeley and went to Los Alamos in 1943 from the Metallurgical Laboratory at the University of Chicago. He joined the Theoretical Division, where he worked on the water boiler reactor and designed the core of the implosion bomb, Fat Man, sometimes known as the "Christy gadget." He returned to the University of Chicago after the war as a professor and administrator. He went to the California Institute of Technology in 1950, becoming vice president and provost in 1970. He was a member of the National Academy of Sciences Committee, which surveyed the risks of nuclear power. Christy ate dinner at Edith Warner's on a regular basis with his closest friends: the Wilsons, the Serbers, and the MacMillans.

10D SLIDE RULE (1952)

(Bradbury Science Museum, Los Alamos National Laboratory) This slide rule, thought to be Enrico Fermi's, was altered to calculate fission.