

## Crystal Giants

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Photograph by Carsten Peter, Speleoresearch & Films *National Geographic* November 2008

The largest known gypsum crystals in the world are found in a cavern deep below northern Mexico's Chihuahuan Desert. Made of selenite, a transparent, colorless form of gypsum, these giants have grown to astonishing proportions—several exceed 30 feet (10 meters) in length. The longest, the Crystal Cien, measures 37.4 feet (11.4 meters)!

The dazzling discovery of the Cave of Crystals, as it's called, was made by two miners excavating an exploratory tunnel inside the Naica mine, almost a thousand feet below the surface (300 meters). Owned by the Peñoles company, Naica is Mexico's most productive lead mine. Other caves, with smaller crystals, have been found in the mine, beginning in 1910, when the Cave of Swords was discovered at a depth of 394 feet (120 meters).

Upon learning of the cave, scientists around the world wanted to know how the crystals had grown so large. The answer lies in the unusual environmental conditions in which they developed.

For about 600,000 years mineral-rich water filtered through the cave, depositing molecules of calcium sulfate like stacked bricks. At first an intrusion of magma deep below the surface superheated the water. Then around half a million years ago the water temperature cooled to roughly 136 degrees Fahrenheit, the right temperature for the calcium sulfate in the water to form selenite crystals. Conditions in the water-filled cave remained virtually unchanged for hundreds of thousands of years, allowing the crystals to reach astounding sizes.

Around 1985 miners unknowingly drained the water from the cave as they lowered the water table in the mine with pumps. No longer immersed, the crystals stopped growing, although they would start growing again if water were allowed to return.

For now the cave is secured by the company with a heavy steel door to protect against looters and environmental damage from the mine's ventilation system. Few people are allowed into the cave for two important reasons. First, it's exceedingly hot and humid, and people who enter without special cooling suits risk dying of heatstroke. Second, because gypsum is so soft (it has a hardness of 2 on the Mohs' scale), it can be easily scratched and damaged by tools, boots—even a fingernail.