(As published in The Oak Ridger's Historically Speaking column on July 16, 2020)

This Historically Speaking column will reflect on the amazing experiment at the Trinity Site on July 16, 1945. It seems well to include such an article at on the 75th anniversary of the world's first atomic explosion, ushering in the Nuclear Age. It also seems appropriate that the key figure in this article is an Oak Ridger, Fred Vaslow, who lived to be 100 years old.

Just a few weeks ago, I was contacted by a National Geographic writer who was searching for the last surviving person who was at the Trinity test on July 16, 1945, and he thought that might be Fred Vaslow. I agreed to see if I could locate Fred for him. When I went to Fred's house, his neighbor told me that he had passed away in March of this year and that his wife had just passed away the previous Monday.

I contacted the National Geographic writer with the sad news. He was, of course, disappointed and I expressed to him that I sure wish he had contacted me sooner.

So, in Fred's memory, Carolyn Krause asked me if we might publish a Historically Speaking column featuring Fred Vaslow and his experience at the Trinity Site. I agreed, and I know you will enjoy Carolyn's tribute to Fred.:

One of, if not, the longest living of the witnesses of the world's first atomic bomb test 75 years ago was Fred Vaslow, who died in March in Oak Ridge at the age of 100. Vaslow, who had retired in Oak Ridge and volunteered at the American Museum of Science, worked on the chemistry of plutonium for the Manhattan Project.

Shortly before the Trinity test on July 16, 1945, Vaslow was transferred from Ames, Ia., to Los Alamos, N.M. Having driven there himself, Vaslow had extra gas coupons, enabling him to take himself and a few close friends in his car to Alamogordo, N.M., to witness the Trinity test.

Seven years ago, Carolyn Krause interviewed Vaslow for the "Historically Speaking" column. Vaslow, then 93, resided at the Greenfield (now Commonwealth) extended living facility in Oak Ridge. The Chicago native, born on Nov. 17, 1919, described to her his experience at the Trinity test.

"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."

He drove his fellow passengers to the La Fonda Hotel in Albuquerque to celebrate the success of the detonation. "We toasted ourselves in great joy," Vaslow said. After the war, he earned a Ph.D. at the University of Chicago and then had a long career at Argonne National Laboratory, where he helped write environmental impact statements.

Oak Ridge has another connection to Trinity, the code name of the first detonation of a nuclear device. Analysis of the nuclear material sent from Oak Ridge to Los Alamos forced the design of a new atomic weapon that the Manhattan Project leaders thought required a test in the desert.

The Trinity "Gadget" sitting atop a 100-foot tower on the desert site 60 miles northwest of Alamogordo was an implosion-type plutonium weapon. The Fat Man bomb dropped Aug. 9, 1945, on Nagasaki, Japan, had the same conceptual design as the Gadget.

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The implosion design was developed after Emilio Segré at Los Alamos received in April 1944 the first sample of plutonium bred 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 problem was that the latter isotope releases excess neutrons at a high rate. Los Alamos weapons designers concluded that the gun-type design to be used in the atomic bomb fueled with uranium-235 from Oak Ridge (and dropped on Hiroshima, Japan, on Aug. 6, 1945) would not work with plutonium bred by reactors at Hanford, Wash.

So, the Los Alamos weapons designers led by George Kistiakowsky made a small spherical core of plutonium and surrounded it with high explosives that burned at different speeds, compressing the core.

When Vaslow witnessed the Trinity test, he was in the presence of members of the "Who's Who in Science in the 1940s." Also experiencing the great flash, big boom and rush of heat 6 to 20 miles away were J. Robert Oppenheimer (scientific director of the Manhattan Project and director of the Los Alamos laboratory) and his brother Frank, Enrico Fermi, Hans Bethe, I. I. Rabi, Richard Feynman, George Kistiakowsky, Harvard University President James Conant, and Harvard physicist Kenneth Bainbridge, who selected the test site and supervised preparations for the test. Gen. Leslie Groves (military leader of the Manhattan Project) was also there.

Two events almost prevented the planned detonation. What kept Robert Oppenheimer awake two nights before was a failed test of the explosives designed to compress and trigger fission in the plutonium core. The cause: blown circuits in the dummy device's wiring.

Then Jack Hubbard, Oppenheimer's meteorologist, correctly predicted that a severe thunderstorm would sweep through the desert site early that Monday morning. While some wanted to call off the test for that day, Oppie agreed with Hubbard's recommendation to postpone the Gadget test from 4 to 5 a.m. and then to 5:30 a.m.

After the countdown, a number of men witnessed an "unearthly mushroom cloud soaring into the heavens above Point Zero" ("American Prometheus: The Triumph and Tragedy of Robert Oppenheimer" by Kai Bird and Martin Sherwin).

One of the best descriptions of the landmark event came from Joe Hirschfelder, the chemist assigned to measure the radioactive fallout from the explosion:

"All of a sudden, the night turned into day, and it was tremendously bright, the chill turned into warmth; the fireball gradually turned from white to yellow to red as it grew in size and climbed into the sky; after about five seconds the darkness returned but with the sky and the air filled with a purple glow, just as though we were surrounded by an aurora borealis...We stood there in awe as the blast wave picked up chunks of dirt from the desert soil and soon passed us by."

Groves' deputy, Gen Thomas Farrell, spoke of the "strong, sustained, awesome roar which warned of doomsday and made us feel that we puny things were blasphemous to dare tamper with the forces heretofore reserved to The Almighty." Groves later wrote, "I no longer consider the Pentagon a safe shelter from such a bomb." He had spearheaded the construction of the War Department's massive headquarters in Washington and the creation of a weapon that can destroy it.

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Frank Oppenheimer said, "I think the most terrifying thing was this really brilliant purple cloud, black with radioactive dust, that hung there, and you had no feeling of whether it would go up or would drift towards you."

He recalled that he and his brother both shouted with relief, "It worked!" The witnesses cheered, danced, shook hands and laughed while slapping each other on the back. Oppenheimer named the bomb test Trinity when recalling John Donne's poem ("Batter my heart, three-person'd God") and the Hindu scripture Bhagavad-Gita's references to the creator, preserver, and destroyer. In a 1965 NBC television documentary, Oppie said, "We knew the world would not be the same." Quoting the Bhagavad-Gita, he added, "Now I am become death, the destroyer of worlds."

Before leaving the test site, Oppie called his secretary at Los Alamos and asked her to convey to his wife Kitty a coded message indicating the test was a success. "Tell her she can change the sheets."

Thanks Carolyn, Fred Vaslow was a unique individual who had a great career and spent his retirement years greeting visitors at the American Museum of Science and Energy and enjoyed telling tourists of his experiences. He would often tell folks of his presence at Trinity. That place is certainly a special location.

There are tours there twice a year where the public can see the site. The tours are very popular and fill up quickly. They are held in April and October of each year, however, the April 3, 2020, tour was cancelled because of the COVID 19 crisis. October 3, 2020 and April 3, 2021, are the next tours available. See: <u>https://www.wsmr.army.mil/Trinity/Pages/Home.aspx</u>.

I want to express my personal pride in being allowed to visit the Trinity Site for four hours alone with only a public relations person from the White Sands Missile Range. I still count that among the highlights of my career as a historian.



Fred Vaslow

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



Holding Trinitite - its removal is prohibited

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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.