I'm **Ron Reynolds**, *NMIMT B.S. Physics, 1967*. I was on the COOP program, and worked for Lamar Kempton most of my time there starting in 1963. I have a fairly good memory, and in my last years, I worked directly for Lamar, and his right hand man, Kenny Sorenson, and the explosive's handler, Jim Deatherage. BTW, Rosy Tripp's mother was our group secretary.

Due to my experience in warheads working there, I was recruited to the Naval Ordnance Lab, Corona (NOLC), which was a source of TERA's contracts. From both my experience at Tech and at NOLC, I gained a fairly comprehensive understanding of the work done at Tech.

Socorro had an exceptionally good situation for the work needed done by NOLC.

NOLC need several elements of work done: one aspect was to do quality assurance testing of production warheads. Another aspect was to conduct R&D on new warhead technologies that could improve blast kill radius by directing the energy with the information from improved guided missile fuzing.

Lamar had developed an outstanding test facility for doing explosive testing for the Navy. TERA had a canyon behind tech, and the improvements there included an upper pad for testing large warheads, cleared areas for collecting fragments, high speed cameras (2250 frames/second) for capturing gas and fragmentation patterns as they developed, and a lower pad for material science tests.

The material science tests were to initiate blasts to propel single samples of a given metal against the likely components of aircraft, and to assess the depth of cuts and hence the desirability for use in warheads. Impact images were captured using a pulse X-ray system, with large cases of X-ray film. When I worked there, I also developed those negatives for assessment by the engineers who also worked for Lamar. They were Hank Giclas and Frank Casey (Spelling unsure.)

Lamar also had developed a site in the canyon for bolting sections of B-29's to a solid rock face, and by placing strain gauges around the aircraft's stringers and formers. As cuts were made, simulating a warhead strike, one could assess the re-distribution of stress as cuts were made. This lead to the development of the Fast Air Reaction Tube which was to provide dynamic loading of aircraft sections, so that warhead interaction could be studied in a more realistic flight environment. I had graduated and left before this Fast Air Tube was utilized in operations.

All of the explosives were handled, or in some cases the warheads were filled, by Jim Deatherage, who was an EOD expert from WWII. In my last years, I also worked with him. We set up the charges, checked firing lines, set detonators, confirmed safety checks, and then initiated the count-down for firing.

A later engineer (whose name I can't remember) added to the staff in the mid 1960's was investigating new techniques for assessing gaseous momentum transfers. He initiated the design and production of "work gauges" which were annular cavities covered by a thin aluminum sheet. These were placed over and above the explosive under test, and the depression of the thin sheet into the cavity was regarded as a measure of goodness of explosive momentum transfer. Another aspect of measuring gaseous momentum transfer was to use larger targets, suspended over a test warhead, linked by baling wire. The larger targets were beer cans. It was a very novel approach at the time. All the students were asked to donate, and we even had search parties comb the banks of the Rio Grande River picking up beer cans to be used in the tests!

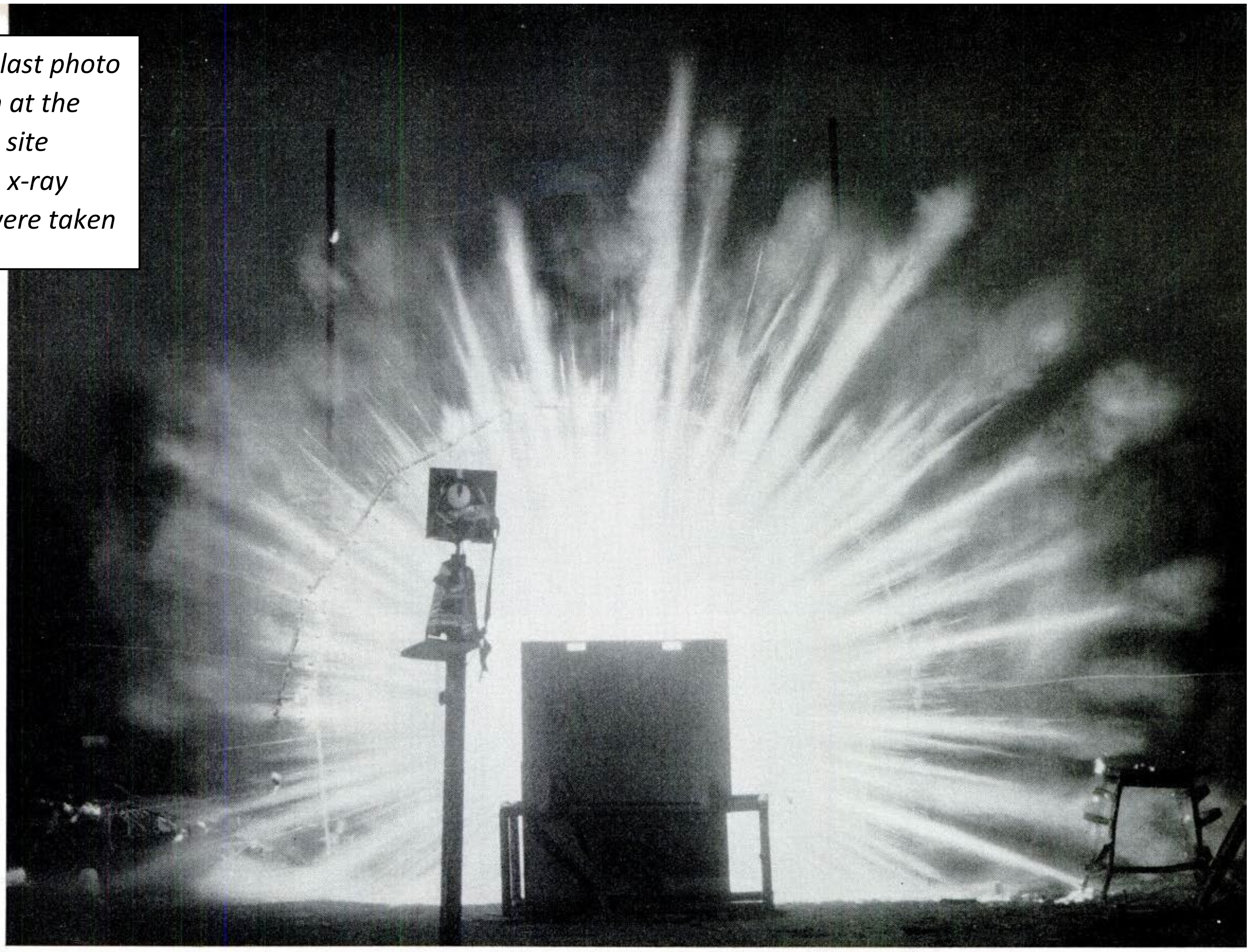
In fact, using beer cans was so novel that Time Magazine wanted to do an article on the use of the beer cans. So, they sent a team to interview Lamar and Kenny, and they took some photos of various elements of the work. This was all published in the December 16, 1966 Issue of Life Magazine. The article was part of the

Science section, titled "Blasted Old Beer Cans? a Dusty Look at the Shape of a Bang” - *see last two pages of this article with my comments in boxed notes.*

This review brought back a lot of memories to me and lots more details of the machine shop, the tool rooms, the exotic materials that were cut, turned, welded and formed into exotic warhead shapes for exploratory development.

It was a great place to work, with terrific people to work with, and a wonderful background for my career in Navy Tactical Weapons assessment.

The first blast photo was taken at the lower test site where the x-ray pictures were taken



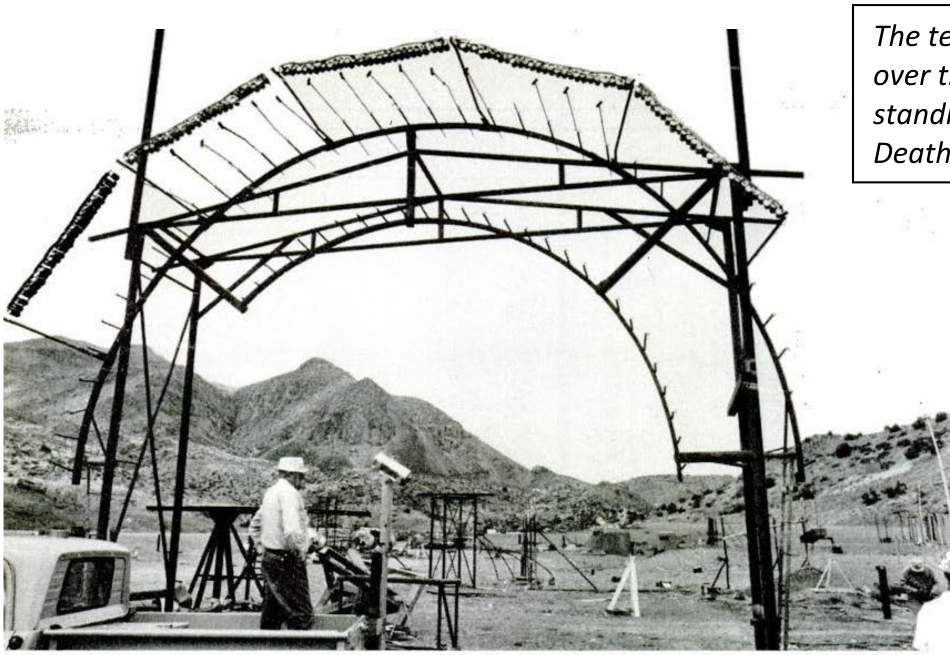
SCIENCE / Blasted Old Beer Cans

Sooner or later, somebody other than Japanese toy makers was bound to think up a use for pesky old beer cans—blast them! Working under a Navy contract to develop more effective antiaircraft warheads, the New Mexico Institute of Mining and Technology has found that the canisters make dandy indicators of the size, shape and force of an explosive fireball. Harvested along highways and other places where beer drinkers throw them, the empties are strung together like beads, carefully numbered and draped above a test charge which is then detonated. Photographs taken over the next few seconds show that the force developed by the explosion does not take a symmetrical form as some experts thought. Instead, it expands in an irregular, amoeba-like shape, hitting some cans sooner and harder than others. By reassembling the test pattern on the ground (*below*), institute researchers can begin to get an idea as to how warheads should be detonated to do maximum damage to airborne targets.

Lamar is in the white shirt at the bottom of the image. Kenny Sorenson is in the white hat at the top of the image, and I am on the right side of the image. I don't remember the name of the other COOP student on the left side.

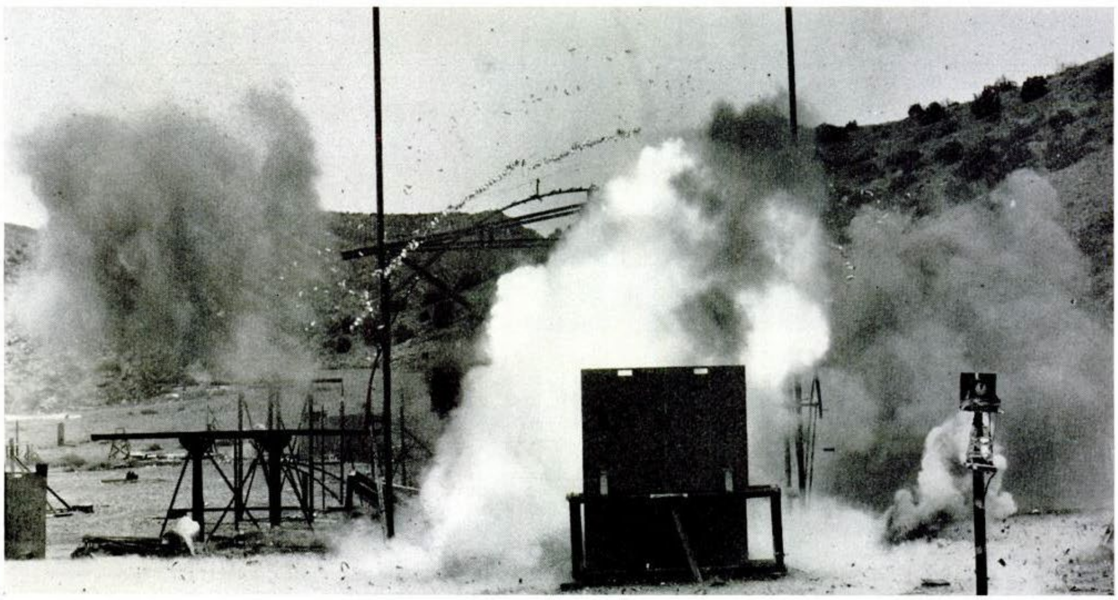
CONTINUED

The test setup for stringing the beer cans over the test warhead, and the individual standing in the bed of the truck is Jim Deatherage.



A dusty look at the shape of a bang

On a rainbow-shaped rig (*left*), beer cans are all the same distance from charge and are strung with welded seams up to give maximum "crunchability." The dents made by the blast are a measure of its maximum force and, coupled with the can's velocity, indicate its possible effect on aircraft.



The last two image are samples from the high speed cameras on the test firing, showing the progression of energy transfer as the gases propel the beer cans.

Because of the noisy nature of the tests, the institute decided to conduct them out in a New Mexico desert—and straightaway ran into a bad visibility problem. The scrubby, boulder-strewn hills made it difficult to photograph the beer cans in motion. To solve the problem, explosive specialists planted a length of primer cord under desert clay and detonated it (*middle picture*) a moment before each test blast, sending up an instant backdrop of opaque dust that screened off the hills. In front of the cloud, the flying cans showed up sharply enough to give the researchers a look at the first effects of the bang, then soared on up against the sky in an irregular pattern (*right*) as the test explosion expanded.

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