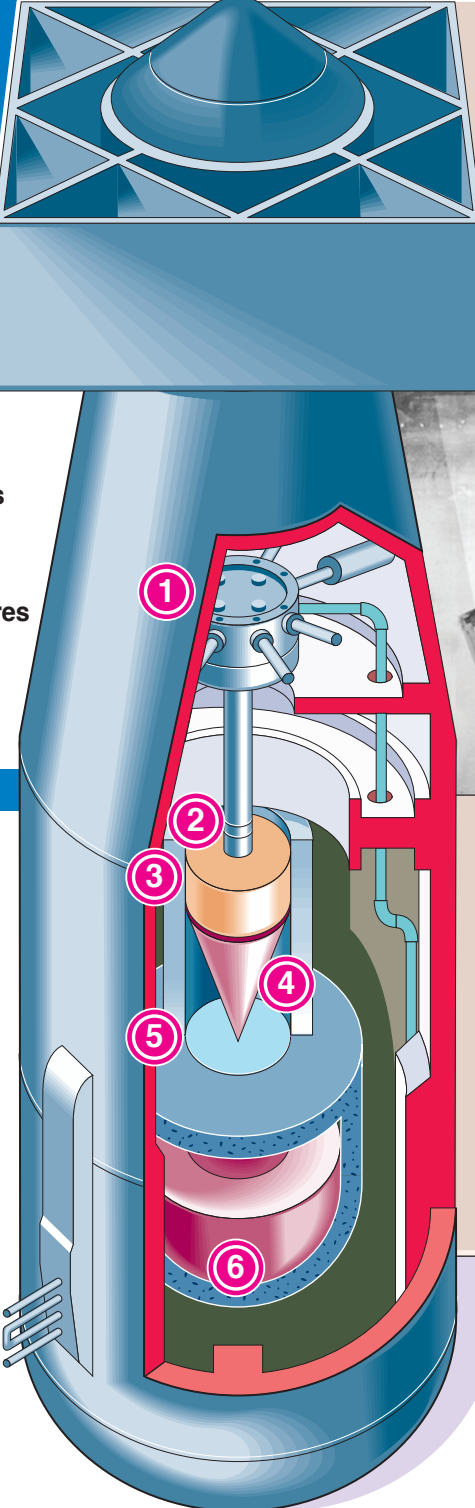
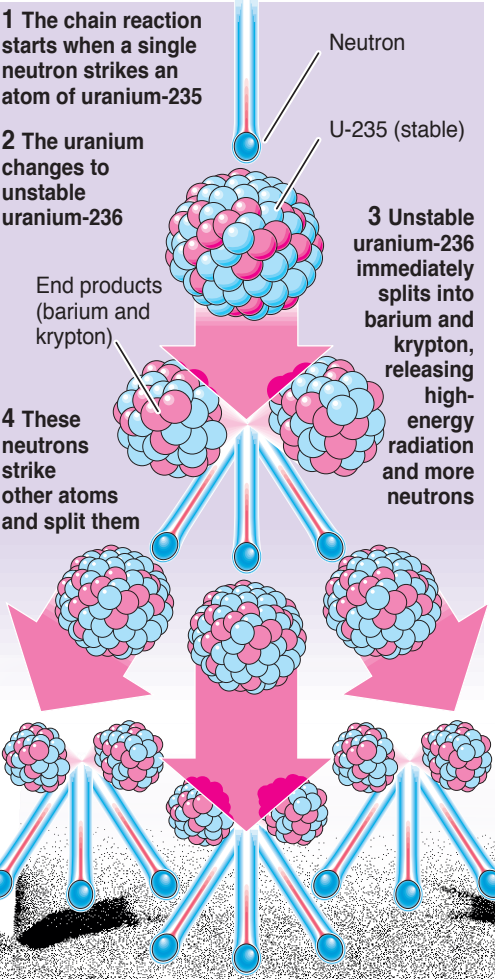


AGE OF THE BOMB

Just before dawn on July 16, 1945, the New Mexico desert was illuminated by the all-consuming fire of the first ever atomic test. So bright was the explosion, it is said, that even blind people registered the flash. And the scientists themselves were no less amazed, for the *Trinity Test*, as it was known, yielded four times more energy than they had thought possible – the equivalent of 20,000 tonnes of TNT. In that instant, the Pandora's Box reality of the nuclear age dawned. An age which, despite the ending of the cold war and the signing of test ban treaties, endures today. Since *Trinity* there have been more than 2,000 nuclear tests, with six more planned by the French from this September until May of next year

The world's first atom bomb

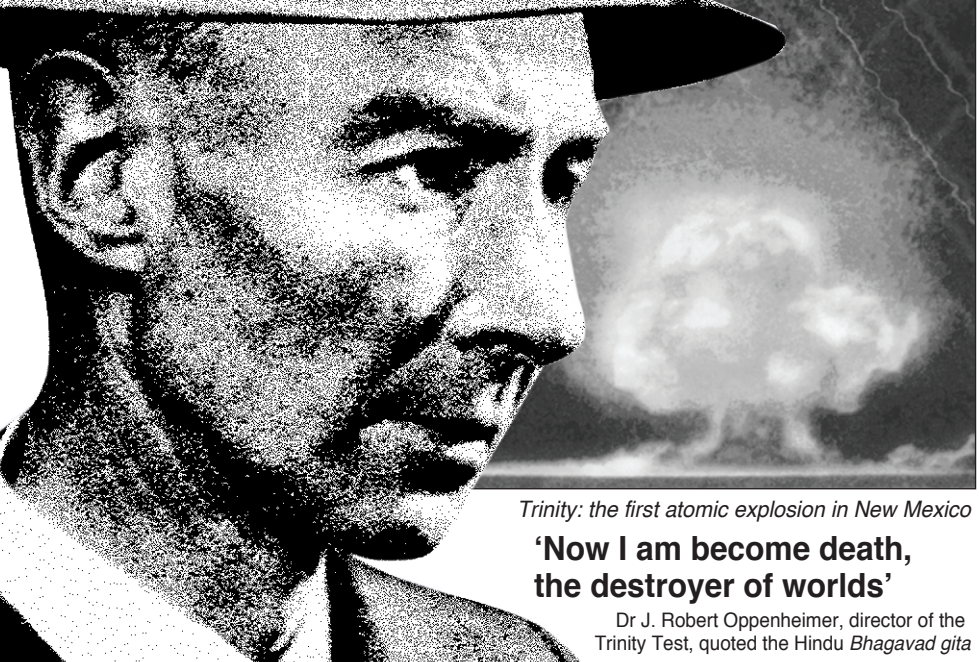
The power of the first atomic bomb came from the release of energy holding together each individual atom of uranium in the nuclear fuel. When sufficient fuel was brought together a chain reaction occurred. In less than a millionth of a second the chain reaction resulted in a massive atomic explosion



'Little Boy' – the Hiroshima bomb

1 Air pressure sensor triggers detonator when bomb falls to 1,890 feet. 2 Detonator fires, setting off (3) conventional explosive charge. 4 Conical wedge of uranium-235 is shot down (5) a conventional gun barrel into (6) a large target of uranium-235

The force of the impact welds the two pieces together creating a super-critical mass of uranium drenched in neutrons. The chain reaction accelerates and the explosion follows instantly



Trinity: the first atomic explosion in New Mexico

'Now I am become death, the destroyer of worlds'

Dr J. Robert Oppenheimer, director of the Trinity Test, quoted the Hindu *Bhagavad gita*

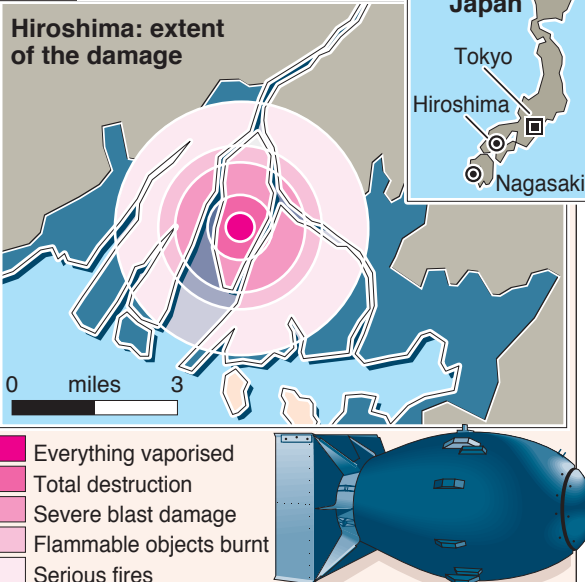
'The city was hidden by that awful cloud... boiling up, mushrooming, terrible and incredibly tall'

Colonel Paul Tibbets, pilot of *Enola Gay*



The New York Times.

FIRST ATOMIC BOMB DROPPED ON JAPAN; MISSILE IS EQUAL TO 20,000 TONS OF TNT; TRUMAN WARNS FOE OF A 'RAIN OF RUIN'



ATOMIC TERROR THAT CHANGED THE WORLD

1945 At a cost of \$1bn a year, atomic scientists worked at Los Alamos on the Manhattan Project to develop atomic weapons to hasten the end of World War II. They pursued two separate atomic devices. The *Trinity Test* involved the fission of artificially-produced plutonium-239, although not enough was available for the planned attack on Hiroshima just weeks later, on August 6 1945.

So the *'Little Boy'* device used enriched uranium that had been

separated into its most fissionable form. When it was loaded on to the 20-tonne B-29 aircraft, christened *'Enola Gay'*, no one knew if it would actually work.

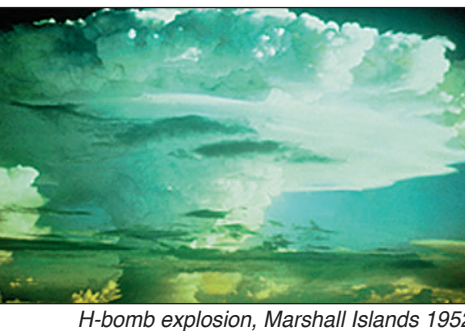
Just after 08.15am that morning, the bomb devastated four square miles. Three days later Major Charles W. Sweeney, flying another B-29 named *'Bock's Car'*, took off for Kokura loaded with a plutonium bomb – *'Fat Man'* (above). The target was so heavily defended that Sweeney decided to make

Victims from heat flash and blast

Hiroshima	80,000
Nagasaki	45,000
Total death toll from injuries and the effects of radiation	200,000

A-BOMB

1946 When the U.S. Navy tested its first atomic weapon a mile-high sheet of water engulfed Bikini Atoll. Using different combinations of fissionable material, the U.S. Atomic Energy Commission varied its tests, thinking it was at least a decade ahead of the USSR. In 1949, U.S. military planes picked up Soviet radioactive debris over the Pacific



H-bomb explosion, Marshall Islands 1952

H-BOMB

1952 In 1940, the physicist Edward Teller had determined how the sun shone by fusing together hydrogen and helium. In 1942 he suggested that just such a thermo-nuclear process could be mimicked on Earth, but not until after the end of the war was such a 'super-device' sanctioned. November 1952 – the first H-Bomb yielded the equivalent of 10 million tonnes of TNT

MORATORIUM

1958 In 1952, Britain had joined the nuclear club, detonating its own plutonium device followed five years later by a hydrogen bomb at Christmas Island. In 1958 the U.S. and USSR began to negotiate on the banning of more tests. A moratorium was declared for the duration of talks, but suspended after the U-2 incident in May 1960. France tested in 1960. China exploded devices in 1964

PARTIAL BAN

1961 The Cuban Missile Crisis erupted leading Britain, the U.S. and USSR to sign the *Partial Test Ban Treaty*. This stopped them from conducting tests in the Earth's atmosphere, but neither China nor France signed. All continued with underground tests. But as President Kennedy declared, *'It was a first step towards peace, towards reason,*

TREATIES 1974-96

a step away from war'

In 1974 India tested its own device and South Africa may have done so in 1979. Today 170 states which have ratified the **Nuclear Non Proliferation Treaty** have agreed in principle to a moratorium on nuclear testing. It is believed that Israel and Pakistan now have nuclear capability, and countries known to be pursuing nuclear weapons programmes include North Korea, Iran and Iraq

1995: Discussions are underway to sign a **Comprehensive Test Ban Treaty** banning all tests by the end of 1996

Nuclear arsenal (strategic warheads)

United States	8,258	(Dec 1994)
Former Soviet Union	9,584	(Dec 1994)
United Kingdom	234	(1995)
France	482	(1995)
China	434	(1993)

1995: FRENCH TESTS

Technological advances have reduced the size of warheads and increased the accuracy of computer modelling of their explosions. France claims it is lagging behind and the six planned tests will allow them to calibrate their calculations. Other countries suggest that mini hydro-nuclear experiments would produce the data they need. France, however, is developing new warheads for launch from cruise missiles and its submarine fleets – so it is clear that the first test at the Pacific atoll of Mururoa this autumn has more to do with politics than technology

Words by Nicholas Booth