C-T extinctions without the impact

Ninety-two million years ago, the oceans of the earth suffered a mild mid-life crisis when various species of clams, plankton and nautilus-like creatures died out abruptly, an event that marks the boundary between the Cenomanian and Turonian ages in the geologic record. While experts have long puzzled over the cause of this die-off, geologists have found new evidence that suggests volcanic activity may have triggered the extinctions.

At 15 locations in western North America—all of which were at the bottom of an intercontinental sea 92 million years ago — researchers from the Los Alamos (N.M.) National Laboratory (LANL) and the University of Colorado in Boulder have found a concentrated layer of the element iridium at the Cenomanian-Turonian (C-T) boundary, they report in the April GEOPHYSICAL RESEARCH LETTERS. Iridium, normally rare in the crust of the earth, is much more concentrated in meteorites and in the earth's interior.

Many scientists believe that an iridium layer at the Cretaceous-Tertiary (K-T) boundary, 65 million years ago, is a signal that one or several extraterrestrial bodies hit the earth and killed off a large fraction of earth life, including the dinosaurs. But Carl Orth of LANL and his colleagues are not looking skyward for an explanation of the C-T boundary iridium. "We think it's some terrestrial process," he says. "We can't completely rule out an impact cause, but it also looks like we're seeing enhanced levels of elements such as scandium and titanium that are normally pretty low in meteorites."

The elements concentrated at the C-T boundary are more characteristic of material in the upper mantle of the earth than of that in meteorites, Orth says. This leads him to suspect that at the end of the Cenomanian age, mantle material started erupting abruptly through a midocean rift or some other feature. The eruptions, he suggests, laid down a concentrated layer of these elements.

Gases from the eruptions could have proved toxic to the marine animals that died off at the same time, according to Orth. The extinctions may not be related to the layer of concentrated elements, "but it's a heck of a coincidence if they're not," he says.

The iridium layer seems strongest in the southwest United States and dwindles toward Manitoba, a distribution that suggests the eruptions were localized. Orth's group will next look for the element layer in Texas and Europe. If the layer does not appear elsewhere, he says, the eruption theory may not be able to explain why the extinctions affected the entire globe. — *R. Monastersky*

Sneaky, secret bomber shows its face

Courtesy U.S. Air Force

The U.S. Air Force calls this a "reasonably accurate artist's rendition" of the super-secret B-2 "stealth" advanced technology bomber, but doubts persist. After years of shrouding the high-tech plane in secrecy, the Air Force released the drawing because it expects to begin flight tests this fall.

The strange-looking plane marks a return to the "flying wing" design abandoned in the late 1940s. Its relative flatness and absence of a vertical stabilizer lessen the plane's radar profile. Experts say the whole craft is probably covered with radar-absorbing materials, and they speculate that its hot jet engines are encased in the wing to limit the emission of detectable infrared radiation and shield the metal from radar. The plane's underside and jet engine outlets are not shown in the drawing.

An Air Force spokesman says the drawing is "accurate enough to recognize the plane if you saw it flying around," but refuses to say whether any details were omitted. Some experts have questioned the lack of rounded engines on the wings, which would reduce radar reflection, and the April 25 AVIATION WEEK AND SPACE TECHNOLOGY reports the engine inlets are farther back on the wing than depicted. The Air Force has engaged in subterfuge before when unveiling aircraft, most notably by adding a fake propeller to the Bell XP-59 jet fighter in the mid-1940s and retouching photographs of the F-104 Starfighter in the mid-1950s, says Smithsonian Air and Space Museum Head Curator Robert Mikesh. However, an Air Force spokesman says releasing disinformation about the B-2 is "absolutely out of the question."

The latest rung on the shuttle's ladder

"Everything still looks clean," said a NASA spokesman after listening to the latest in a series of daily conference calls. "That certainly is nice to hear." The topic was the ongoing analysis of the April 20 test-firing of one of the space shuttle's redesigned solid-propellant rocket boosters (SRBs). The original SRB design has been widely cited as the culprit in the Challenger explosion 27 months ago that killed seven astronauts and grounded the entire shuttle program.

The booster used in the test at contractor Morton Thiokol's facility near Brigham City, Utah, included deliberate flaws to test whether the redesign would successfully prevent the leakage of hot exhaust gases. A narrow gap termed a "blowhole" was put in the sealant between the rearmost segment of the booster's casing and the rocket nozzle; another defect was placed between two segments midway along the casing.

The first few days of inspection after the test revealed no "anomalies" (unanticipated problems) at all, according to a Thiokol official, based on preliminary appraisals that ranged from reading instruments to sending an engineer crawling inside for a look. As the booster was progressively taken apart, subsequent study was expected to show whether there were any traces of soot or other signs that the hot gases might have gotten through a protective flange called a "J-seal," a key element in the new design.

If test results continue to be as favorable as the first look, only two more tests are planned with the full-scale booster firing for the full 2 minutes that a pair of SRBs need to power the space shuttle's liftoff. Five days after the test, NASA continued readying the shuttle Discovery for an Aug. 4 launch.

Barring unforeseen difficulties, engineers will conduct the first of the two remaining test-firings in June, without the built-in flaws but using a new test stand at Thiokol that simulates structural stresses induced by the SRBs' interaction with other parts of the shuttle. The final test is aimed for July.

Meanwhile, even before the redesigned SRBs carry the shuttle on its return to space, NASA plans to seek proposals from industry for the development of an improved SRB called the Advanced Solid Rocket Motor. Envisioned as offering increased payload weight, reliability and safety, the new booster is planned for service in the mid-1990s. — *J. Eberhart*