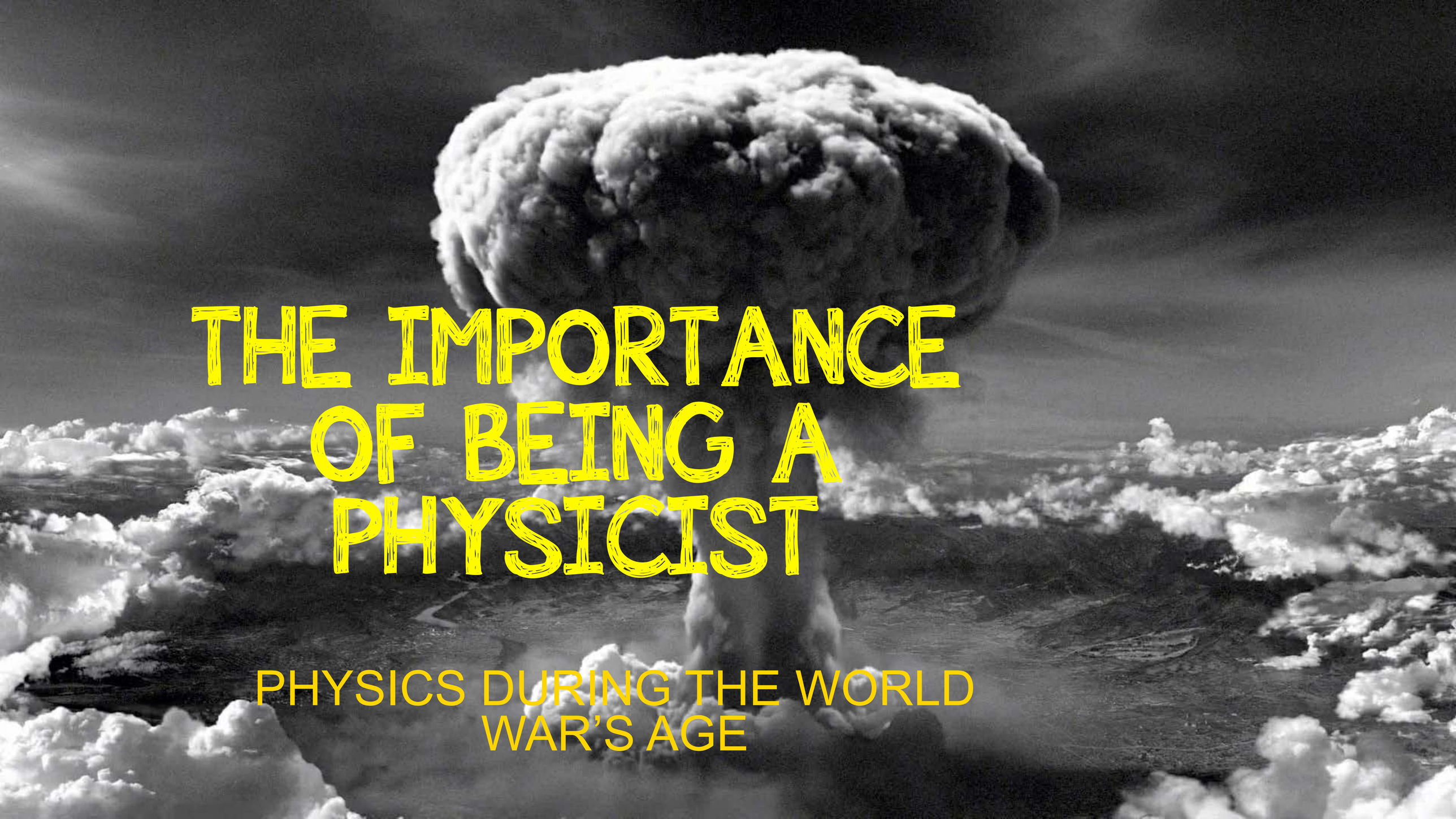


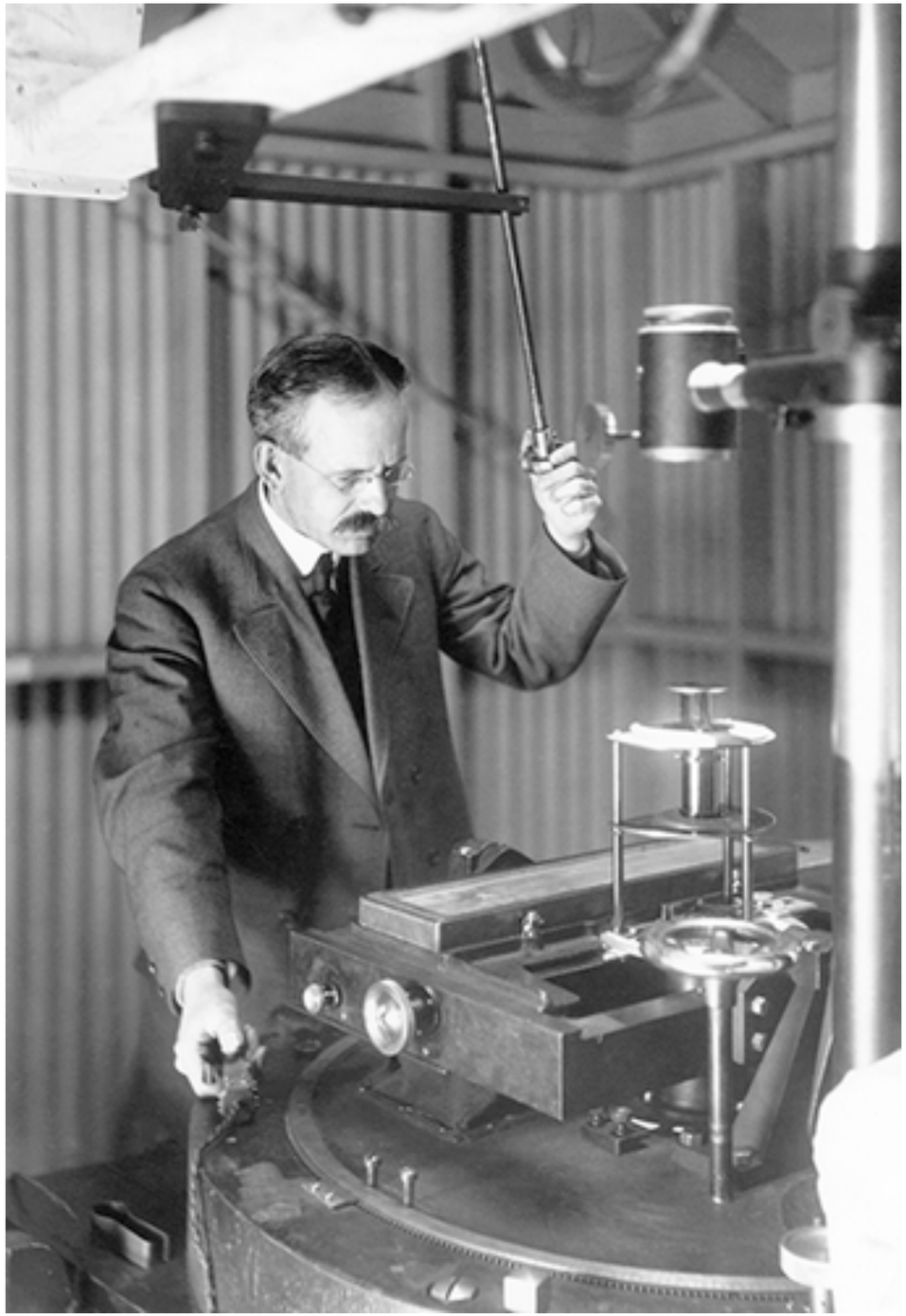
THE IMPORTANCE OF BEING A PHYSICIST

PHYSICS DURING THE WORLD WAR'S AGE

SCIENTIFIC PREPARATIONS FOR WAR

ON HOW THE GREAT WAR CHANGED THE IMPORTANCE OF SCIENCE.

The scientific and technological researches of US scientists begun shortly after the outbreak of war in Europe. After the Lusitania's shipwreck in 1915, Edison suggested the creation of a special committee of scientists. In 1916 George Ellery Hale founded the NAS. In 1917, when US entered in First World War, NRC was created to coordinate fundamental and applied researches for defense purposes.



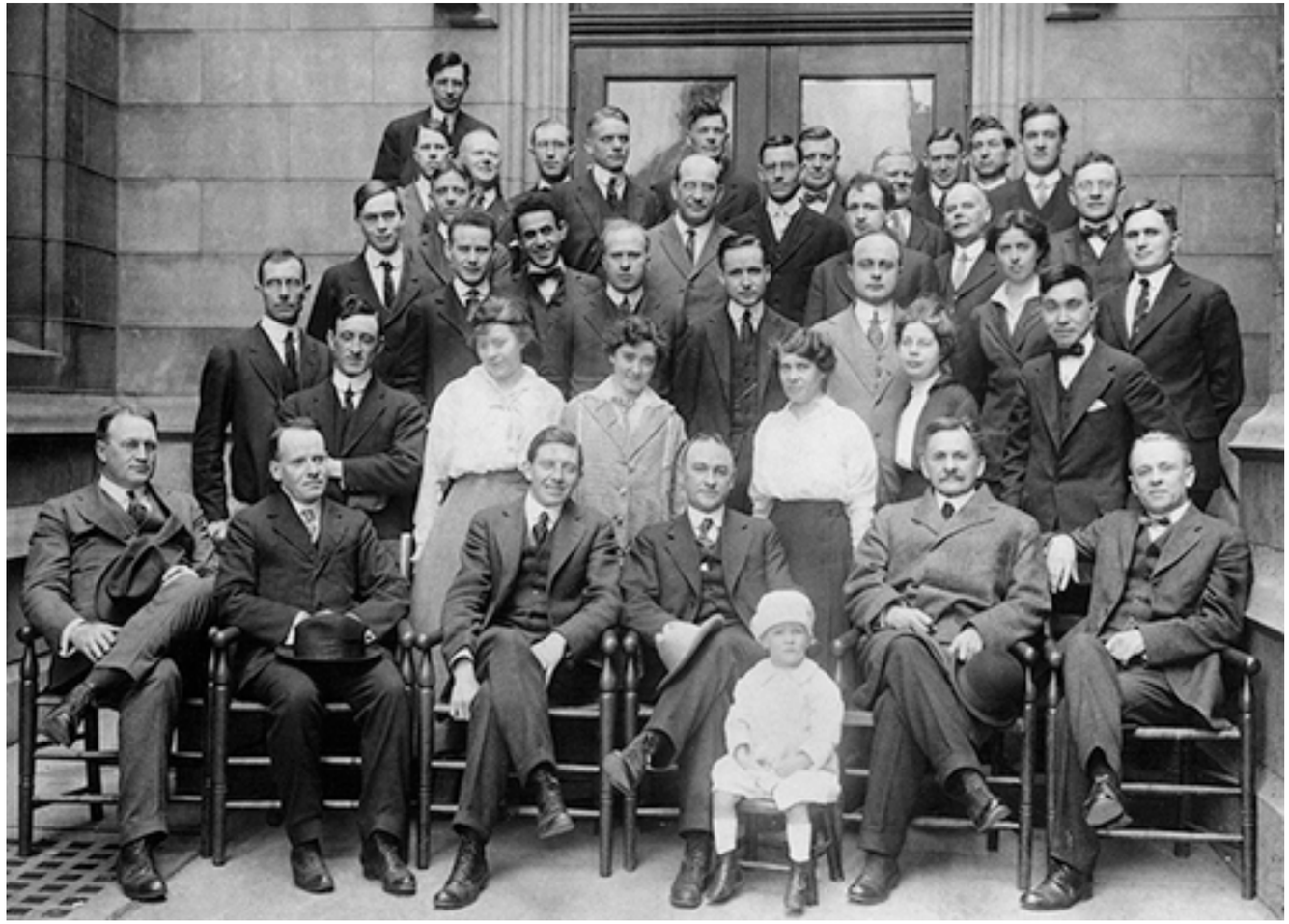
GEORGE ELLERY HALE AT THE MOUNT WILSON OBSERVATORY.

"The brains ... that today are necessary to the output of munitions were needed yesterday, and will be needed again tomorrow, for the arts of peace."

GEORGE ELLERY HALE

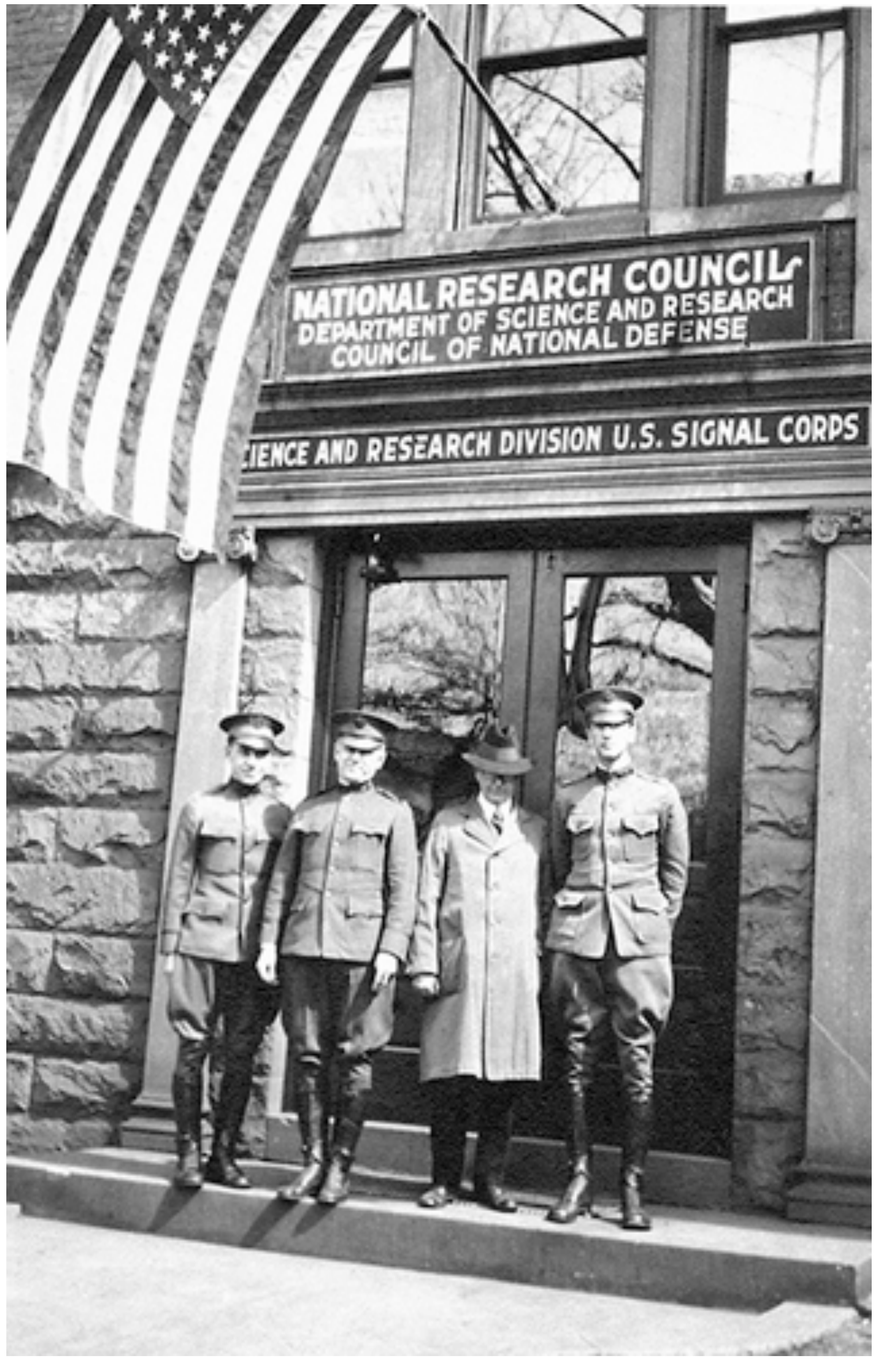
The centralized coordination of research through the NRC followed the example of European academies and organizations. Hale had personal contacts with foreign scientists, among them Ernest Rutherford, that informed him about their researches on submarine detection technology.

Hale was the mastermind of NRC, but the physicist Robert Millikan shaped much of its wartime work. Millikan and Hale had worked at the University of Chicago, where Albert Michelson was the head of Ryerson Physical Laboratory.



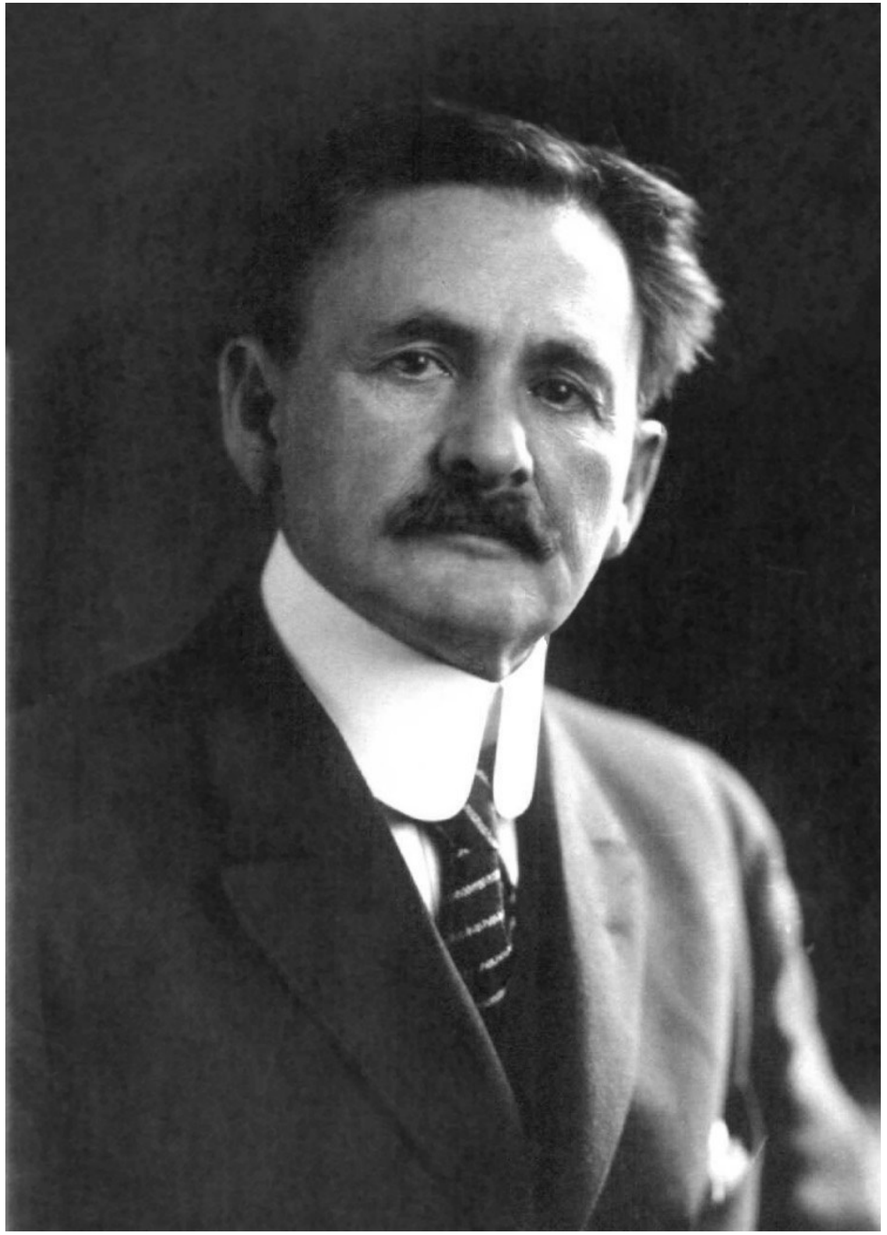
MEMBER OF THE RYERSON PHYSICAL LABORATORY

The main research of Physical Science Committee (the physics section of NRC) was the development of method for submarine detection. Millikan, the head of physic section, established a physical group that included Vannevar Bush (the head of World War II scientific research). Based on the findings of British and French scientists, the physician Max Mason proposed an improved detector in July 1917. The physical improvement involved a particular geometrical arrangement of listening tubes, the M-V tubes(Multiple Variable).



Albert Abraham Michelson

- Both military and scientific training
- Head of Millikan's laboratory in Chicago
- First US Nobel prize in Physics
- Joined the US Naval Reserve in 1918
- Led the research on improved optical range finders



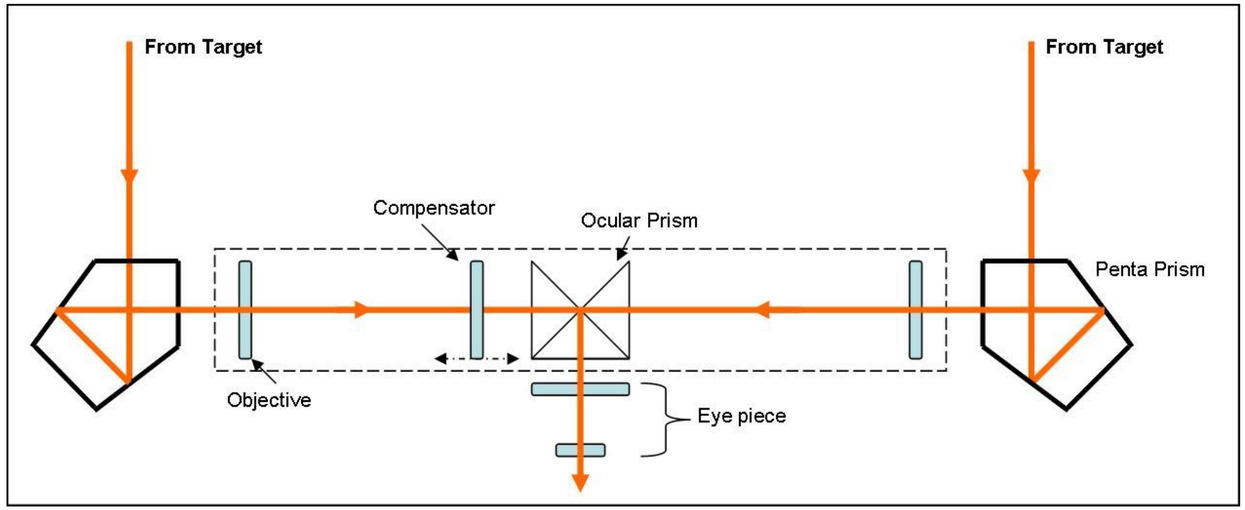
Optical range finders

- Before the War, high-quality optical glasses were imported from Germany

- During and after the War, began an intensive phase of testing and development in US that led to self-supply

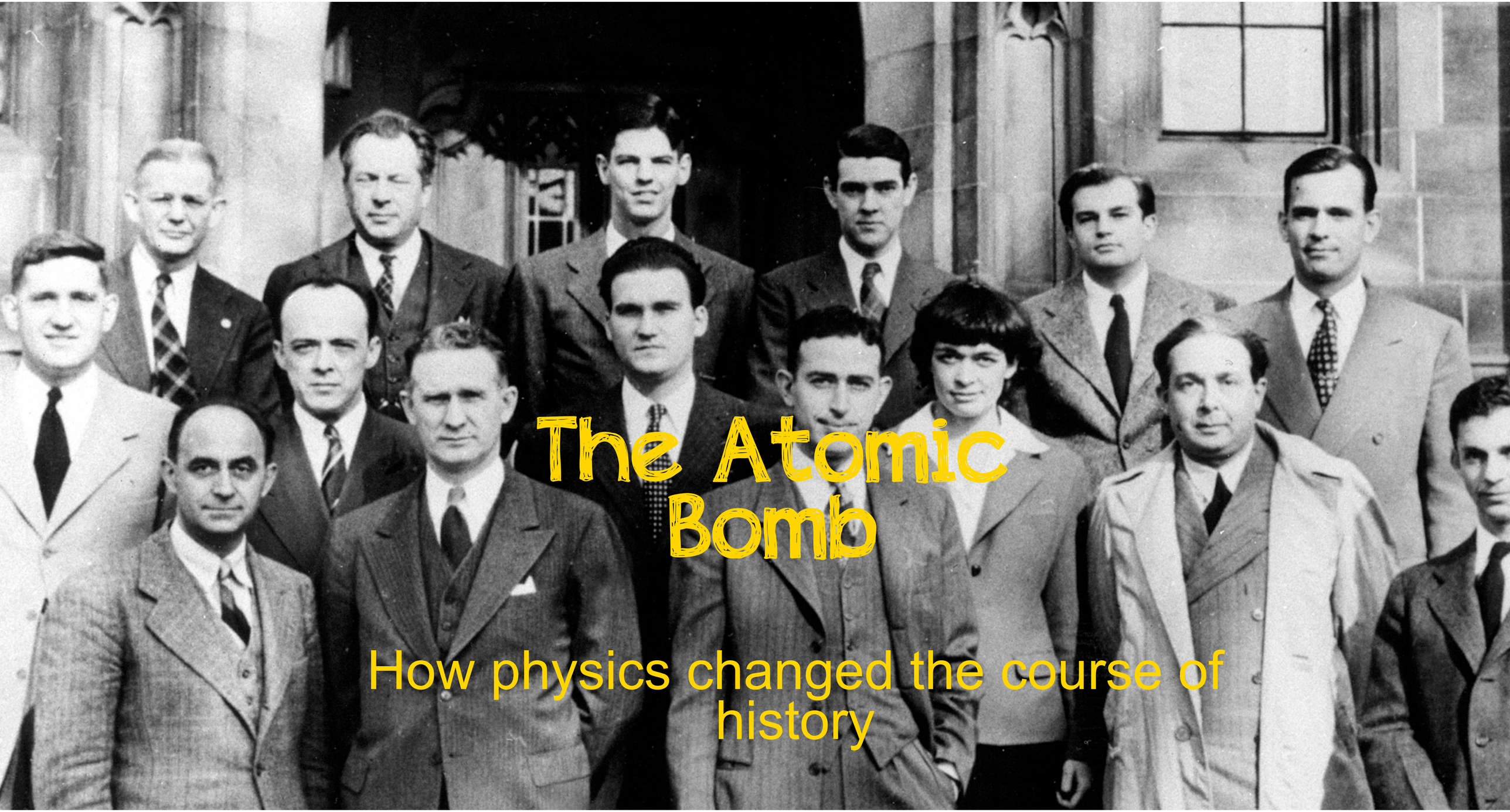
Optical range finders

- Based on the principle of optical coincidence
- Composed by two offset telescopes
- The image is unified in the eye of the observer
- The offset caused by parallax is corrected by deflecting prisms



Physics legacy after WWI

- Physics didn’t have a profound effect on the course of the war
- But it was underlined its importance during wartime and not only
- An entanglement between science, industry and military research started
- It began to lead an important role in research, wartime organization and production of reports
- Important physicists became political advisors (especially during WWII), science administrators and policymakers



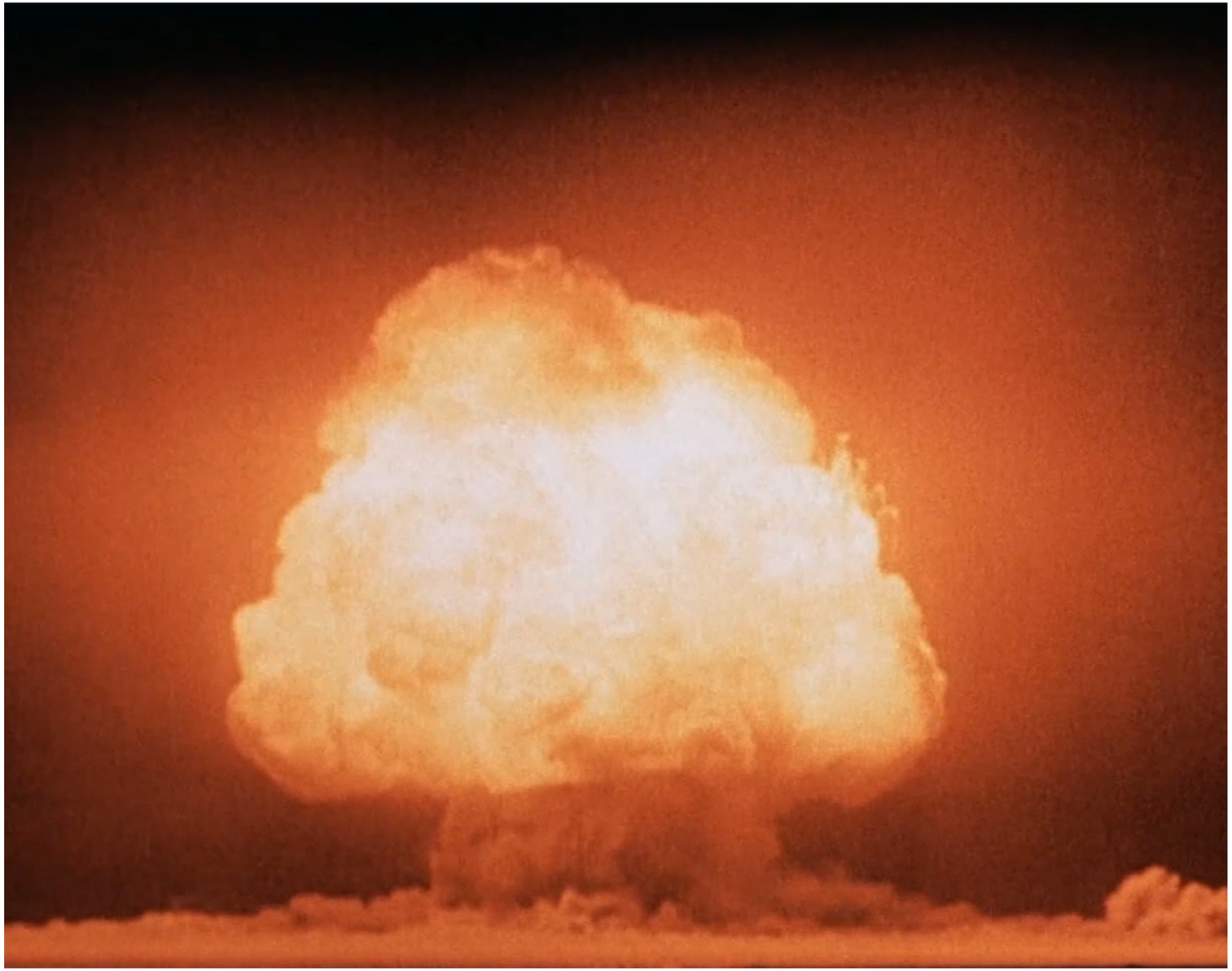
The Atomic Bomb

How physics changed the course of history

The Trinity test

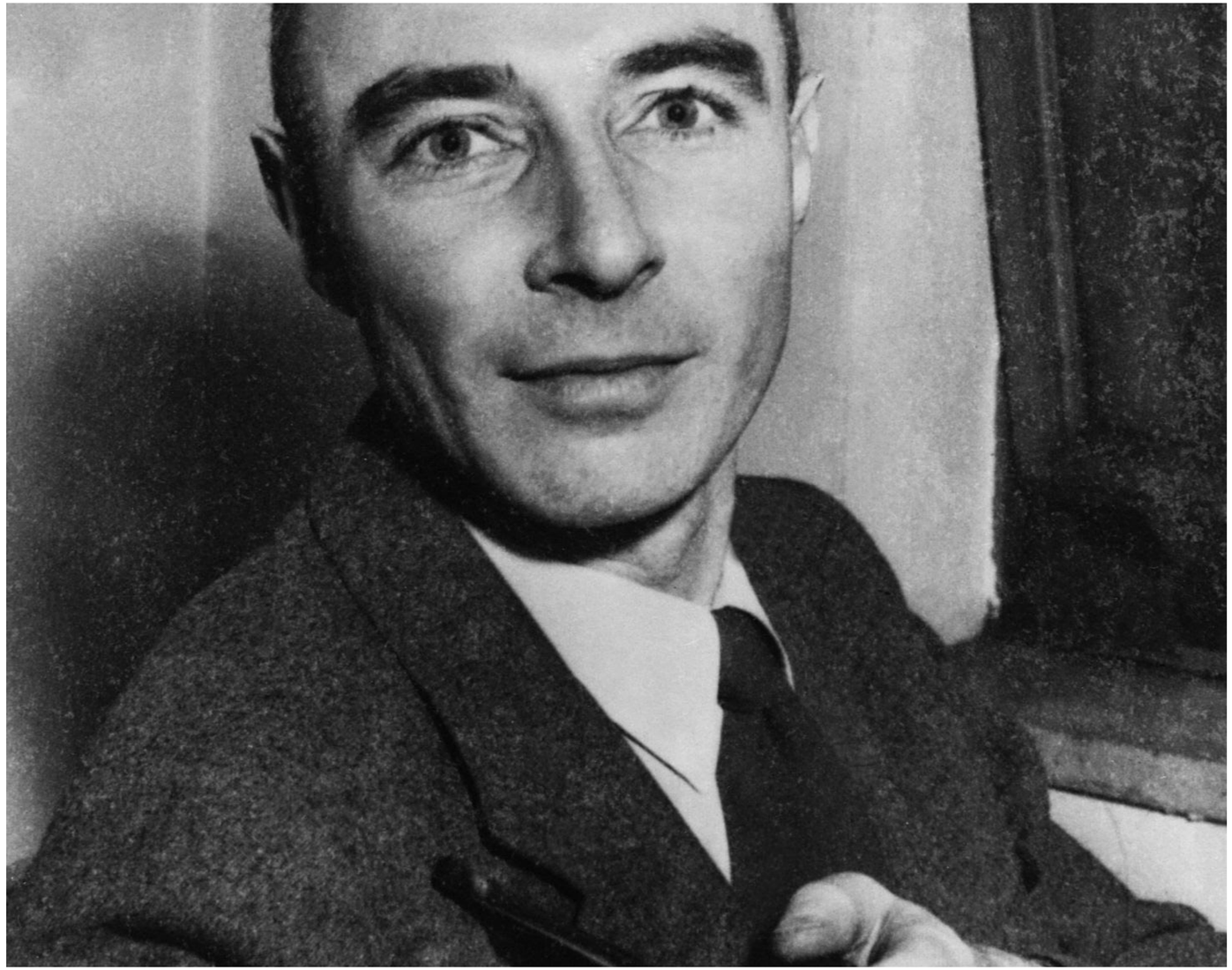
It was the first test for a nuclear weapon and was carried out on July 16, 1945 by the United States of America during Manhattan Project.

The test involved a plutonium bomb, similar to the one that hit Hiroshima



Julius Robert Oppenheimer

Is an American physicist, author of some important contributions in the field of modern physics, in particular for the quantum mechanics. His name is mainly linked to the construction of the first atomic bomb as part of the Manhattan Project.

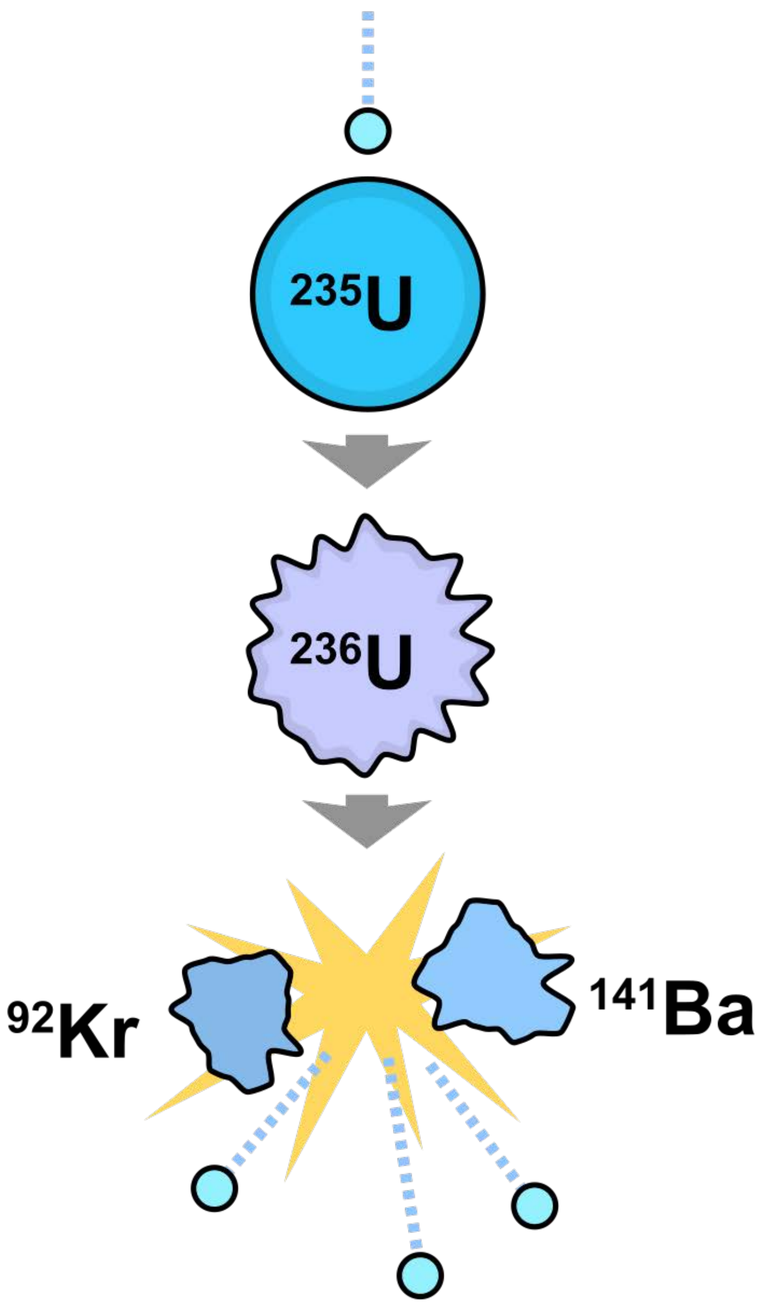


At Columbia University, physicist Enrico Fermi built a prototype nuclear reactor, using various configurations of graphite and uranium. Vannevar Bush organized the National Defense Research Committee in 1940 to mobilize US scientific resources in support of the war effort.

BUT HOW DOES A NUCLEAR BOMB WORK?

NUCLEAR FISSION

Nuclear fission was discovered in 1938 by Otto Hahn, Fritz Strassman and Lisa Meitner. In physics and chemistry nuclear fission is a nuclear reaction process. Is a subdivision of an heavy atomic nucleus (uranium, plutonium or thorium) in two smaller fragments of roughly equal mass. The fission often produces gamma photons, and releases a large amount of energy that drives the explosion of a nuclear weapon



I KNOW NOT WITH WHAT WEAPONS THIRD WORLD WAR WILL BE FOUGHT, BUT FOURTH WORLD WAR WILL BE FOUGHT WITH STICKS AND STONES

ALBERT EINSTEIN