# Magma Drilling Comes Up Short

Prospects have cooled for tapping a sleeping volcano as an energy source in California. On 14 September, geologists pulled the plug after 2 months of drilling at a scientific well in Long Valley Caldera, a dormant but seismically active volcanic region near the Nevada border. Their aim was to plunge a preexisting borehole closer to a suspected mass of magma, or semimolten rock, far beneath the valley floor to better gauge its location and assess its potential as a clean energy resource. But tough drilling conditions and a dried-up well of funding halted the project at a depth of 3 kilometers—nearly a kilometer short of the goal.

Geothermal researchers believe that injecting liquids into magma would yield a steady flow of pressurized steam for generating electricity. The California Energy Commission, with three other agencies, took several years to scrape together a $2 million funding package to explore this scenario, but now the odds against future drilling are long. "We haven't produced any results that point to a big energy resource payoff, and that's disappointing," says co–project manager John Finger of Sandia National Laboratories in Albuquerque, New Mexico.

The team ran into highly fractured rock in the thick dome overlying the magma, Finger explains. Operations were halted several times daily to haul up just a couple of meters of broken-up drill core, rather than 5 to 6 meters at a time as hoped. Water also courses through the fractures, carrying away heat and masking the thermal signature of the magma beneath. As a result, the researchers are no closer to finding the chamber, which could lurk as deep as 7 kilometers or more.

Project volcanologists still hope to learn more about the caldera's "resurgent dome," which has bulged Long Valley ominously upward by more than half a meter since 1980. Small eruptions occurred nearby 250 years ago, and a cataclysmic blast gouged the caldera about 760,000 years ago. Instruments left in the borehole should help illuminate future hazards.

## Rabid Vampires?

The vampires of legend may have been real after all. According to a report in this month's issue of *Neurology*, symptoms of rabies—such as a tendency to bite and an aversion to stimuli like strong smells and mirrors—bear an uncanny resemblance to historical descriptions of vampires. Reports of the bloodthirsty undead terrorized areas of Eastern Europe in the early 1730s, a few years after a major rabies epidemic was recorded in Hungary among dogs and wild animals.

Juan Gómez-Alonso, a neurologist at the Hospital Xeral in Vigo, Spain, says the idea that rabies was to blame struck him as he watched his first vampire movie nearly 20 years ago. He was intrigued when the movie's presenter quoted philosopher Jean Jacques Rousseau saying that vampires were real historical figures. "I watched the film more as a doctor trying to solve a difficult clinical case than as a spectator," he says.

Gómez-Alonso lists plenty of reasons to diagnose vampires as rabid. Its victims suffer from insomnia and sometimes have increased sex drives, he says, while vampires were said to wander in the night and stalk women. The animals associated with vampires—wolves and dogs—were common rabies carriers at the time. In addition, because rabies victims have trouble swallowing, bloody saliva sometimes drips from their mouths.

**Vampires of legend, as depicted by Goya.**

Some experts, however, aren't ready to drive a stake through this mystery. Human-to-human rabies transmission is rare even through bites, says Charles Rupprecht, chief of the U.S. Centers for Disease Control and Prevention's rabies section. The rabies explanation is intriguing, he concludes, but still "a bit of a stretch."

## Tiny Moon Source of Jupiter's Ring

A wee moonlet appears to be the main source of the 260,000-kilometer-wide ring circling Jupiter. On 15 September, scientists unveiled new images of the Jovian ring system suggesting that erosion of tiny Adrastea—just 20 kilometers in diameter—is feeding Jupiter's brightest dust ring. "It's an American success story—the little guy wins," says planetary dynamicist Joseph Burns of Cornell University.

Soon after the Voyager 1 spacecraft discovered the Jovian ring system in 1979, researchers realized that fresh dust must be continually feeding into the ring system to replace the dust that drifts into Jupiter. Some experts suggested that the continual rain of comet and asteroid debris pelting small moons or unseen orbiting boulders could be blasting dust into the ring.

**Adrastea (upper right) is minuscule compared to better known moons such as Io (lower left).**

That little Adrastea alone could give rise to the bright main ring had seemed unlikely. But new images from the Galileo spacecraft now orbiting the planet reveal dust from two larger satellites feeding the extremely faint ring beyond the main ring. So Burns and his colleagues envision a scenario in which impact erosion works at Adrastea, which is poised on the ring's outer edge, far more efficiently than previously assumed. The moon presents a fair-sized target to speeding impactors, but it isn't so large that its gravity can hold onto much of the resulting debris, he says. In fact, Adrastea is so close to Jupiter that the massive planet's tug would sweep parts of the moon clean. "Even though it's small," says Burns, "it's the perfect source."

Adrastea probably gets help from its larger neighbor Metis, which is embedded in the ring, but Burns can't rule out boulder fields contributing as well. Galileo's crippled communications antenna prevents a search for smaller actors in ring creation.