

# Proving Ground

After months of wrestling with The Bomb the Free World's leading scientists watched nature's destructive potential reach critical mass.

By Sid Moody  
The Associated Press

**W**HEN IT WAS OVER that July 16, 1945, the man who had led the development of The Bomb walked into the desert to reflect.

A turtle miles away from the world's first atomic explosion had been flipped helplessly on its back by the shock wave. J. Robert Oppenheimer set it right-side up.

"It was the least I could do," he said.

That test, called Trinity, of a plutonium bomb capped a \$2 billion — unprecedented in those times — effort conducted in super-secrecy.

Maj. Gen. Leslie Groves, overall boss of this so-called Manhattan Project, predicted — correctly — that two atomic bombs would stun Japan into surrender and end World War II.

But in Trinity's mammoth, violent, roiling flames mankind had never seen before erupted moral questions still debated.

The light, brighter at its core than the sun, was seen 250 miles away.

The bomb's identical twin, nicknamed Fat Man, was to ravage Nagasaki just more than three weeks hence. Their uranium cousin, Little Boy, destroyed Hiroshima Aug. 6.

Hundreds of thousands of Japanese were killed outright or died from the effects. But also millions of lives, Japanese and American, had been spared by ending the war, soon to be climaxed with the invasion of Japan itself.

## Far-reaching consequences

**A**n equation of madness? Or mercy? Trinity culminated a gigantic scientific and industrial steeplechase to produce tiny amounts of fissionable uranium-235 and plutonium that could be carried in a suitcase. Fueling the urgency was the fear that the Germans, first to split the atom, would make a bomb first. But Hitler had lost the war before an American-British weapon was ready. Japan, her wood and paper cities largely in ashes, was nonetheless still fighting with ferocity.

Theoretically, the uranium bomb was straightforward enough to be dropped without a test. Fat Man was more efficient but more complex: precisely shaped charges imploding inward to compress in milliseconds a sphere of plutonium not much bigger than a grapefruit beyond critical mass to explode instantly in a frenzy of energy-releasing neutrons.

Theoretically, Trinity, sited in a desert of south-central New Mexico north of Alamogordo, was to be proof, in effect the world's largest lab test.

For months, the leading scientists of the Free World had been testing, tinkering, thinking in the desolation of the desert.

The bomb rested atop a 100-foot tower: The bomb was intended to kill by blast rather than radiation, hence the need to interpolate the effects at altitude. Spherical, a little taller than a man, Fat Man

looked like a woman under a hair dryer at the beauty parlor with wires and knobs all over it.

The scientific "long hairs" worked through nights to correct glitches. Explosives expert George Kistiakowsky picked at cast imperfections with dental tools.

Others argued whether the bomb should be used at all.

But first Trinity had to prove Fat Man would work.

## Uncertain futures

**A**s the scientists gathered at the site, they opened a betting pool estimating the force of the explosion. With his \$1 ante Edward Teller, who was to become a major innovator of the later hydrogen bomb, picked highest: 45,000 tons (45 kilotons) of TNT. Oppenheimer picked 300, Canadian John Williams 200 pounds and Harvard physicist Norman Ramsey went low: zero. Latecomer Isidor I. Rabi, who had just won a Nobel Prize, arrived in the desert and settled for the last number: 18 kilotons.

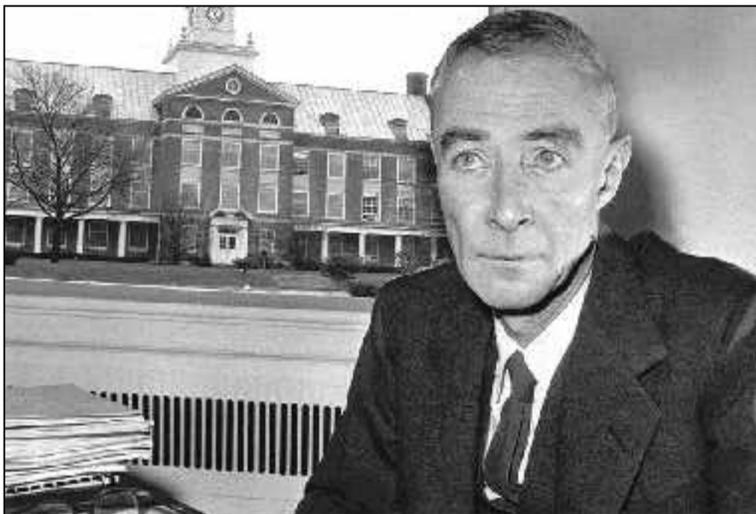
Jornada del Muerto had come alive with miles of cables, strung from yuccas where poles weren't available, bunkers, dials, gauges, plus 90 miles of roads. Twenty teams fanned out in villages and hamlets to measure fallout should hasty evacuation be needed.

Alvin and Elizabeth Graves moved into Cabin 4 at Miller's Tourist Court in Carrizozo, population 1,400 and 40 miles northeast of Ground Zero, and set up Geiger counters and a seismograph. Groves suspended all air traffic south from Albuquerque. He prepared a cover story that a remote ammunition dump including



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Scientists and workmen rig the world's first atomic bomb to hoist it up into a 100-foot tower at the Trinity bomb test site near Alamogordo in July 1945. Heat generated within the bomb's explosion was near 100 million degrees.



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Dr. J. Robert Oppenheimer, shown in 1958, led the team that developed the atomic bomb. The Trinity test capped a \$2 billion effort conducted in super-secrecy.

poison gas shells had exploded, requiring mass evacuation.

GIs of the Special Engineering Detachment made a gallows joke that the bomb, referred to as "the gadget" or "the thing," would knock Earth off its axis.

Enrico Fermi, the Italian who had pioneered the first controlled nuclear chain reaction in December 1942, gazed over the desert on July 15 at "the world on the eve of its disintegration." The man who had opened a new world with aid of his slide rule did not believe this would happen. He planned to shred bits of paper to measure the blast by how far the shock wave blew them.

Always everywhere, living off coffee and cigarettes, his cadaverous frame shrunk to 116 pounds from the strain, was Oppenheimer, cajoling, encouraging, advising. Between atoms, Oppie, a student of Sanskrit, pondered the ancient Indian poem, the Bhagavad-Gita, or read. (He named Trinity while reading John Donne: "Batter my heart, three-person'd God.")

Two days before Trinity, on July 14, two Army officers, Maj. Robert Furman, a Groves aide, and Capt. James Nolan, the Los Alamos obstetrician, escorted by seven carloads of security guards, signed a receipt

for three crates at Los Alamos, where the bombs were devised.

The load was put in a closed black truck, driven to Kirtland Air Base, put on two DC-3s and flown to San Francisco. Little Boy had begun its journey to Tinian, the huge B-29 base in the Marianas.

Beyond New Mexico, U.S. warships were shelling the Japanese coast with impunity. Fifteen-hundred planes that day added to the thunder. Australian troops landed in Borneo. The fighting for Okinawa was just over, taking some 200,000 American, Japanese and Okinawan lives. Churchill, Truman and Stalin were sitting down to a final Big Three conference at Potsdam.

At Trinity, all this was an afterthought. Thunderstorms had swept over the site after midnight on the 16th, threatening a delay because of adverse winds.

Groves, a single-minded driver of little charm but vast ego and determination, was inclined to go ahead. Obsessed over security, he feared postponement would inevitably lead to leaks. But he agreed to move firing later, from 4 a.m. (Nighttime had been chosen both to cause the least notice and for better photographic contrast for cameras.)

At 5:10 a.m., Sam Allison began intoning the count over a clamorous rendition of "The Star-Spangled Banner" as station KCBA in Delano, Calif., began its broadcast day over the same frequency. At three camps 10,000 yards from the tower scientists and VIPs put on welders' glasses.

And at 5:29:45 a.m. Mountain War Time, humanity entered a new world.

In Arizona, 150 miles away, a mystified woman tried to explain why she saw "the sun come up and go down again."

As he watched the swelling fireball never seen before by man, Oppenheimer thought of the Bhagavad-Gita. "I am Death—the shatterer of worlds."

Fermi scattered his papers as the shock wave visibly approached and estimated the explosion at 20 kilotons. (Close, but Rabi at 18 kilotons won the pot, \$102.)

An awed Charles Thomas of the Monsanto chemical company shouted to physicist Ernest Lawrence that they had just seen the greatest happening in history.

In Carrizozo, the Graves' cabin trembled. By afternoon their Geiger counter clacked off the scale as a 100-by-30-mile blanket of radioactivity arrived. Groves was about to evacuate the town, but the readings soon subsided.

Newsrooms were swamped with callers wondering what happened. The Associated Press in Albuquerque put out Groves' release.

## Changing the world

**G**eorge Harrison, president of the New York Life Insurance Co. and a member of President Truman's Interim Committee, pondering what to do about the bomb, wired from Washington to Henry Stimson in Potsdam: "Doctor has just returned and most enthusiastic and confident that the Little Boy is as husky as his big brother. The light in his eyes discernible from here to Highhold and I could have heard his screams from here (Washington) to my farm." Highhold was Stimson's Long Island estate 240 miles from Washington and Harrison's Virginia farm was 50 miles, the distances Fat Man was seen and heard.

At Potsdam, Truman took Stalin aside and told him the United States had just tested a weapon of unusually destructive force. The Soviet dictator, whose British-naturalized spy and Los Alamos physicist, Klaus Fuchs, had witnessed Trinity, said only: "I hope you make good use of it."