



# Nuclear Rapture

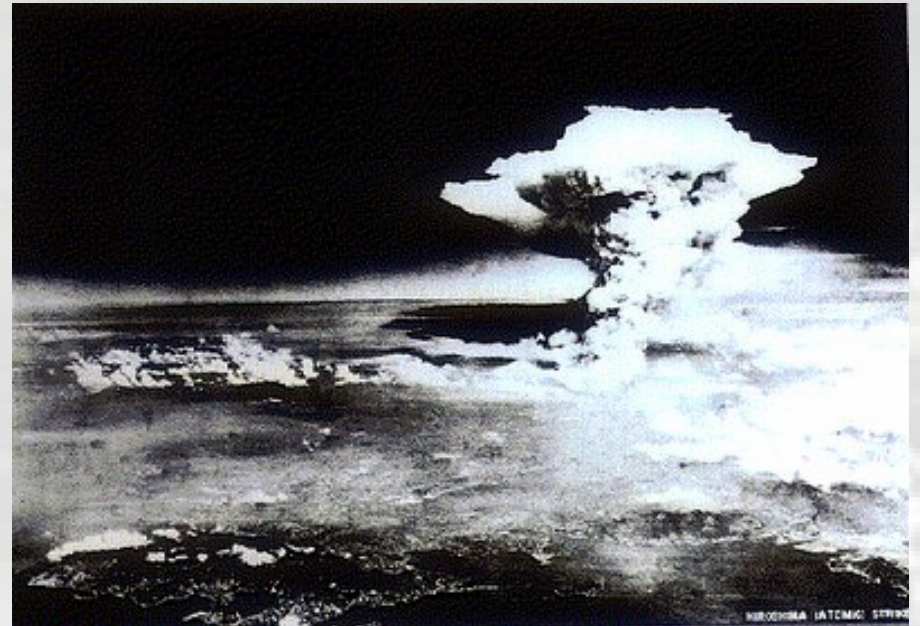
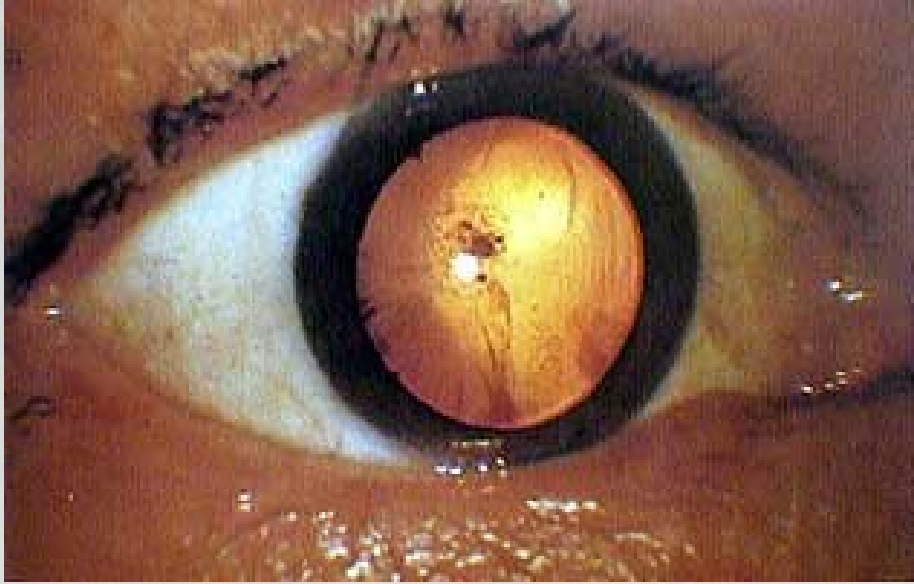
Prof. Weppner

For Professor Lopez's Rapture class, April 10, 2007



## **Yosuke Yamahata**

He is the photographer that took the pictures that followed. He arrived in Nagasaki the day after the bomb went off.

















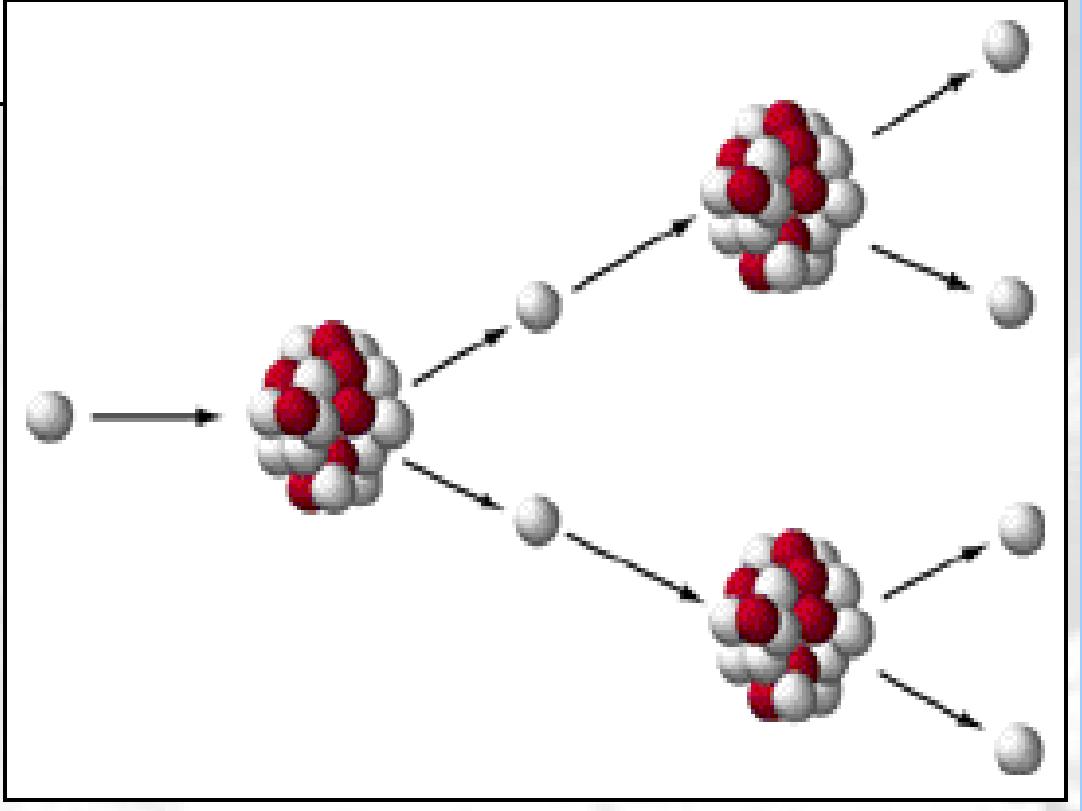
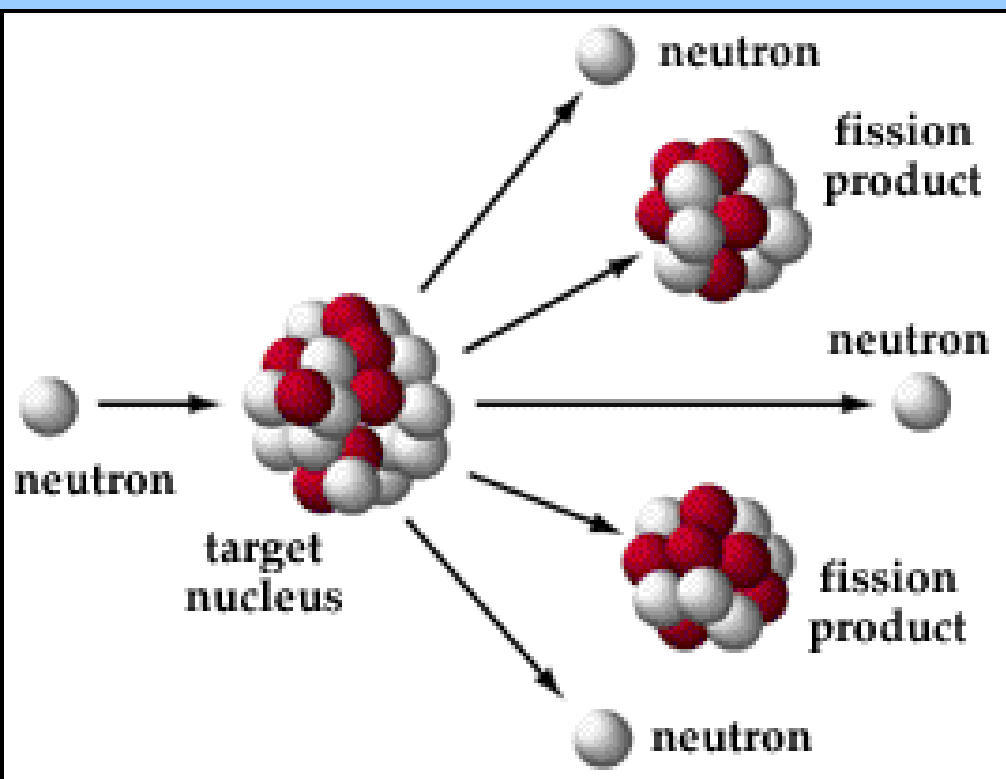
OH ALICE, YOU'RE  
THE ONE FOR ME

BUT BOB, IN A  
QUANTUM WORLD  
HOW CAN WE BE SURE?

$$\psi^* \psi = \psi^2$$

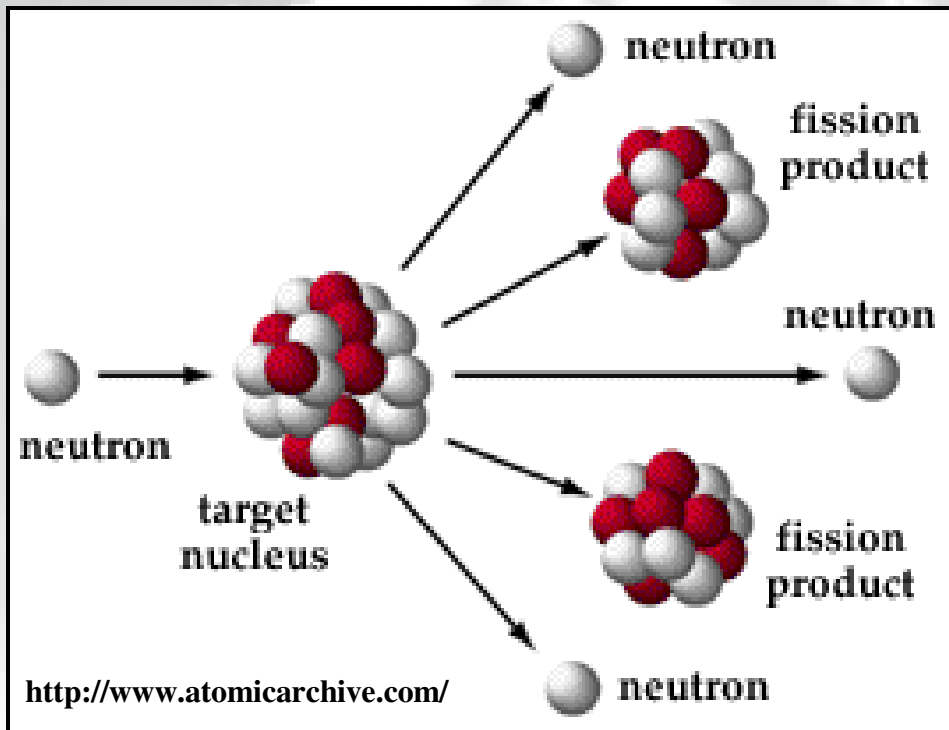
Physics World



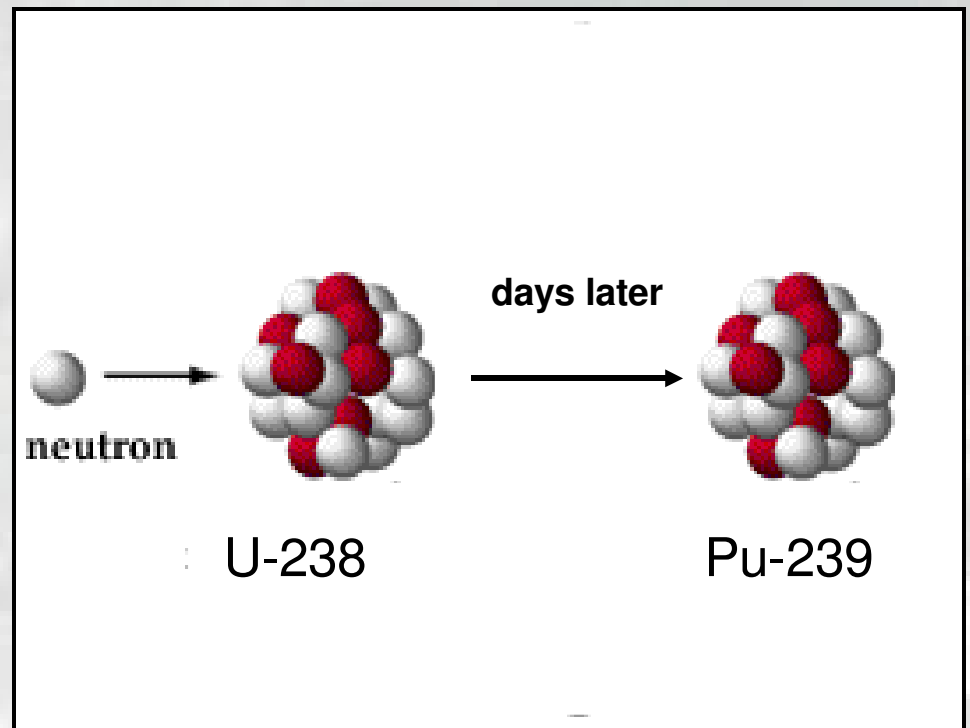


$$E = mc^2$$

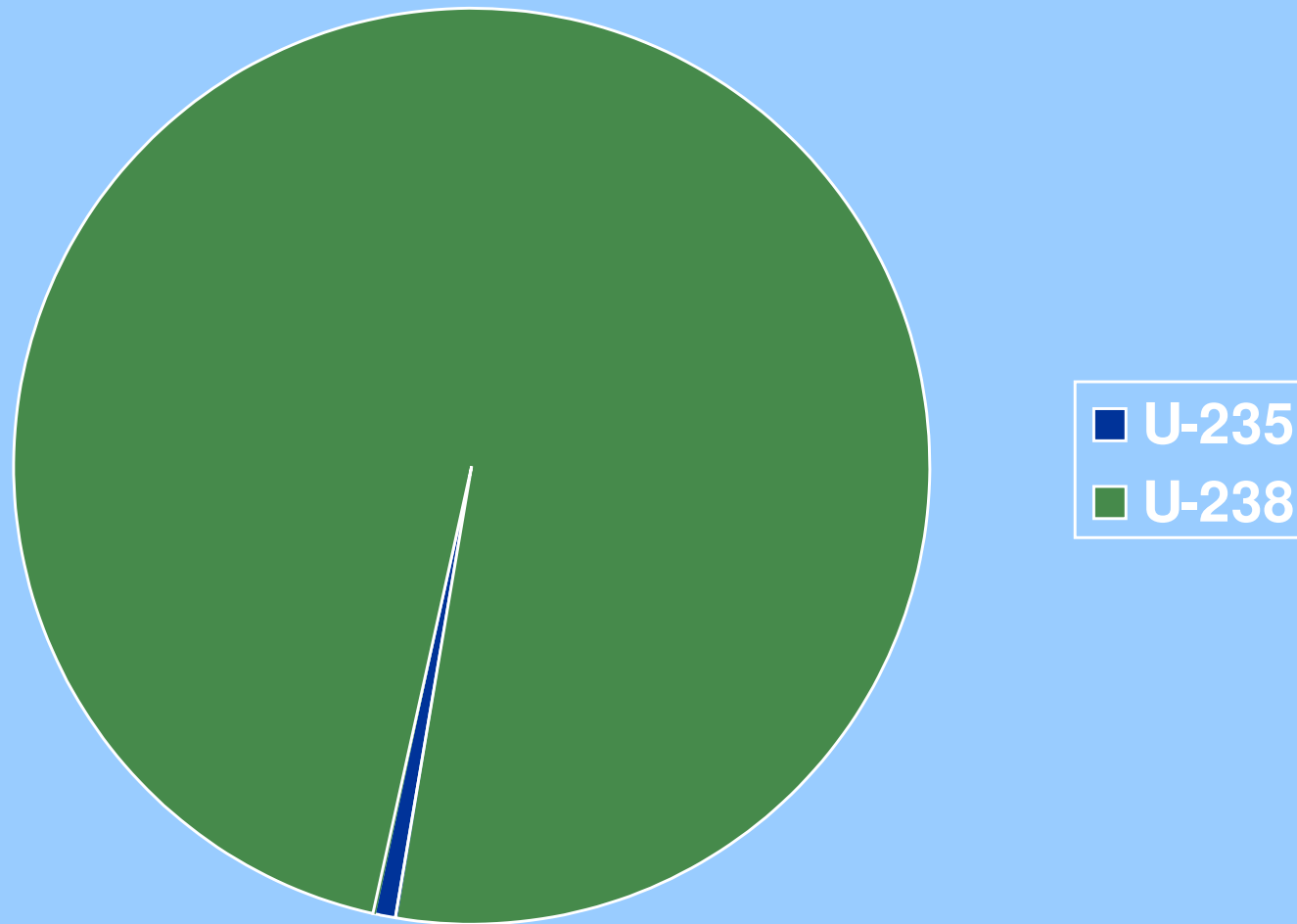
# U-235



# U-238

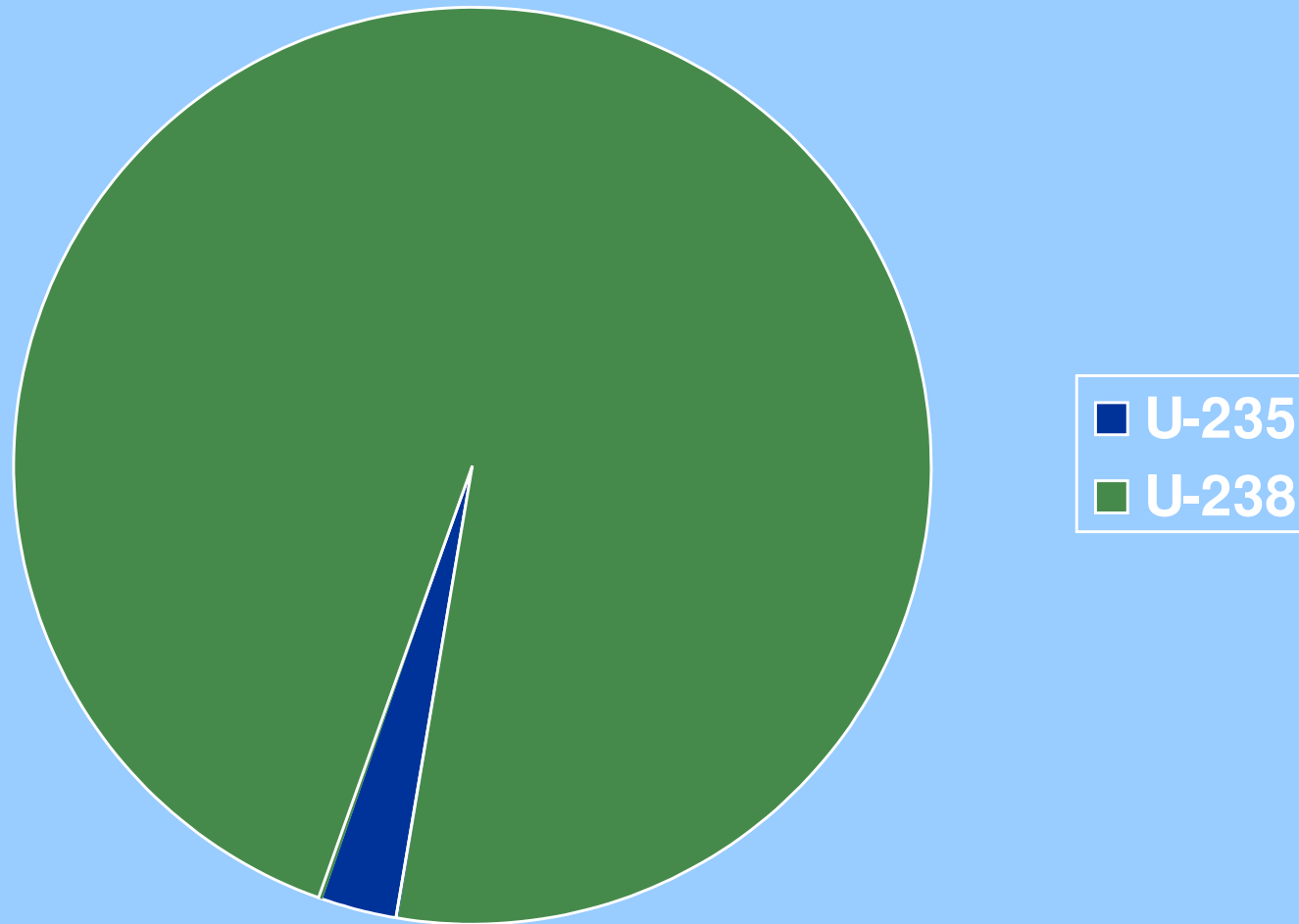


# Isotopes of Uranium

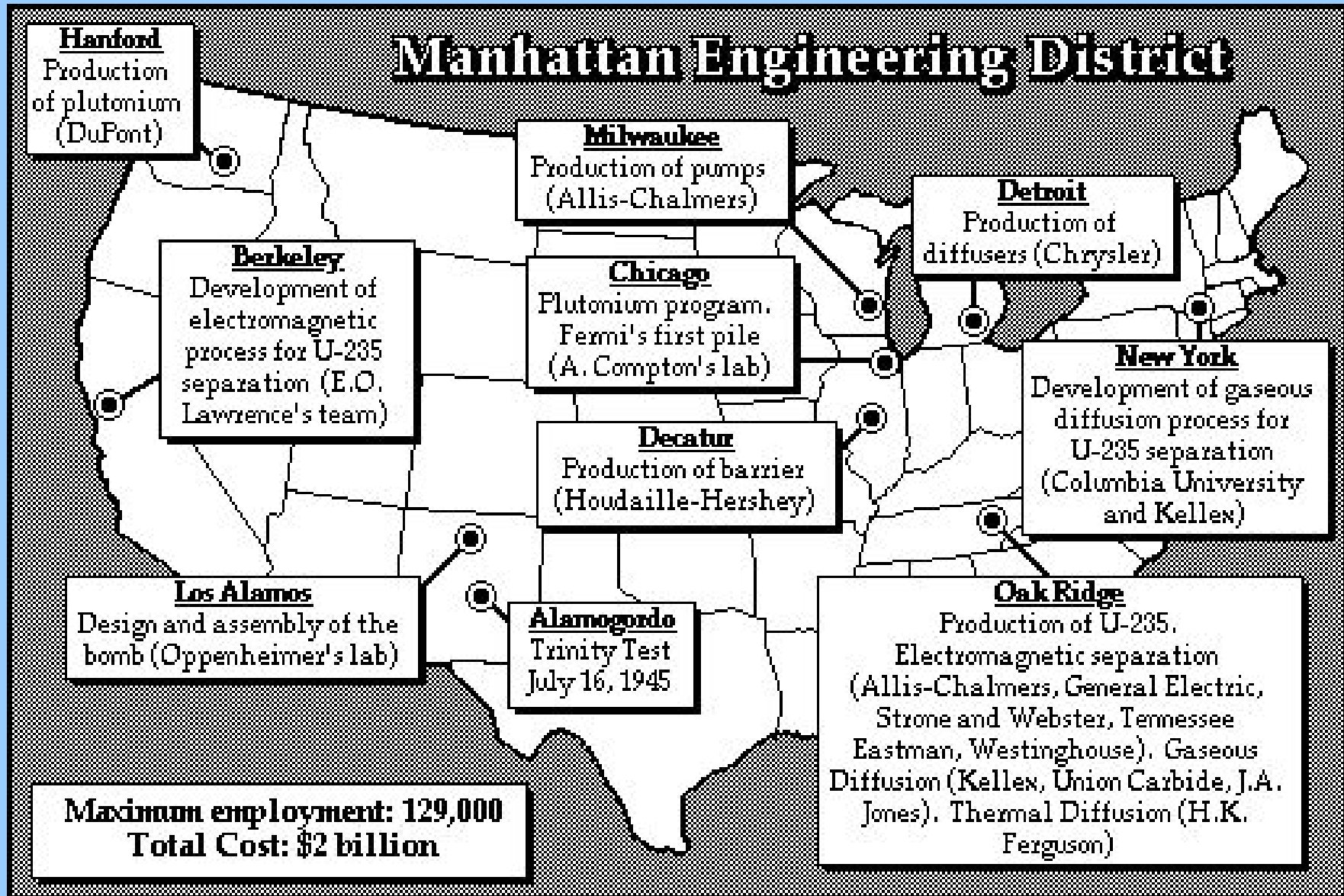




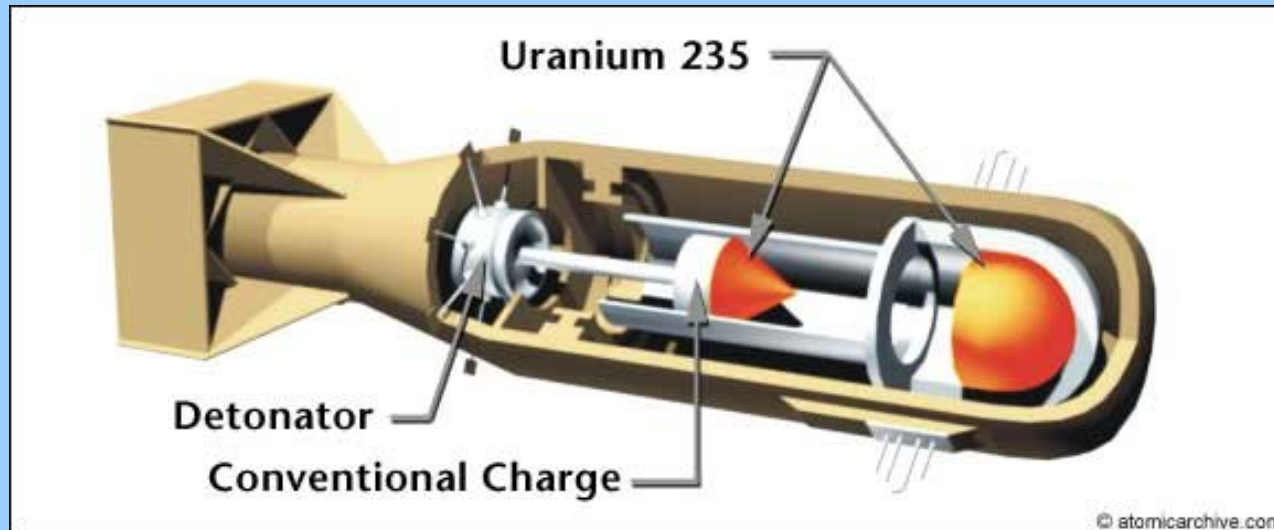
# Enriched Uranium



# Manhattan Project, 1945



# Hiroshima-August 6, 1945



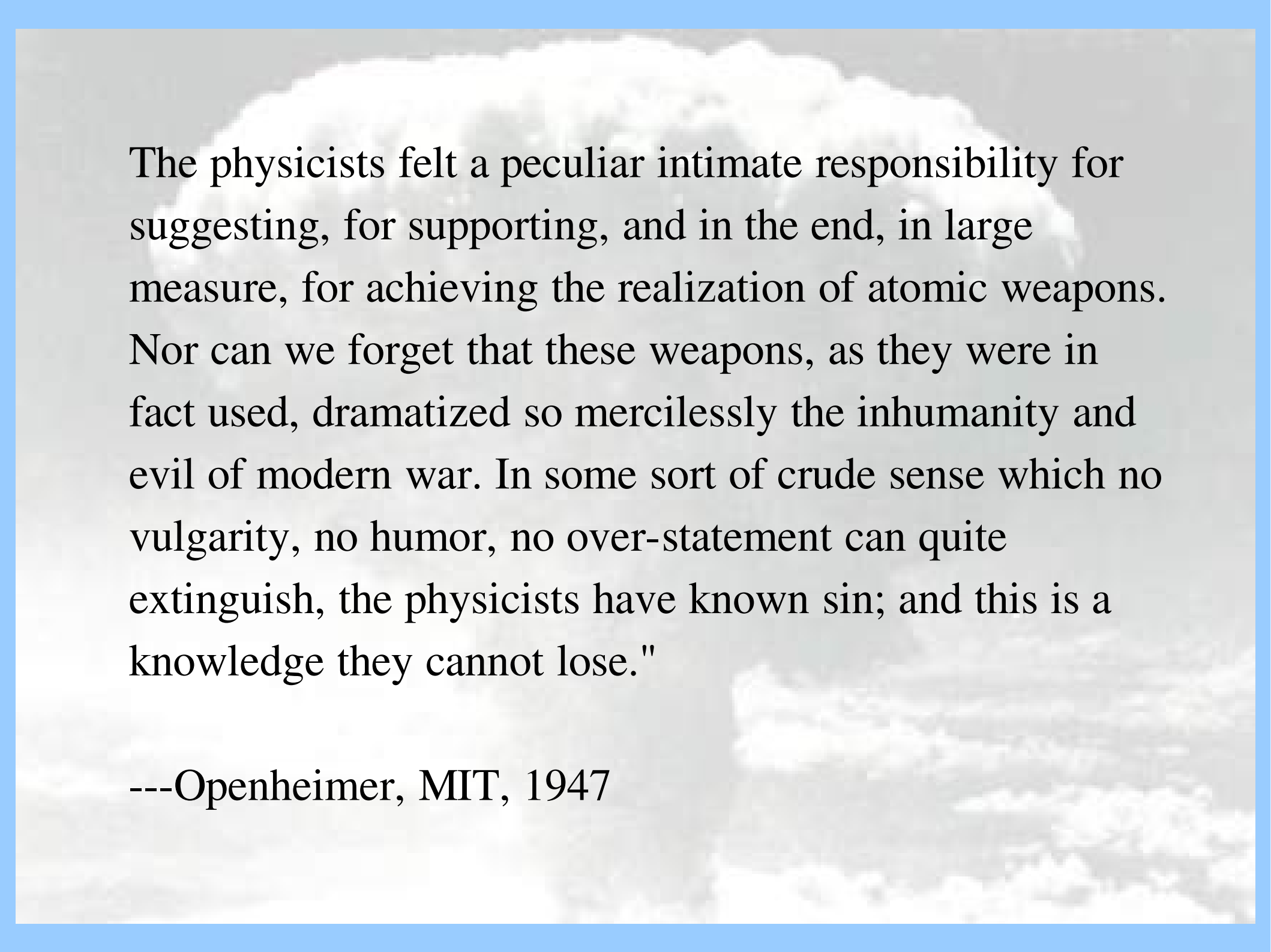


A wood-frame house exposed to a nuclear blast at the Nevada Test Site on March 17, 1953. The house is 1,100 meters from ground zero. <http://atomicarchive.com>



# Hiroshima – what happened....

- A square mile was instantly obliterated with temperatures comparable to the surface of the sun (8000 F)
- Fires enveloped over a 5 square mile area
- 90,000 instantly died
- People close to ground zero died from extreme heat (less than a mile)
- People farther away died from shock blasts (1 to 2 miles away)
- People farther away died of radiation poisoning (2 to 4 miles away)
- a “black rain” fell for three hours after the explosion
- About 250,000 died due to radiation effects within 5 years of the blast
- general malaise, fatigue, headaches, loss of appetite, nausea, vomiting, diarrhea, fever, abnormally low white blood cell count, bloody discharge, anemia, loss of hair, and aggressive cancers
- This bomb only had a 2% efficiency, later bombs would be 1000x larger (15 ktons of TNT vs. 15 Mtons of TNT)

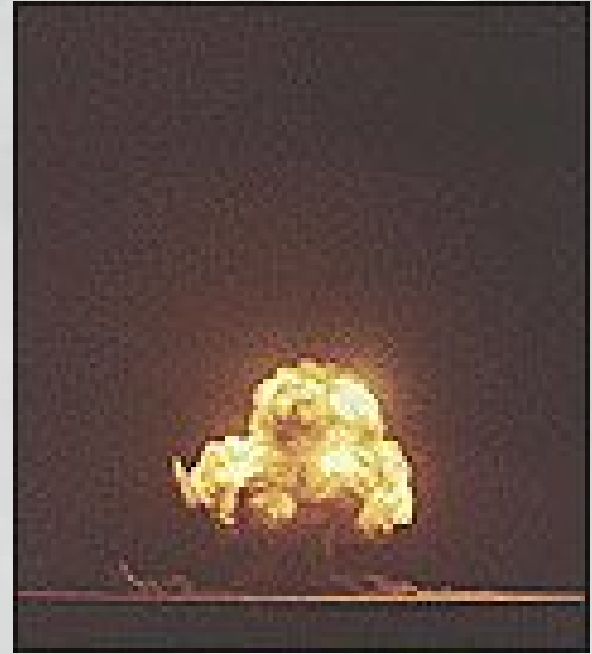


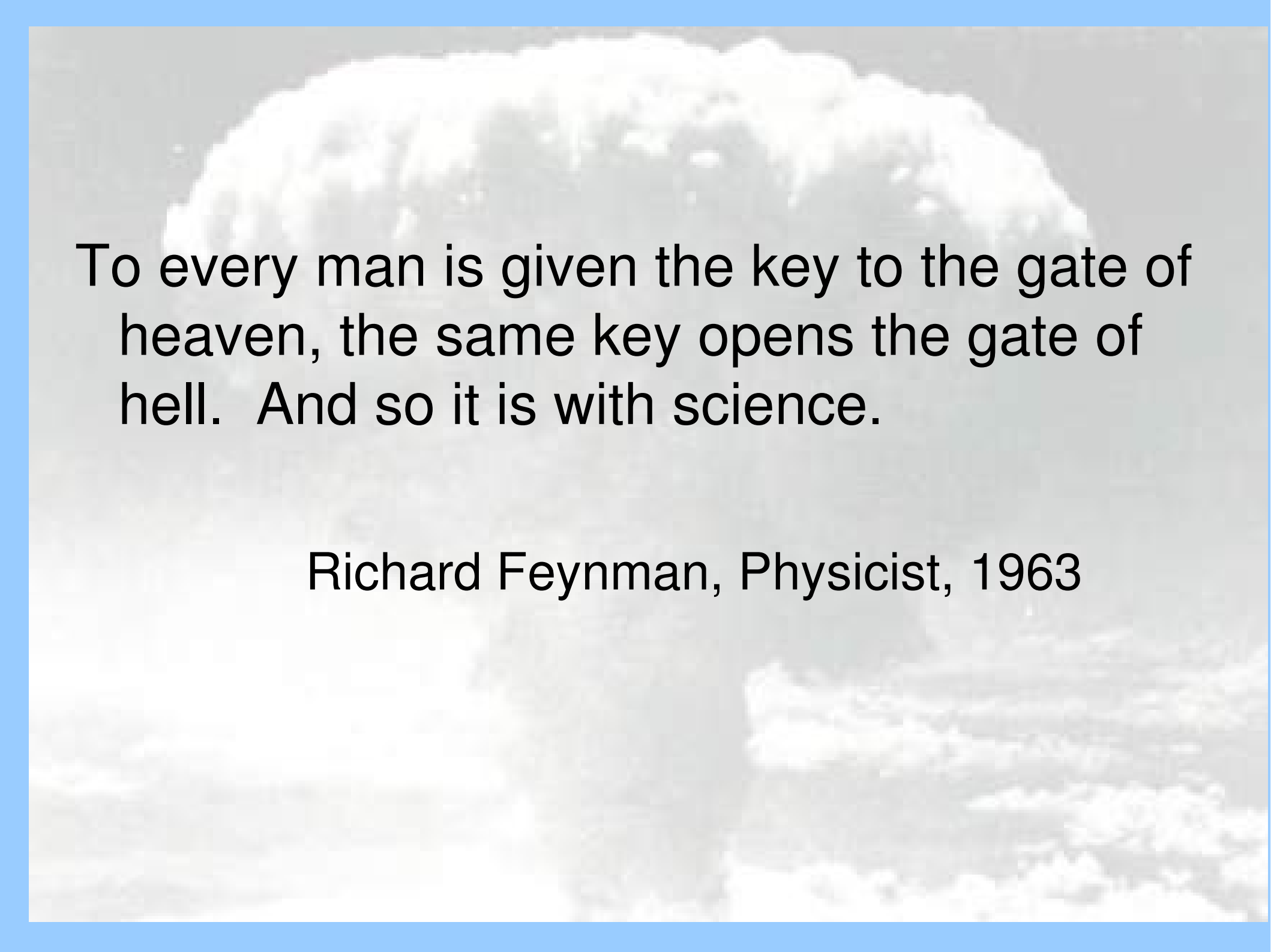
The physicists felt a peculiar intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no over-statement can quite extinguish, the physicists have known sin; and this is a knowledge they cannot lose."

---Openheimer, MIT, 1947

"...that being a physicist, on a planet where the smartest animals hate being alive so much, means never having to say you're sorry."

--Kurt Vonnegut,  
*Timequake, 1997*





To every man is given the key to the gate of heaven, the same key opens the gate of hell. And so it is with science.

Richard Feynman, Physicist, 1963



"Well, now we're  
all sons of bitches"  
--Kenneth  
Bainbridge



Oppenheimer, "the father of the scientists"

I owe my life to the fact that I was in the toilet. The morning of August 6 I got out of bed at about eight o'clock... How many seconds later it happened I can't say, but all of a sudden there was a blow to my head, and everything went dark. I was in agony; amid a hail of sound I heard my own cry distinctly.

--*Hara Tamiki, Summer Flowers*



The churning yellow smoke thinned to reveal Hiroshima: buildings split, bridges fallen, packed streetcars burned, an endless heap of rubble and embers.

Soon a procession of the naked, crying, walking in bunches, trampling on brain matter: charred clothes about waists, skin hanging like rags from arms raised to breasts.

-- *Togi Sankichi, Poems of the Atomic Bomb*

The first atomic bomb struck squarely in the centre of Hiroshima on August 6 with a flash and concussion that to the Super-Fortress crew ten miles away had the effect of the close explosion of anti-aircraft artillery. Colonel Paul W. Tibbitts, who piloted the 'plane, and Captain William S. Parsons, a United States Navy Ordnance expert, described the explosion as tremendous and awe-inspiring.

"It was hard to believe what we saw," said Colonel Tibbitts. Colonel Tibbitts was awarded the Distinguished Flying Medal immediately he returned from the raid. He said the trip out to the target was uneventful. The bomb was released by direct vision.

From *The Guardian*, August 8th, 1945

<http://century.guardian.co.uk/1940-1949/Story/0,,127716,00.html>

