Leslie R. Groves and J. Robert Oppenheimer.
Source: Leslie R. Groves, *Now It Can Be Told* (New York: Harper & Row, 1962)

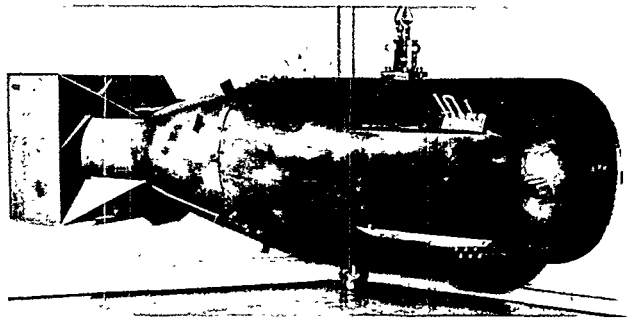
particles of the lighter isotope would be deflected more when passing through a magnetic field. Later, in 1944, Groves approved a production plant using a third method, liquid thermal diffusion, in which the lighter isotope concentrated near a heat source within a tall column.

The second path chosen to build the bomb focused on producing large amounts of fissionable plutonium in a uranium pile or reactor. On December 2, 1942, on a racket court under the west grandstand at Stagg Field of the University of Chicago, researchers achieved the first self-sustaining chain reaction in a graphite and uranium pile. Groves built a pilot pile and plutonium separation facility at the x-10 area of Clinton. Space and power generating limitations, however, precluded building the full-scale production facilities at the site. Groves chose an alternate site near Hanford, Washington, on the Columbia River, because of its isolation, long construction season, and access to hydroelectric power. Three water-cooled piles, designated by the letters B,D, and F, and corresponding chemical separation facilities were built at the Hanford Engineer Works.

Much of the research work on producing plutonium, including design of the piles, took place at the Metallurgical Laboratory (Met Lab) in Chicago. Design and fabrication of the first atomic bombs were the responsibility of the Los Alamos Scientific Laboratory in Los Alamos, New Mexico. The laboratory, located at a virtually inaccessible site and headed by J. Robert Oppenheimer, attracted a remarkable array of scientists from universities across the United States.[18]

Trinity, Hiroshima, and Nagasaki

By spring 1945 the Manhattan Project was on the verge of success. Sufficient uranium^{235} and plutonium for initial weapons would soon be available. Los Alamos scientists were confident that the uranium gun design would work and deemed a test before combat use as unnecessary. The plutonium implosion design was more problematical. The test of the plutonium device, named Trinity by Oppenheimer, took place at precisely 5:30 a.m. Monday, July 16, 1945, at a barren site on the Alamogordo Bombing Range in New Mexico. The blast yielded the equivalent of 21,000 tons of TNT, higher than anyone had predicted.



Model of Little Boy uranium bomb.
Source: Richard G. Hewlett and Oscar E. Anderson, *The New World*, 1939-1946, Volume I of *A History of the United States Atomic Energy Commission* (University Park: Pennsylvania State University Press, 1962)