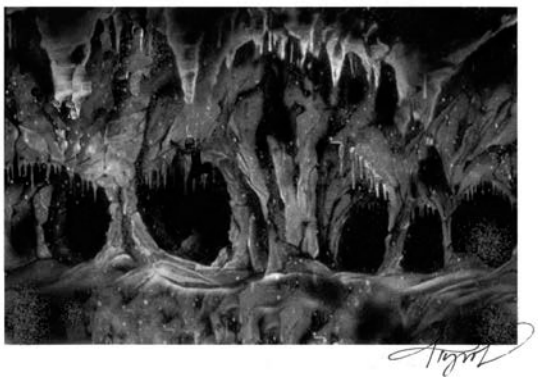
The Outside Story



How Are Caves Created?

By: Susan Shea

To enter the cave, we donned hard hats and descended a vertical drop with the aid of a rope. We crawled on our knees and bellies through a wet, narrow passageway, emerging into a large underground chamber that contained a small lake. By the light of our headlamps, we could make out interesting cave formations — icicle-like stalactites hanging from the cave ceiling and stalagmites growing up from the floor. In the cool, damp darkness, we heard the slow dripping of water. Our underground adventure left us covered with mud — our skin and clothes were caked with it.

This cave, located in eastern New York State, was what is called a solution cave, typically formed from the action of groundwater dissolving carbonate bedrock such as limestone or marble. The process begins when rainwater absorbs carbon dioxide from the atmosphere as it drains through soil and decaying vegetation, resulting in a weak carbonic acid. This acid slowly dissolves minerals in rock, such as calcite found in limestone, and over time, excavates cavities and tunnels. Most of this process takes place at or below the water table.

The next stage in solution cave development occurs after the water table sinks, allowing air to enter the acid-carved cavities. As carbon dioxide escapes from water dripping from cave walls and ceilings, dissolved minerals in the water come out of solution, forming features such as the stalactites we saw. Solution caves may also form above the water table in carbonate bedrock by erosion from melting glaciers or streams that disappear underground.

One doesn't hear much about solution caves in the Northeast. Compared to the southeastern United States, with its extensive cave systems, our areas of soluble rock, or karst, are limited and caves tend to be smaller. But hundreds of solution caves occur in the marble, limestone, and dolomite belt that runs north-south along the western boundaries of Vermont, Massachusetts, and Connecticut and the easternmost portion of New York. Our region also has non-solution caves, including talus caves, openings under piles of boulders at the bottom of cliffs left by glaciers, and fracture caves, where forces such as faulting have moved the rock apart.

Northeastern caves, especially those in New England, have not been extensively studied by the scientific community; much of the available information about them

comes from cavers. Rodney Pingree, a geologist by training, founded the Vermont Cavers Association thirty years ago and has explored almost 100 of the state's caves. Pingree says spelunking is "not a glamour sport. Caves are dark, cold, wet, tight, and can be claustrophobic. The appeal is going where nobody has ever gone before. Unlike climbing a mountain, in a cave you can't see the end. Your flashlight may be the first to light parts of a cave." The association maps caves, discovers new caves, works with landowners to keep caves accessible, helps biologists with bat counts, and assists in cave rescues. Pingree recalls a rescue of two people who had entered a cave with only one flashlight, and when its batteries died, were unable to find their way out in the total darkness.

A cave's environment is remarkably stable. The air temperature remains relatively constant year-round — 40 to 45 degrees in Vermont's deeper caves, according to Pingree. Outside temperature swings are buffered by soil and rock. A number of animals, including porcupines, snakes, and bears will sometimes use caves as winter dens. Many northern bat species use caves for hibernation. These hibernacula once hosted many thousands of bats, before white nose syndrome, a fungal disease, decimated populations. Some of these caves have now been closed to protect bats from human visitors, who can disrupt roosts and spread white nose syndrome via their clothing.

If you're interested in visiting a cave, Howe Caverns and Secret Caverns, near Schenectady, New York are commercially-operated limestone caves that offer tours. The glacier-made Polar Caves in Rumney, New Hampshire (closed for the season) are a popular family destination. Pawtuckaway State Park in Nottingham, New Hampshire has an extensive boulder field with many talus caves you can explore on your own.

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