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Witness the Trinity test through Lab artifacts

Get a close-up look at one of the Atomic Age architects and the novel substance created at the site

By the National Security Research Center staff

July 16 marks the 77th anniversary of the Trinity test, conducted in a desert in New Mexico. The test subject, an atomic bomb called The Gadget, was successfully detonated from a 100-foot steel tower. This event marks the commencement of the Atomic Age, a new era where fission capabilities could be employed for national security purposes.

Shortly after the Trinity test, two Los Alamos-created atomic weapons were released above Japan, helping to end the world's bloodiest conflict just weeks later.

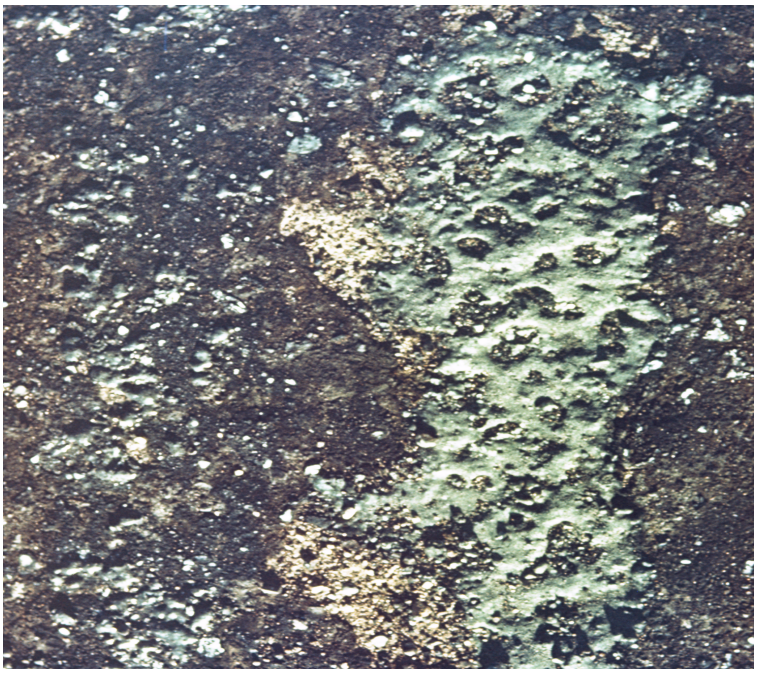
"Trinity was one of the greatest scientific experiments ever," said NSRC Senior Historian **Alan Carr** said. "Los Alamos scientists changed the world forever on that day. Not only was it the dawn of the Atomic Age, but also the beginning of the Lab's eight decades of cutting-edge science and its national security charge."

To preserve this event, and to continue to learn more about this critical moment in history, the National Security Research Center (NSRC) curates a collection of photographs, films, notes, unclassified artifacts and numerous other materials related to the science of the test. Notably, the collection includes a novel material that formed at the site, trinitite, and artifacts from one of the intriguing scientists present at the test, Enrico Fermi.

Find out more about a few of the most fascinating objects below, which are on display in the NSRC.

"Although these relics related to the Trinity test are unclassified, they're located in a classified area," said **Danny Alcazar**, NSRC archivist. "It's great to be able to share their images with the Lab staff. They represent an event that is arguably one of the greatest scientific accomplishments of all time, plus remind us that the organization we work for has an incredible legacy."

Trinitite



https://drive.google.com/file/d/1_w-mTdzxD777NmNzt0Osinmj7Q62tdLx/view?usp=sharing

caption: Trinitite is a glassy substance that formed as heat from the 1945 Trinity test fused the desert sand.

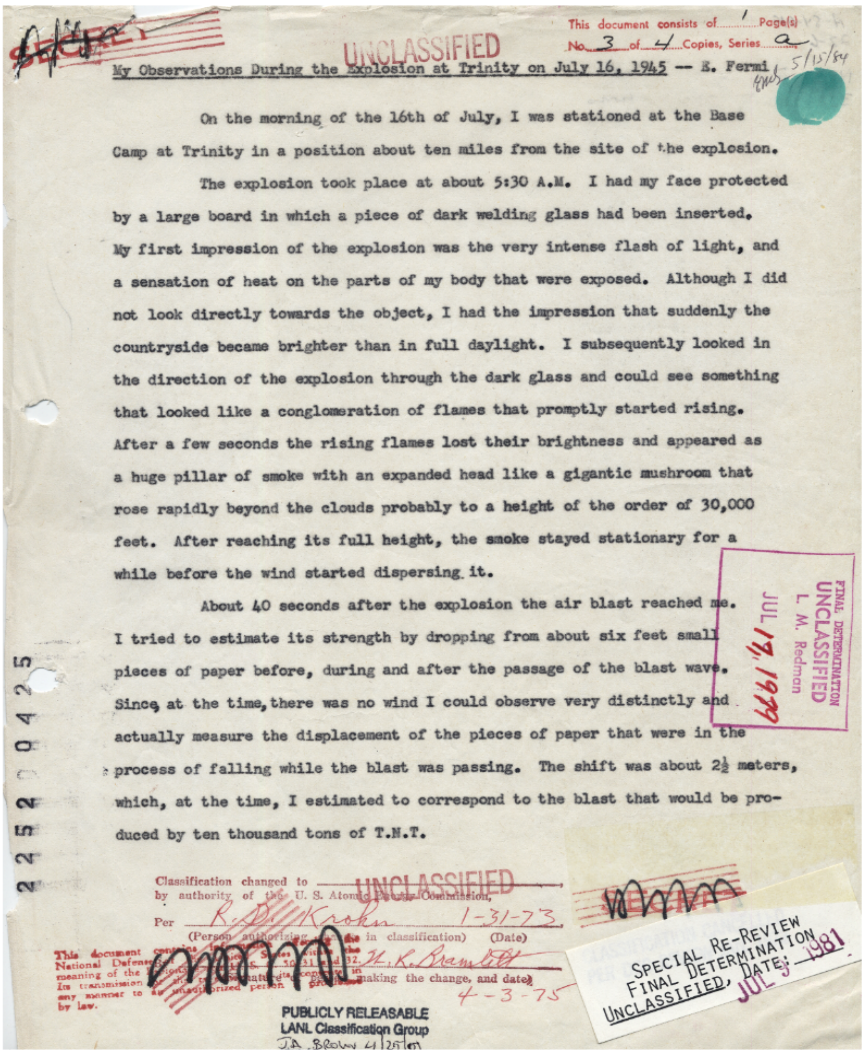
Also called atomsite or Alamogordo glass (after the nearby city), trinitite is a glass-like material formed when the intense energy of the Trinity test transformed the surrounding sand and other materials. This fascinating new substance, samples of which can also be found in well-known museums worldwide, gives us a direct connection to this momentous event.

Trinitite formed from the distinct conditions created by The Gadget's detonation. The immense force of the explosion and the 15,000-degree Fahrenheit heat combined with the surrounding desert sand to form a jade-green glass.

In his 2021 article "Thirty Minutes Before Dawn," Carr writes that "the radioactive material would attach itself to the dirt: smaller particles would rise into the atmosphere in the form of smoke and heavier, molten particles would quickly fall back to the surface. Once on the surface, the molten material solidified as temperatures cooled, forming the greenish, glasslike mineral trinitite."

This unique substance has been collected by visitors to the Trinity site as souvenirs, but this is now prohibited. Actor Charlton Heston, who was a World War II veteran and Lab-clearance holder, was given a piece of trinite, which he called his son's birthstone.

Fermi's notes



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My Observations During the Explosion at Trinity on July 16, 1945 — E. Fermi

On the morning of the 16th of July, I was stationed at the Base Camp at Trinity in a position about ten miles from the site of the explosion.

The explosion took place at about 5:30 A.M. I had my face protected by a large board in which a piece of dark welding glass had been inserted. My first impression of the explosion was the very intense flash of light, and a sensation of heat on the parts of my body that were exposed. Although I did not look directly towards the object, I had the impression that suddenly the countryside became brighter than in full daylight. I subsequently looked in the direction of the explosion through the dark glass and could see something that looked like a conglomeration of flames that promptly started rising. After a few seconds the rising flames lost their brightness and appeared as a huge pillar of smoke with an expanded head like a gigantic mushroom that rose rapidly beyond the clouds probably to a height of the order of 30,000 feet. After reaching its full height, the smoke stayed stationary for a while before the wind started dispersing it.

About 40 seconds after the explosion the air blast reached me. I tried to estimate its strength by dropping from about six feet small pieces of paper before, during and after the passage of the blast wave. Since at the time, there was no wind I could observe very distinctly and actually measure the displacement of the pieces of paper that were in the process of falling while the blast was passing. The shift was about 2½ meters, which, at the time, I estimated to correspond to the blast that would be produced by ten thousand tons of T.N.T.

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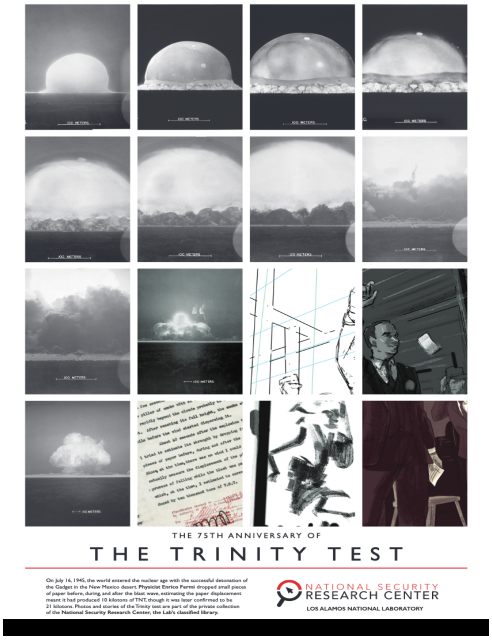
https://int.lanl.gov/news/_assets/pdfs/2019/0716-fermi-observations.pdf

Physicist and Nobel laureate Enrico Fermi was among the scientists who witnessed the Trinity test. His notes **(picture above)**, which are part of the NSRC's unclassified collections, give us insight into what he was thinking during and after the test.

"Fermi's observations aren't dated, but were likely written shortly after the test," Carr said. "They're fascinating and just one of quite literally thousands of incredible pieces of the Lab's history that we have in the NSRC."

Fermi conducted a small experiment of his own while the test took place, estimating the output of the explosion by means of simple materials he had at hand: "About 40 seconds after the explosion, the airblast reached me. I tried to estimate its strength by dropping from about six feet small pieces of paper before, during, and after the passage of the blast wave…The shift was about 2½ meters, which, at the time, I estimated to correspond to the blast that would be produced by ten thousand tons of TNT," he wrote.

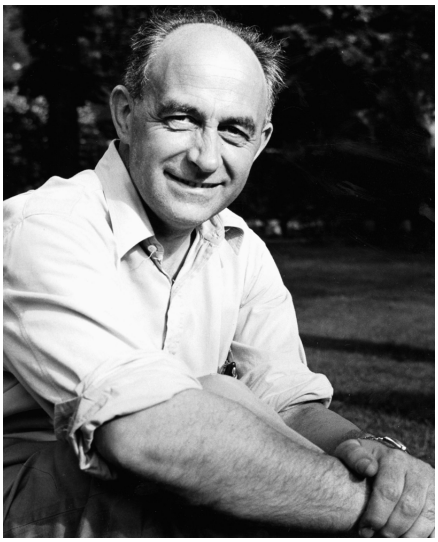
The test proved even more immense: “At the equivalent of 21,000 tons of TNT, the blast was larger than Fermi’s estimate,” Carr said, adding, “but he wasn’t that far off, which is pretty incredible considering he only had a piece of paper.”



https://int-nsrc.lanl.gov/assets/posters/the-trinity-test.pdf

caption: The NSRC illustrated a poster depicting Fermi’s informal experiment, which can be printed and displayed.

Fermi’s one-of-a-kind portrait, badge photo



Caption: Harold Agnew, a scientist, Enrico Fermi's student, and third Lab director, took this photo of Fermi. Agnew declared it one of the best photos of Fermi ever taken.
https://drive.google.com/file/d/1XyUsKNy3uK5udMqsJDhue3A65IPdtepQ/view?usp=sharing

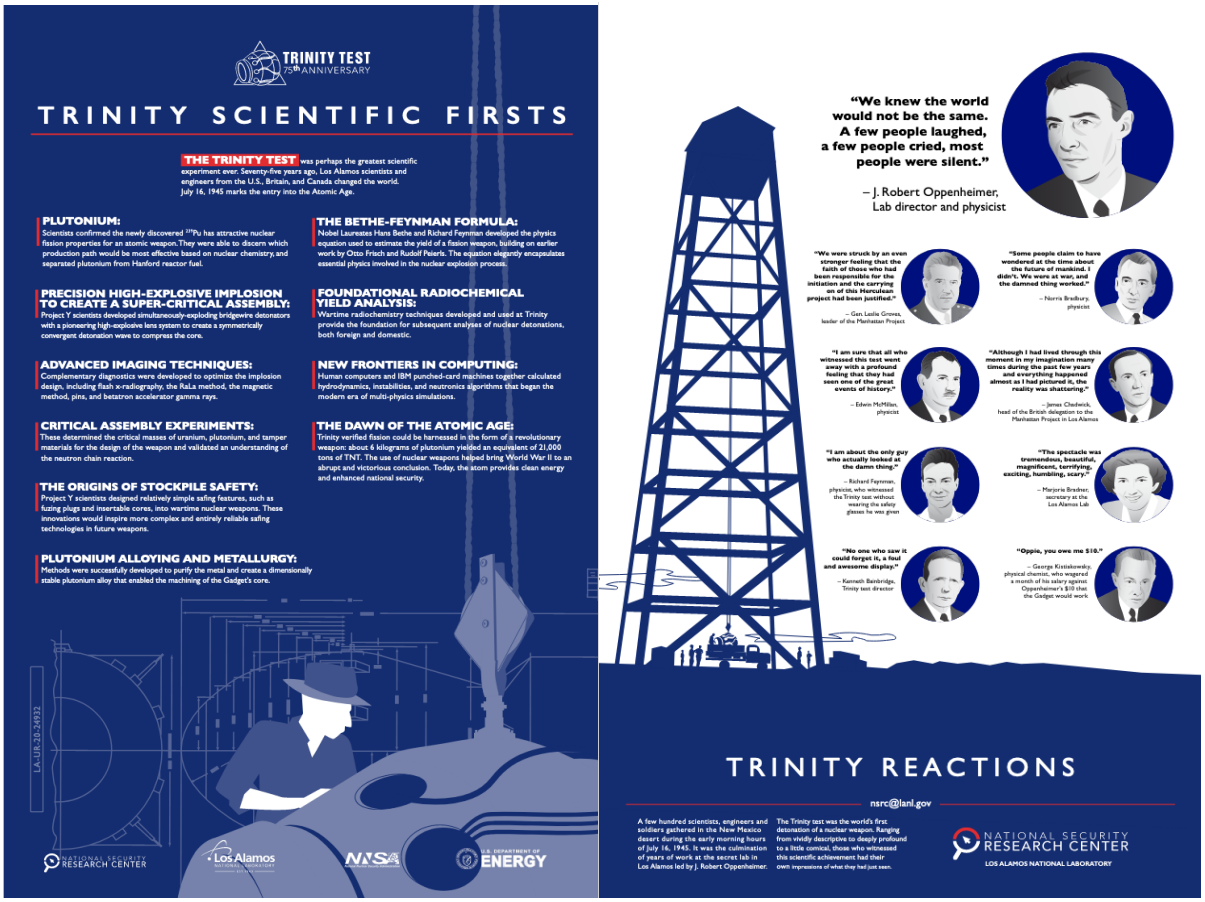
The NSRC's collections includes a one-of-a-kind photo of Fermi. The black-and-white portrait was taken by his fellow Manhattan Project scientist and student Harold Agnew. Agnew would go on to become the Lab's third Director. The portrait, along with hundreds of never-before-seen photos and documents, were a part of Agnew's personal collections and were recently donated to the NSRC by Agnew's son.

Caption: Enrico Fermi's badge photo.
https://drive.google.com/file/d/1ouAXmCbOiPtkitiDkbtP8kfLLNR9SeID/view?usp=sharing

Meanwhile, staff badge photos from the Manhattan Project served the purpose of maintaining security at the secret laboratory in Los Alamos. Today, they preserve the faces of the scientists, among others, who brought the world into the Atomic Age. Fermi's badge photo gives us a glimpse of the human side of a brilliant mind who, as a contributor to the Manhattan Project and creator of the world's first nuclear reactor, has been called the "architect of the nuclear age."

Looking for more?

- To learn more about the Trinity test and the Lab's fascinating history, check out stories, photos, and videos at int-nsrc.lanl.gov.
- Immerse yourself in the sounds, voices, and images of the events and history surrounding the Trinity test with these NSRC-created films: *Trinity Test 75th Anniversary*, *The Science of Trinity*, *Overview of the Trinity Test* and *Trinity and the British Mission*.
- Commemorative posters can be downloaded, printed and displayed:



caption: Seventy-seven years ago the world entered the Atomic Age with the successful detonation of The Gadget in the New Mexico desert known as the Trinity test. You can print your own commemorative poster of Trinity's scientific firsts and scientists' reactions to the successful detonation.