

# A BACKWARD GLANCE

## Eyewitnesses to Trinity

July 16, 2005, marked the 60th anniversary of the world's first nuclear explosion. Conducted at the Trinity Test Site near Alamogordo, New Mexico, the test was needed to determine if a radical new weapon, nicknamed "the gadget," would work. Its designers were confident that their calculations were correct although they could not pinpoint how large or powerful the detonation would be.


At base camp 10 miles from ground zero, Enrico Fermi protected his face "by a large board in which a piece of dark welding glass had been inserted." His first impression of the explosion was "the very intense flash of light" that seemed "brighter . . . than in full daylight." Through the glass, he saw "a conglomeration of flames that promptly started rising," becoming "a huge pillar of smoke with an expanded head like a gigantic mushroom that rose rapidly beyond the clouds." About 40 seconds after the explosion, the air blast reached him. He estimated its strength by "dropping from about six feet small pieces of paper before, during and after the passage of the blast wave," concluding that it corresponded "to the blast that would be produced by ten thousand tons of T.N.T. [*sic*]" The actual yield was about 21 kt.

Victor Weisskopf, also at base camp "on a little ridge about 100 yds. [*sic*] east of the water tower," watched indirectly "through the dark glass" so he could see the deflected light. "When the explosion went off," he wrote, "I was first dazzled by this indirect light which was much stronger than I anticipated, and I was not able to concentrate upon the view through the dark glass." Looking directly at the explosion 3 seconds later, he saw "a reddish glowing smoke ball rising with a thick stem of dark brown color . . . surrounded by a blue glow." The shock wave through the clouds was "plainly visible as an expanding circle all over the sky where it was covered by clouds." Weisskopf "felt very strongly the heat radiation all over the exposed parts of my body." The sound wave arrived "after about 45 seconds and it struck me as being much weaker than anticipated," he wrote.

About 20 miles from the detonation point, Captain R. A. Larkin, seated on the ground, deliberately had his "eyes fixed on the ground immediately in front

. . . to avoid the blinding flash" he expected. "My first impression," he said, "was of a sudden brilliant lighting of the surrounding landscape, accompanied by a momentary flash of heat." He was surprised that the illumination, "initially quite brilliant, continued to increase for a brief interval." His dark glass filter was "designed to eliminate over 99% of the light." But when he looked through it, he was momentarily blinded, much as he would have been by a "close flash of lightning on a dark night." He noted a "ball of light" and below it "a column of red flame about 150 or 200 yards in diameter. Flickering red reflections were distinctly seen on the clouds above the ball of light."

"At about ten seconds after detonation . . . the ball and column took on the shape of a vast mushroom." Ten minutes after detonation the cloud was still "quite distinct and rising rapidly." Fifteen minutes later, the pillar under the cloud had faded, and after 30 minutes the cloud "faded from view."

At Military Police Post No. 2 (20 miles from "zero point"), Ralph Carlisle Smith "stretched out on a blanket facing south" and looked through a welder's glass with his left eye. The flash temporarily blinded his open, unprotected right eye but through his left he saw the "amazingly bright" light that "turned yellow, then red, and then beautiful purple," eventually rising "in something of a toadstool effect." After the cloud turned to a "ponderously" moving cylinder of white smoke and a "hole was punched well above the white smoke column," he saw "two fog rings . . . well above the white smoke column." Then, he said, "There was a spontaneous cheer of the observers." Although he did not report heat, Smith noted that roughly 1.5 minutes after the light "a sharp loud crack swept over us—it reverberated through the mountain[s] like thunder." He estimated the fireball was "1 to 2 miles wide." A nearby observer guessed the strength to be "at least 5000 tons and probably a lot more." 

For these and the accounts of other observers in the Trinity test area, see the Laboratory's history page at <http://www.lanl.gov/history/atomicbomb/trinity.shtml>.