

Secret Cities

Manhattan Project National Historical Park preserves the classified sites where the Atomic Age dawned

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- By: Reed Karaim

On July 16, 1945, at 5:30 in the morning, a light bloomed in the New Mexico desert that was so bright it temporarily blinded a man standing 20 miles away. Other witnesses, better prepared, later described what they saw with a kind of awed reverence. The brilliant physicist Isidor Isaac Rabi wrote, “Suddenly, there was an enormous flash of light, the brightest light I have ever seen or that I think anyone has ever seen. It blasted; it pounced; it bored its way right through you ... [then] there was an enormous ball of fire which grew and grew and it rolled as it grew; it went up into the air, in yellow flashes and into scarlet and green. It looked menacing. It seemed to come toward one. A new thing had just been born.”

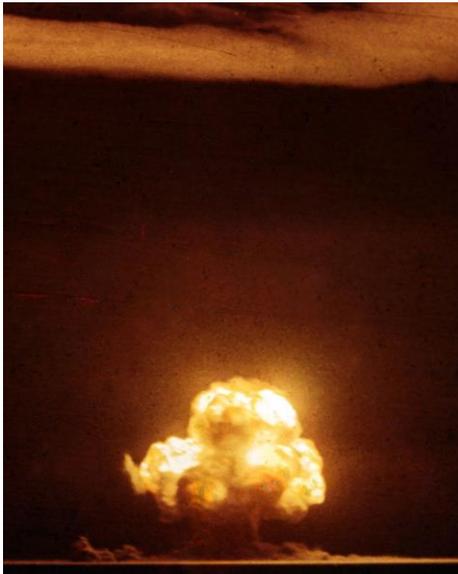


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The Trinity explosion in 1945.

A memorial marker at the Trinity test site.

That new thing was the first-ever manmade nuclear explosion. Recognizing its world-changing significance, J. Robert Oppenheimer, the physicist who led its development, had given the test a name with religious overtones: “Trinity.”

Trinity would be followed in less than a month by the dropping of atomic bombs on the Japanese cities of Hiroshima and Nagasaki—killing more than 150,000 people, hastening the end of World War II, and forever cleaving history in two. Like all moments that signal the dawn of a new age, Trinity came to be seen, as Rabi forecast, as a beginning more than an end. Largely lost in the bomb’s dark shadow has been the monumental effort that led to its creation: the Manhattan Project, almost certainly the most ambitious research and industrial undertaking mounted by the human race to that day.

The Manhattan Project involved more than 600,000 people, including city planners, soldiers, construction workers, technicians, craftsmen, clerks, secretaries, teachers, doctors, and some of the brightest scientific minds of the time. Miles of America were cleared of farms and residences so that entire new cities could be built. Oak Ridge, Tennessee; Los Alamos, New Mexico; and Hanford, Washington sprung up and became full-fledged communities seemingly overnight, with schools and Boy Scout troops and weekend dances for the thousands of people who flocked to the jobs the cities offered—all without officially existing on any map. The project was both massive and top secret. Among the thousands of men and women who worked on it, only a relative handful knew what they were trying to achieve. Security was so tight that knowledge of the project was even kept from Vice President Harry S. Truman.

The United States was the only nation on Earth that could have pulled it off. No other country had both the intellectual resources (bolstered by the participation of British and other foreign scientists) and the industrial might. Yet as Richard Rhodes noted in the 25th anniversary edition of his definitive history book *The Making of the Atomic Bomb*, “More than seven decades after its conception ... the Manhattan Project is fading into myth.”

The [Manhattan Project National Historical Park](#) was created to make sure that doesn’t happen. The National Trust, along with the [National Parks Conservation Association](#), the [Atomic Heritage Foundation](#), and other organizations, played a key role in advocating for the park, which addresses the bomb’s tragic consequences as well as its creation. “Our purpose from the beginning was to say that this was a very important era in American history,” says Nancy Tinker, a National Trust senior field officer who helped lead the effort as part of the Trust’s [National Treasures](#) campaign. “It’s an opportunity to tell very complex parts of this story from everybody’s perspective.”

“Twenty-two thousand people were here. Probably about 100 of them knew what they were doing.”

-Ray Smith

Authorized in 2014 through an act of Congress and officially established in 2015, the park has units at Oak Ridge, Los Alamos, and Hanford. The three sites are central to the development of the atomic bomb, nuclear power, and a surprising number of inventions we count on today (including the field of nuclear medicine, which uses radiation for diagnosis and treatment). Among the three locations, the park provides a chance to explore the science and technology behind this massive operation, along with the lives of those who made it happen. Most important, it helps to preserve key facilities at all three sites, ensuring that an essential part of the American story—the world’s story, really—doesn’t disappear from view.

“National Park” may still conjure up images of towering mountains, verdant forests, and dizzying canyons, but the National Park Service has placed an increasing emphasis on reflecting the nation’s more diverse urban and industrial heritage. Regional Director Sue Masica, who oversees the new park, says it’s all part of the Park Service’s role as “the nation’s storyteller.”

As the United States cleaned up old sites from the Manhattan Project and the Cold War, many of the buildings that told that story were torn down. This legacy will now be preserved. Earlier this year, I went to take a look at a place that holds several of the most historic surviving facilities: Oak Ridge, Tennessee, the “secret city” that during the war grew from around 1,000 people to more than 75,000, all within a fenced perimeter that could only be entered through carefully guarded gates.

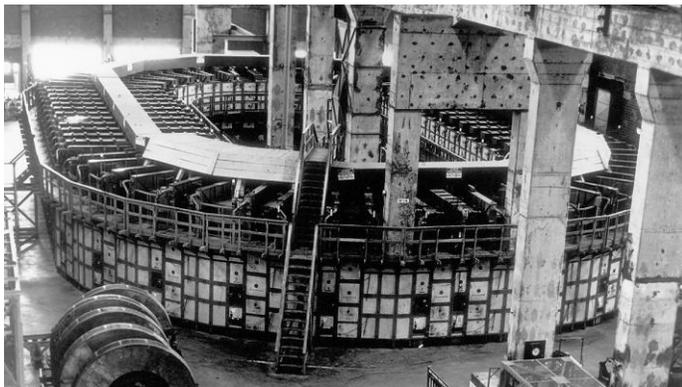


photo by:U.S. Department

A calutron "racetrack" at the Y-12 plant used strips of silver as part of the uranium refining process.

If you're a science nerd, and I freely confess I am, there is something wonderful about the technology of the 1940s. Unlike today's sleek glass-and-aluminum gadgets, it's big and heavy and advertises its significance in a profusion of dials and levers. So it was with uncomplicated delight that I found myself standing inside a cavernous room staring at opposing banks of gray control panels stretching back into the shadows, each one properly festooned with old-fashioned controls.

"This is exactly like it looked in 1945," Ray Smith tells me. Smith has worked at the Y-12 National Security Complex in Oak Ridge for 45 years, most recently as its official historian. A big man with a shock of unruly salt-and-pepper hair, bright eyes, and a boyish smile that makes him a natural tour guide, Smith says he's "poked his nose into every nook and cranny" of the Y-12 plant over the years. His pleasure in sharing its historic treasures is evident.

The control panels we are staring at were for "calutrons," which separated weapons-grade uranium-235 out of heavier uranium-238 through the use of powerful electric and magnetic fields. Each calutron yielded only a very small amount of enriched uranium, and the process had to be repeated to obtain the necessary purity, so the government built 1,152 calutrons at Oak Ridge. The magnets at the heart of the machines required so much conductive metal that the project borrowed 14,700 tons of silver from the U.S. Treasury's reserves.

Yet the 1943 calutron building wasn't even the biggest facility at the Oak Ridge site during the war. That was the gaseous diffusion plant, K-25, which used a different approach to enriching uranium. (There were three approaches to enriching uranium, the third being liquid thermal diffusion. No one was sure which would work best, so Gen. Leslie Groves, the Manhattan Project's military commander, decided to try them all.) The U-shaped gaseous diffusion plant, which was torn down in 2013 after sitting abandoned for decades, consisted of two half-mile-long wings that each measured 400 feet wide—the world's largest building at the time of its completion in 1945.

A tour of any unit of the Manhattan Project park is a tour of superlatives: the "first" this, the "biggest" that, repeated over and over again. Yet it is also a profoundly human story.

The young women who operated the calutrons came from around the South, drawn by the jobs and a chance to be part of the war effort and something they could sense was very big, even if none of them knew what it was. Most employees were told no more than what they needed to know to do their jobs, and were prohibited from even talking about that.

“Twenty-two thousand people were here,” says Smith of the Y-12 facility. “Probably about 100 of them knew what they were doing.”

Some of those who did know worked on the world’s first continuously operating industrial-size nuclear reactor. The now-inoperative X-10 Graphite Reactor at the Oak Ridge National Laboratory has been a National Historic Landmark since 1966. It’s open to the public as part of the bus tours of the park’s Oak Ridge unit. On display is the original logbook in which scientists monitoring the reactor noted the moment the nuclear reaction became self-sustaining. A hand-written, circled note written shortly after 5 a.m. on November 4, 1943, reads: “Critical reached!”

The casual nature of that note, scrawled on lined, yellowing paper, stopped me. It was like stumbling upon a record of the discovery of fire. The excitement evident in the cursive script and the exclamation point again brought home the very human nature of the Manhattan Project—our desire to be part of something bigger than ourselves, the inexhaustible human curiosity that leads us down new paths, both good and bad. These were the most brilliant minds of their time, but they were working with slide rules—not computers—and making much of it up as they went along. The entire concept of nuclear fission had been discovered only five years earlier, in Nazi Germany.

In the city of Oak Ridge, I find a hidden gem of a museum. The American Museum of Science and Energy is the departure point for tours of the Manhattan Project park facilities on U.S. Department of Energy property. But more than that, it contains a set of impressive exhibits on the history of atomic energy and Oak Ridge’s role in the Manhattan Project. One, “The Story of Oak Ridge,” smartly focuses much of its attention on the lives of the men and women who worked at the site.

The exhibit includes one of the 1,622 “B-1” prefabricated houses built for residents of the town. They were flat-topped Midcentury Modern–style houses, only 576 square feet but efficiently planned and filled with light. Standing inside the B-1, thinking about the smiling

young workers captured in photographs, I consider the irony that a place where the good life started for so many Americans was the same place where the destructive power of the atomic bomb began.

The Manhattan Project park is a partnership between the Department of Energy and the National Park Service; the DOE continues to operate active facilities at both Los Alamos and Oak Ridge. The sprawling Y-12 complex, for example, still handles nuclear material for the DOE's National Nuclear Security Administration. Security is an understandable priority.

Figuring out how to increase public access to some of the sites is a work in progress. The Hanford reactor site in Washington State is open for tours from March to November, but historic sites within the DOE facilities at Los Alamos, where extensive scientific research continues, won't be open to visitors this year. Still, "there's something to see at every site," says Sue Masica.

The city of Los Alamos offers a walking tour that includes Oppenheimer's house and the Fuller Lodge, which served as temporary housing for some of the 6,000 physicists, mathematicians, engineers, support personnel, and their families who relocated to Los Alamos. Fuller Lodge was once part of the Los Alamos Ranch School for boys, located on a remote New Mexico mesa. (If you're going to test the world's first atomic bomb and you're not exactly sure how big the explosion will be, remote is key.)

Oak Ridge, too, is working to make sure the city integrates its historic attractions—including the Alexander Inn, where Oppenheimer and other dignitaries stayed, and the town's multi-denominational Chapel on the Hill—with the park experience. "The museum will be the hub. From there, you'll be able to take tours to Y-12 and the Oak Ridge laboratory, and then you'll be able to get your orientation and head out into the town to see the historic sites we have here," says Mark Watson, city manager.

The sites are just one more part of a complex story. "At its core, it's the development of the nuclear weapon that was the purpose of the Manhattan Project," says Masica. "But as you peel the onion, you realize there are so many nuances to that story—stories of industrialization, stories of women in the workforce, stories of the people displaced by the project. There's so much connected to it."

Smith points to the many technological offshoots that came from the project, which include everything from elements in today's smartphone touchscreens to Teflon. The insight into radioactive elements and an improved understanding of their properties would have lasting ramifications beyond weaponry. "The exact same science that created the nuclear bomb also created nuclear medicine," Smith says. "That's an underappreciated story."

But of course, the goal was always to build the bombs dropped on Hiroshima and Nagasaki, leaving both cities in ruin and more than 150,000 dead. Masica says this legacy, too, will be examined at the park, which will include perspectives from Japan. The National Park Service may be "the nation's storyteller," but at the Manhattan Project National Historical Park, there is an understanding that this tale—a story of both the tremendous ingenuity of the human race and its capacity for destruction—is much more than just an American story.

Reed Karaim, who grew up in North Dakota, is a freelance writer now living in Tucson, Ariz. His work has appeared in *Smithsonian*, *The Washington Post*, *The American Scholar*, *Architect*, and *U.S. News and World Report*, among others.