Collier's, August 9, 1952, pages 17-19

When an A-Bomb Misfires

By Robert Cahn

Who turns it off? That's the job of a mild-mannered scientist who twice has risked instant destruction, neutralizing with his bare hands the most terrible explosive force known to man

"The time is now minus one minute," blared the voice from the public-address system. "Put on your dark glasses or turn away from the flash."

Inside the control room of the concrete blockhouse, ten miles from the target, the Atomic Energy Commission's deputy test director, Dr. John C. Clark, "triggerman" for nuclear detonations, watched his control panel as green lights flashed to red. Two hours before, at the top of a 300-foot tower, he had started the triggering operation by arming the bomb. At H hour minus 15 minutes, he had pressed the last button on his board to set in motion a sequence timer. Now it was entirely the job of the robotlike timer to perform the thousands of minutely synchronized operations which would finally climax by firing the bomb.

Dr. John C. Clark

"Minus 30 seconds!"

Outside the control building, military and scientific observers adjusted their dark glasses and braced their feet for the flash and shockwave of the 18th atomic explosion at the Nevada Proving Ground. Six miles north of Yucca Flat, only 7,000 yards from the bomb tower, GIs crouched in their foxhole and shivered in the predawn cold.

"Minus 10 seconds!"

Dr. Clark watched another green light change to red. "Nine... eight... seven... six... five... four..."

The final green light turned red. The robot had almost finished its work. Dr. Clark lifted his hand from a switch that could, until the last second, overrule the robot and disconnect the entire circuit. The six men in the control room tensed... "three... two... one... zero..."

For a moment, two moments, three moments, there was silence—a stillness more shocking than the violent combustion they had expected. Like small boys watching a fuse sputter and disappear into a giant firecracker, the scientists waited. Out of the hushed vacuum came only the metronomic ticking of the dependable old grandfather clock which, oblivious of the foibles of twentieth-century inventions, served as the master-control timepiece amidst the galaxy of superelectronic circuitry.

"Damn!" muttered Clark.

Out across the desert, the unseen loud-speaker voice, which some GIs had dubbed "Big Brother," boomed a warning: "There has been a misfire. Everybody keep in position. Do not move."

For another few moments, the six-man firing team in the 20- by 20-foot control room stood numb. Then their trained minds began groping for an answer. Somewhere in the labyrinthian web of tens of thousands of wires and connections which lead from the control room to the bomb 10 miles away, something had happened. This had been one of the most complicated experiments ever attempted, yet according to the control panel, everything in the firing circuit was in order. Theoretically, the bomb tower at "ground zero' should long since have been vaporized into a mushroom cloud.

Even while they discussed previously-planned emergency procedure and searched for answers to their enigma, everyone knew what the next move had to be. Despite the elaborate controls which left practically everything to the electrical-minded sequence timer, there was one thing that had to be done by the hand of man—disarming the bomb. And although again theoretically there was no reason why the bomb should now explode, there was also no certainty that it wouldn't. If the precise electronic system was capable of *one* mistake...

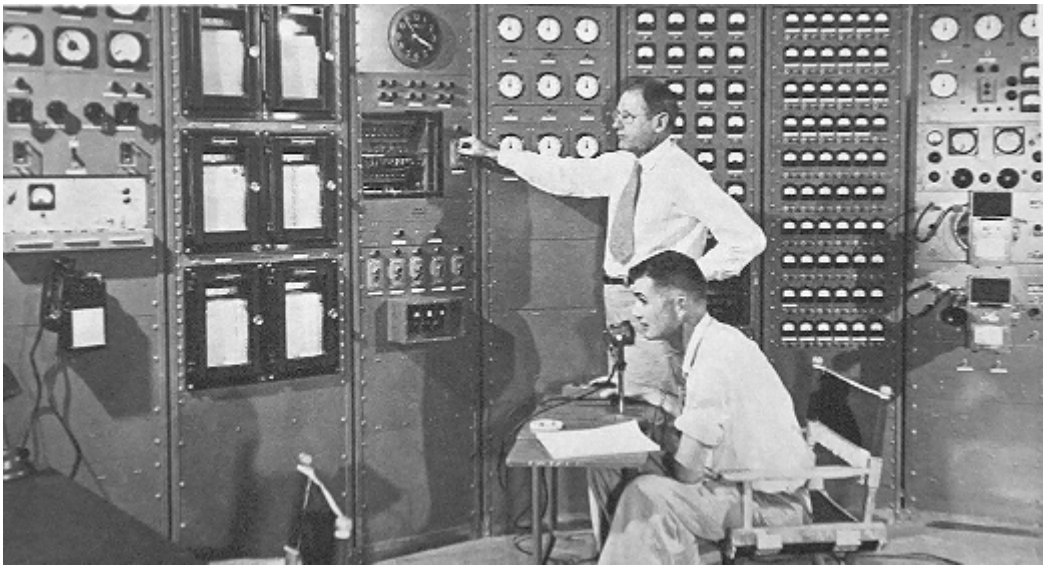
Someone was going to have to climb the 300-foot tower and risk possible annihilation. It was not a question of volunteers. Inevitably, the disarming chore was the responsibility of one man, the firing party commander. Dr. Clark, a slight, bespectacled, forty-nine-year-old physicist, on loan to the AEC from the University of California, and a man who looks more like a schoolteacher than the triggerman for the United States atomic detonations.

For most of his adult life, Jack Clark had been a schoolteacher. Fifteen years ago, while the 60-inch cyclotron was still under construction at Berkeley, Clark was teaching physics at nearby Stanford University. During the war, he served with the Army in ballistics and detonation research at Aberdeen Proving Grounds. At the close of the war, while on a special intelligence mission to uncover German and Japanese research secrets, Clark found himself rapidly becoming involved in the field of nuclear energy. In 1946, he was asked to take part in the University of California-directed research program in the Los Alamos Scientific Laboratory, where he rapidly advanced until he became the AEC's deputy test director.

His Second Job of A-Bomb Disarming

In October of 1951, when the atomic device on the sixth Nevada bomb test failed to fire, Clark had found it his duty to disarm "the gadget." Now, on May 20, 1952, at 5:05 A.M., Clark was faced for the second time with a job no man should have to do even once in a lifetime.

Photographs for Collier's by Don English



Dr. Clark stands at complicated control panel at Nevada Proving Ground. In foreground is his assistant, Dr. Gaelen Felt. Bomb is exploded from this room by pressing button on sequence timer; blast occurs after 15-minute interval.

At the control building, the six men on the firing team—AEC test director Dr. Alvin C. Graves, AEC test manager Carroll Tyler, Clark, and assistants Dr. Gaelen Felt, Herbert Grier, and Barney O'Keefe—checked and rechecked their electronic recording instruments. Meanwhile, in accordance with emergency procedure, the troops which had been prepared to move into the target zone after the blast in a simulated combat maneuver were ordered to face away from the bomb and evacuate the area. The cause of the misfire remained a mystery.

"We'll let the gadget sizzle for an hour if it wants to," Clark told his colleagues as they moved to his office, adjoining the control room, for a conference of key personnel called by Dr. Graves. From the time he had armed the bomb, shortly before 3:00 A.M., Jack Clark, as firing party commander, had given the orders. Now, with a misfire on their hands, the decisions and orders were up to Al Graves, the forty-two-year-old, boyish-looking test director.

For the next 60 minutes, the scientists made their plans. A disarming procedure was adopted. A detailed checklist was drawn up. And Barney O'Keefe and John Wieneke, the two specialists who had the most intimate knowledge of the elaborate circuitry involved in this test, were selected to accompany Clark and assist, check and advise him during the disarming operation.

Finally, at 6:15 A.M., Graves, his face showing the strain, nodded across the room at Clark. Clark picked up some rope, a few checking instruments, and a hack saw and headed for the door, followed by O'Keefe and Wieneke. Outside the blockhouse, Clark walked to his car as casually as if heading for the mess hall, exchanging greetings as he passed friends he might be seeing for the last time. Dr. Ralph Carlisle Smith, an AEC security officer who has seen more A-bomb blasts than any other man in the world, came alongside to wish him luck.

"For this kind of work a guy deserves double time," Clark joshed as he started the motor of the chartreuse Dodge sedan.

"Okay, we'll pay you in double Martinis," replied Smith.

With O'Keefe beside him, and Wieneke in the rear seat, Clark put the sedan into gear and headed for the tower, which glinted 10 miles away under the rising sun. Along the blacktop road they sped, their eyes, partially shielded by the car's lowered sun visor, averted from the immediate target area to avoid being blinded should the bomb go off. Two miles from the tower they pulled up at a blast-proof switch station to disconnect some electrical circuits. Finally, one mile from the tower, Jack Clark raised the visor and looked straight ahead. Being blinded by the flash now was the least of their worries. They had crossed an invisible line into the area of total hazard, in which detonation spelled quick and certain death.

Two minutes later, they arrived at the base of the three-legged tower. At the top, 300 feet up, enclosed in a 15-foot-square cab for protection against the elements, was a fully armed, live atomic bomb.

"We're going on up, Al," Clark reported over the two-way car radio, which was in contact with the control building where the test director anxiously awaited the report.

Dr. Graves know only too well the danger involved. Six years before, he had been severely injured by a radiation overdose in a laboratory accident which had been fatal to another scientist standing next to him.

Tools and instruments dangling from a rope sling hung over his shoulder, Clark started up the ladder—which, but for the misfire, should at that moment have been drifting lazily away as part of the after-blast mushroom. Behind him came Wieneke, then O'Keefe.

At the 100-foot level they halted, winded. Always before they had ridden the elevator to the top, but it had been removed at Clark's direction after the bomb had been armed.

Photographs for Collier's by Don English

"Should have left that elevator," murmured Wieneke. "What were you trying to do—save the taxpayers some money?"

Three Who Braved Death at the Tower

Nearing the top they paused more frequently, silent, saving their breath, a grim triumvirate: Clark, a mild, graying bachelor with no living kinsfolk; Wieneke, stocky, thirty-four-year-old electronics expert who hoped soon to return to his wife and two children at Los Alamos; the thirty-two-year-old O'Keefe, employee of a Boston firm developing secret equipment for the atomic tests, who had a wife and three small children in Natick, Massachusetts.

Shortly before 7:00 A.M., Clark reached the cab. He removed the hack saw from his rope sling. Hours earlier, before leaving the cab via the elevator inside, as a routine matter he had wired shut the access door, a precaution he now regretted. Forcing the door slightly, Clark sawed through the hasp, and the door swung open. Clark and Wieneke went to the bomb and its associated devices, O'Keefe picked up a telephone in the corner of the cab.

Back at the control point, Dr. Graves abandoned a game of solitaire and hastily grabbed the receiver at the first ring.

"We're in the cab, Al," he heard O'Keefe report. "Jack is at the gadget now."

Graves motioned for a secretary to listen in on an extension. If the bomb did go off now, at least they would have on record every possible bit of information that might help them find out what had happened.

In the cab, Clark worked swiftly with his bare hands. In less than a minute, he had reached the crucial point in the complex circuitry. Beside him, Wieneke checked every move. There were two basic wires which had to be disconnected. Any change in the circuiting, even just pulling out one of these two connecting plugs, might set off the bomb.

"Jack is unscrewing the tightening collar of the plug," reported O'Keefe tersely over the phone. "Now he's got one plug out."

A moment's silence...

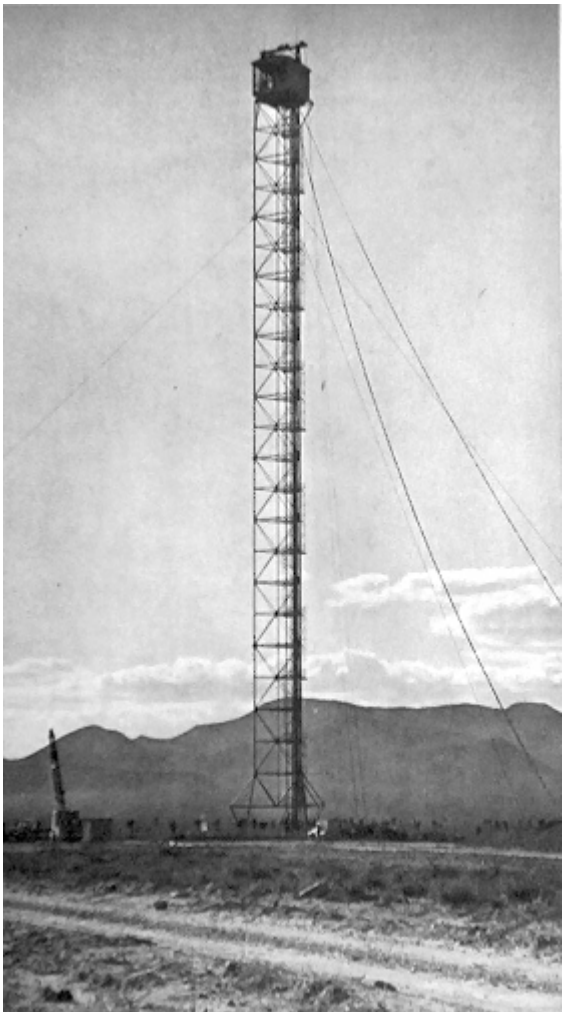
"Now he's got the other...!"

The three men in the cab and their colleagues 10 miles away relaxed slightly. There was no longer a probability of the atomic bomb going off. But it was still necessary to disassemble the bomb partially and to disarm the detonating device—which itself contained enough high explosive to kill all three men in the small cab.

"Disarming of the gadget completed," reported O'Keefe, finally. "We're going back down now."

Not until two hours later, after a photographic recovery team had brought back and processed film from a lead-lined underground bunker near ground zero, was the mystery solved: one of the measuring devices had not been ready to record, a malfunctioning which had automatically blocked the firing circuit. Had the bomb gone off at H hour, one of the most important measurements would have been lost and the valuable fissionable material wasted.

Like a returning infantry patrol, Clark and his helpers climbed down the ladder and drove back to the control building. Their work was not completed. They still did not know why the bomb had failed to go off. According to the monitoring instruments in the control room, all elements of the primary firing circuit had functioned perfectly.



Bomb, resting in cab at top of 300-foot tower, normally disintegrates the entire structure. Disarmament team had to climb ladder to cab, remove crucial wires.

The detonation, therefore, must have been prevented by the automatic safeguards which operate when any part of the experimental apparatus fails to function properly.

Photographers Solve the Mystery

With the situation under control, Jack Clark completed his role of atomic triggerman and re-assumed his post as deputy test director. Over the public-address system, he gave the orders permitting personnel to return to the test area. He ordered the elevator place back in the bomb tower. Finally, at 3:00 P.M., after 36 hours of continuous duty, Clark climbed into his sedan and drove back to his bachelor quarters at the Proving Ground administrative headquarters in Camp Mercury. Bone-tired, he undressed, showered, poured himself a stiff drink and went to bed.

Five days later, when the sequence timer again reached "zero," the bomb did not miss its cue. The flash was seen as far as Los Angeles, 300 miles away.

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