

ANATOMY OF A MUSHROOM CLOUD

Think “nuclear weapon,” and you probably picture a mushroom cloud—a stem supporting a puffy head. But photos from U.S. atmospheric nuclear tests (1945–1963) show more than the basic stem-and-head structure. The detonations produced different, sometimes odd, effects. **BY EILEEN PATTERSON**

FIREBALL

The fireball was gone in seconds, so photographing it during the tests required a rapid electronic camera, called a rapatronic camera. Rapatronic photos of a test detonated on a tower showed a fireball with “legs”—the tower’s guy-wires becoming a glowing plasma in the fireball’s heat. The phenomenon was called a **rope trick**.

TUMBLER-SNAPPER HOW

JUNE 5, 1952
NEVADA TEST SITE

DOMINIC SUNSET

JULY 10, 1962
NEAR CHRISTMAS ISLAND

BUSTER CHARLIE

OCTOBER 30, 1951
NEVADA TEST SITE

CAPS

A high-yield test in the South Pacific created a swiftly rising cloud that might push warm water vapor ahead of it to great, cold heights, where the water vapor froze into one or more ice caps.

CASTLE BRAVO

FEBRUARY 28, 1954
BIKINI ATOLL

THE BASIC MUSHROOM

The iconic mushroom cloud begins as a fireball, a luminous bubble of extremely hot air and vaporized weapon residues. The fireball rises like a hot-air balloon, pulling air, water vapor, and debris into its base to form the mushroom stem. As the fireball rises, it cools, losing its glow, and the vaporized material and water vapor condense and spread, forming the mushroom head.

ABOUT TEST NAMES

Nuclear tests were done in series. A test’s name had two parts: series title first, test name second.

SKIRTS AND BELLS

Some tests produced “skirts” or “bells,” cone-shaped phenomena descending along the mushroom’s stem. These occurred when the dropping pressure and temperature of the high altitude caused humid air around the stem to condense into water droplets heavy enough to fall.

RINGS

A test in a warm, wet environment like the South Pacific sometimes produced rings of vapor instead of the type of vapor cloud seen in photos of Crossroads Baker. The rings were caused by the layers of humidity in the air.

SLICK AND CRACK

Crossroads Baker produced a “slick” and a “crack,” both caused by the underwater test’s shock wave’s first contact with the surface. The slick was an expanding circle of dark water resembling an oil slick, the source of its name. The crack was the shock wave’s disturbance of the water—a circle of white, ruffled water.

A FAKE MUSHROOM

Here, Crossroads Baker seems to be a mushroom cloud but is not. Baker was detonated under water, so the “stem” is a hollow pillar of water, and the “head” is short-lived (seconds) vapor.

CROSSROADS BAKER

JULY 24, 1946
BIKINI ATOLL

TEAPOT MET (MILITARY EFFECTS TEST)

APRIL, 15, 1955
NEVADA TEST SITE

LINES

The vertical lines in many nuclear test photos are smoke trails from rockets. The rockets were fired so the progress of the test’s shock wave could be recorded against the pattern of lines provided by the smoke trails.

CROSSROADS BAKER

JULY 24, 1946
BIKINI ATOLL