atoms would explode, or make them do it where the released energy could be made to do useful work. This was the situation at the beginning of the war. Our scientists were almost on the verge of this discovery. But so were the Germans. The race for solving the problem of using the energy locked up in the quiet atoms has been won by our side, and just in time.

Science News Letter, August 18, 1945

PHYSICS

Rapid Assembling

Atomic bomb parts are made to assemble themselves just before detonation. One method would be shooting one part from a gun against a target which is the second part.

➤ TO PREVENT the atomic bomb which wrecked Japanese cities from going off prematurely in a harmless fizzle, the bomb was constructed in such a way that its various parts would assemble themselves at the moment when the explosion was desired. This is revealed in a technical report by Dr. H. D. Smyth, of Princeton University, recently released by the War Department.

This rapid assembling can be done by shooting one part as a projectile from a gun against a target which is the second part of the bomb.

Weight of the projectile, its speed and the caliber of the gun need not be far from the range of standard ordnance practice. But new problems were introduced by the fact that it was necessary to have sudden and perfect contact between projectile and target and by the fact that gun, projectile and target all had to be "portable."

The reason why assembly could not be done until the very last minute is because of what is known as the "chain reaction." When you light a fire, Dr. Smyth explains, you set in motion such a chain reaction. The match releases enough energy to ignite some fuel which releases more heat to set fire to more fuel and so on.

If atomic energy is to be practical for large-scale use, such chain reactions must be set up. This is not always easy. It all depends on whether more neutrons are produced by the splitting of the atoms than are lost through escape, through capture without atom-smashing by the uranium atoms, or by capture without smashing by impurities. Neutrons released by atom splitting of uranium-235 have very high speeds. To prevent the escape, they must be slowed down.

In a bomb, while it is necessary to have this chain reaction, the chain must not be started too soon. With all the conditions made purposely favorable for a chain reaction, precautions must be taken to prevent its being set off accidentally. Cosmic rays with which we are constantly being bombarded from outside space could set it off. So could the spontaneous splitting of an atom, or reactions in impurities.

It is for this reason that all the parts of the bomb must not be assembled until the moment when it is ready for explosion.

As used in combat, the bomb is detonated at such a height above the ground that the blast effect against structures will be at a maximum and the radioactive products will be spread in a cloud and carried upward in an ascending column of hot air and dispersed harmlessly over a wide area.

Science News Letter, August 18, 1945

PHYSICS

Idea for Plutonium Bomb Credited to Dr. Lawrence

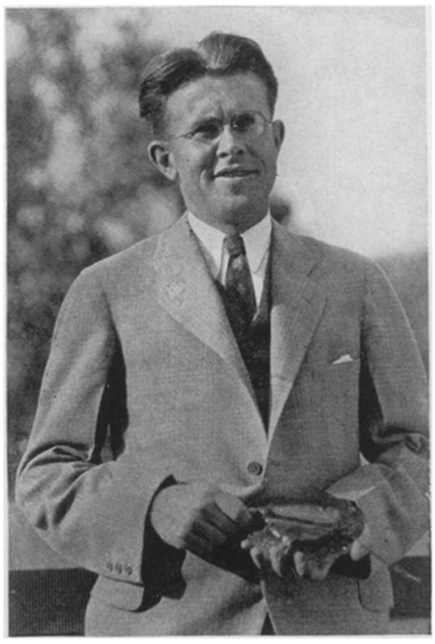
➤ IDEA for the atomic bomb using the new element plutonium is credited to Dr. E. O. Lawrence, of the University of California, in the official report written by Dr. H. D. Smyth, of Princeton University, and released by the War Department.

In a memorandum submitted to a committee of the National Academy of Sciences in May, 1941, seven months before Pearl Harbor, Dr. Lawrence included what the report terms "an important idea not specifically emphasized by others, namely, the production of large quantities of plutonium for use in a bomb." Dr. Lawrence is quoted as saying:

"If a chain reaction with unseparated isotopes is achieved, it may be allowed to proceed violently for a period of time for the express purpose of manufacturing element 94 in substantial amounts . . .

"If large amounts of element 94 were available it is likely that a chain reaction with fast neutrons could be produced. In such a reaction the energy would be released at an explosive rate which might be described as a 'super bomb.' "

Science News Letter, August 18, 1945



BEGINNING—Prof. E. O. Lawrence, of the University of California, holds in his hands the small beginning of the cyclotron.

PUBLIC HEALTH

Polio Cases Increase Slightly Over Nation

➤ INFANTILE paralysis cases increased slightly throughout the nation for the week ending Aug. 4 but the total number, 476, was only just over half the total for the corresponding week last year when cases mounted to 932.

The week's increase of 22 cases over the previous week was much less than the increase of 175 cases in the corresponding week last year.

Cases will probably continue to increase for another three or four weeks before beginning to decline. The peak of the rise during the epidemic last year was reached the week ending Sept. 2.

States reporting biggest increases for the week ending Aug. 4 were New Jersey, Pennsylvania, Illinois and New York. Decreases were reported from Virginia, Tennessee and Texas.

Science News Letter, August 18, 1945