

Oak Ridger witnessed July 16, 1945 Trinity nuclear test (As published in *The Oak Ridger's Historically Speaking* column on July 1, 2013)

One of the places I have experienced where I have had what was among my most sobering and thought provoking while at the same time extremely exciting and tremendously wonder-filled event was my time spent at the Trinity Site near Alamogordo, New Mexico. Actually, the Trinity Site is closer to Socorro, NM, by a good bit but Alamogordo has gotten connected with the location. Interesting how those things happen.

The normal schedule of twice per year tours of the Trinity Site has been reduced to only one tour each year. The October 5, 2013 tour has been cancelled because of fiscal constraints within the Department of Defense. The next scheduled tour is April 5, 2014 and that will be the only tour for a year.

I have included some of the photographs I made while essentially alone (there were three of us) at the site that literally changed the world forever. This specially arranged visit is something I count as one of my most rewarding personal experiences.

A visit I made to Stonehenge in England ranks close, but being allowed to visit the Trinity Site with just two other people and being given the freedom to photograph it until my heart was content for four hours is my top bucket list item thus far. If you would like to see many more images from this visit go to: <https://picasaweb.google.com/109845787057992130059/TrinitySite#>

Now, enjoy an article written by Carolyn Krause who brings us the story of Fred Vaslow, who saw the Trinity Atomic Test when the world changed forever.

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On July 16, 1945, the U.S. Army exploded the world's first nuclear device over the desert near Alamogordo, New Mexico. Fred Vaslow, 93, a former physical chemist and an Oak Ridger who volunteers at the American Museum of Science and Energy, witnessed the terrifying explosion of the plutonium-fueled device 68 years ago.

Trinity, the code name of the first detonation of a nuclear device, was a test of an implosion-design plutonium weapon informally named "The Gadget." The Fat Man bomb dropped Aug. 9, 1945, on Nagasaki, Japan, had the same conceptual design as The Gadget, which produced the explosive power of 20 Kilotons of TNT.

The implosion design for The Gadget was developed after Emilio Segré at Los Alamos, N.M., received in April 1944, the first sample of plutonium created at the pilot-scale X-10 reactor in Oak Ridge. Segré discovered that this plutonium sample was not as pure as cyclotron-produced plutonium (a synthetic element first made in a cyclotron, isolated, and identified by Glenn Seaborg and others).

Segré observed that the Oak Ridge plutonium sample contained both fissionable plutonium-239 and plutonium-240, the latter of which releases excess neutrons at a high rate. Los Alamos weapons designers concluded that the gun-type design used in the Hiroshima atomic bomb fueled with uranium-235 from Oak Ridge would not work with plutonium created in large amounts by reactors at Hanford, Wash.

So the Los Alamos weapons designers made a small spherical core of plutonium and surrounded it with high explosives that burned at different speeds, compressing the core. Thus, the implosion design was used in the first nuclear device test and last atomic bomb ever detonated over a city.

In December 1942, Vaslow, 24, was a graduate student at the University of Chicago. He took an exercise class in preparation for being drafted. He learned later that when he ran in the West Stands, he was actually running "over" the first nuclear reactor, where a sustained nuclear reaction was first demonstrated.

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At Chicago he worked on making a volatile compound of uranium. "There was enough known before the war that if you're trying to get a volatile compound of uranium, you were working on a bomb," Vaslow said in a Center for Oak Ridge Oral History video oral history interview with Oak Ridge filmmaker Keith McDaniel.

Then the project Vaslow was working on was shifted in 1943 to Iowa State College at Ames, Iowa. There his job was to analyze little strips of uranium metal and later to work on the chemistry of plutonium.

"Sometime in July of '45, people were needed at Los Alamos," Vaslow said. "I got a chance to go to Los Alamos, which was an immense thrill for me."

Vaslow recalled driving from Ames to Los Alamos. He had obtained a number of gasoline coupons for the drive because gasoline was rationed during the war. He was given a white badge.

"Everyone who had received a white badge knew that, in a couple of days, there were going to be nuclear tests over at Alamogordo a couple hundred miles away," Vaslow said. "So a couple people needing gas coupons asked me along, so I got to go to Alamogordo."

They drove to Albuquerque and camped overnight. The next day the driver of the vehicle turned off the main road and drove over a dirt road onto a rocky hill, where they camped out overnight.

"The next morning we were expecting to see the bomb go off," Vaslow said. "But it was rainy, cold, and windy, so we figured they wouldn't set it off."

They wondered what to do next and then something riveted their attention.

"As we were looking over a flat plain off in the east, we saw a green rocket," Vaslow recalled. "A few minutes later, we saw a red rocket go over. And then, a few minutes later, we saw this red glow growing and growing and growing."

"A mushroom cloud started to form, so we dived behind some rocks for cover. I wrecked my red leather jacket. That was my idea of the first nuclear damage.

"We heard a thunderclap. Then the cloud seemed to be drifting over, so we ran as fast as we could to the car and got the hell out of there.

They drove to the La Fonda Hotel in Albuquerque to celebrate the success of the detonation. "We toasted ourselves in great joy," Vaslow said. (Can't you just imagine the excitement of these young men who had just personally witnessed the most significant scientific advance in the history of the world! – Ray)

Although working with plutonium at different times, Fred Vaslow said that the biggest hazard he faced during the war was a fluorine generator for making uranium hexafluoride, a gas used in the uranium enrichment process.

"Once in a while fluorine was on one side and hydrogen was on the other, and they would mix, causing a big explosion," Vaslow explained. "I was working over the generator and it just went bang. My comrades there quickly grabbed me and pushed me under an ice-cold shower. That was the worst experience I had in the war."

Vaslow described the World War II era as "a time of horrors," that included the Nazi massacres during the Holocaust, the "rape" of Nanking, China, by the Japanese, and the fire bombing of

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Tokyo. But in respect to the two U.S. atomic bombs dropped on Japan, he acknowledged that “it wasn't the horror that ended the war, it was the shock, the sheer shock of seeing one city go, two cities go.”

Because Vaslow questioned if he should continue work with plutonium at Los Alamos, he was briefly hospitalized; urine tests showed he had only a few counts of plutonium. Yet he worked instead on high explosives for squeezing plutonium to make it go critical.

Then Vaslow's draft board released him. So he returned to Chicago to continue his graduate work.

But meanwhile George Boyd, his professor and supervisor at Chicago, had moved to Oak Ridge National Laboratory. Boyd invited Vaslow to join him in conducting research. So in May 1946 Vaslow moved to Oak Ridge.

Also during his career he spent three years in Denmark working at the Carlsberg Laboratory in Copenhagen. There he met a Danish woman named Aase and married her.

He later worked at Denmark's national laboratory, the University of Minnesota, and the Argonne and Brookhaven national laboratories.

But Fred retired in Oak Ridge in 1982 and, despite earlier exposures to uranium and plutonium, has lived here in reasonably good health for more than 30 years.

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Thank you Carolyn for yet another excellent Historically Speaking column based on the Center for Oak Ridge Oral History interviews and thanks to Dick Raridon for suggesting a story on Fred.

Fred's volunteer work at the American Museum of Science and Energy is to be commended as well. The people who volunteer there are one of the keys to our success as they meet the visitors and help welcome them to our history and heritage. They are the ones who actually lived it!

Do you know anyone else in Oak Ridge who actually saw the Trinity Test?



Trinity Site – where the world's first atomic explosion took place on July 16, 1945

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Holding Trinitite – its removal is prohibited



Jumbo with its 14 inch walls was designed to contain the plutonium if the Trinity test failed, but as time drew near and confidence increased in the plutonium bomb design, Jumbo was not used – rather it was hung up on a tower nearby ground zero. Although the tower was destroyed by the blast, Jumbo was undamaged. In 1946, six 500 pound bombs were exploded inside Jumbo blowing both ends off.

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Fred Vaslow volunteering at the American Museum of Science and Energy