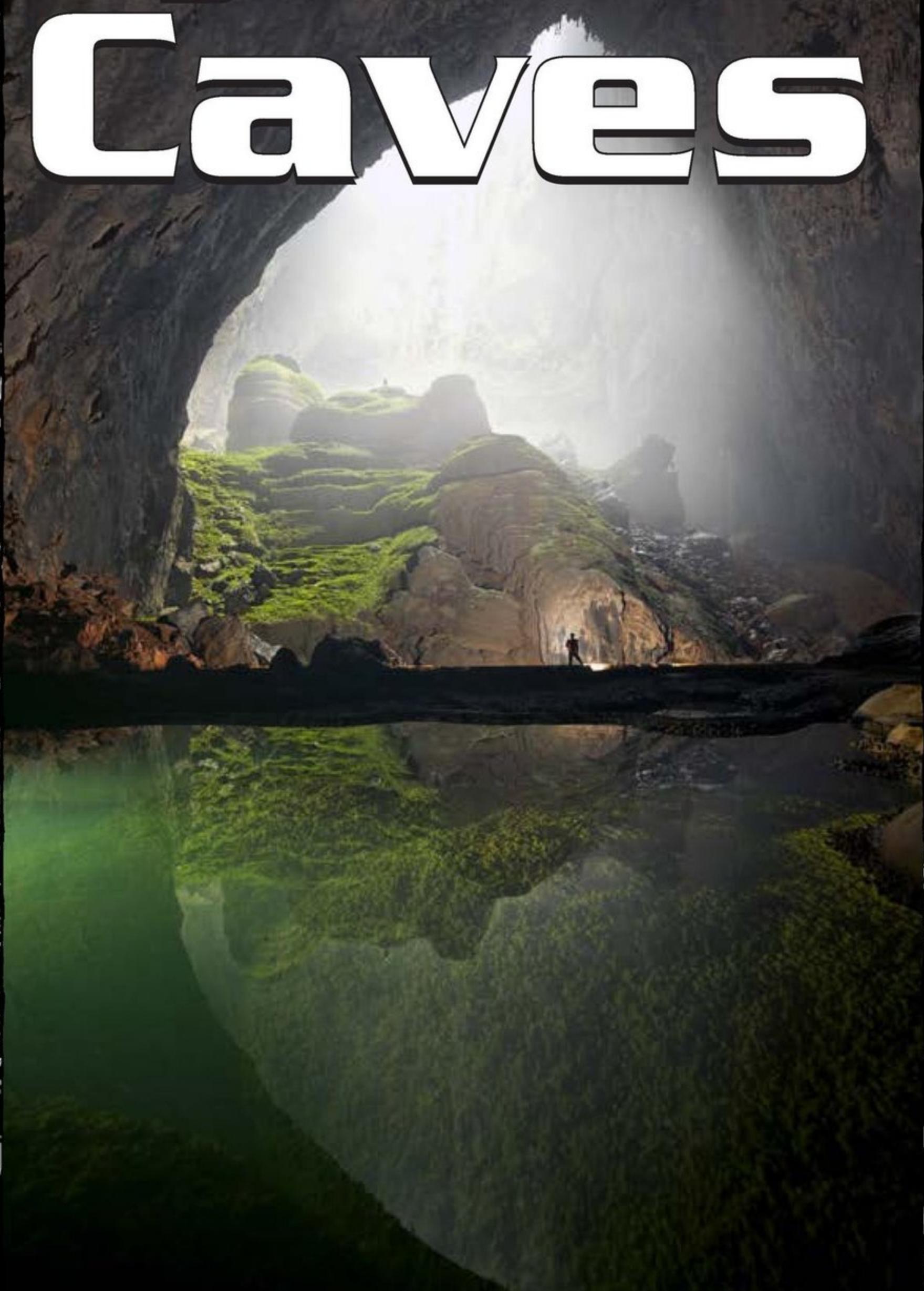


LEVELED Book • V

Mysterious Caves



Written by Terry Miller Shannon

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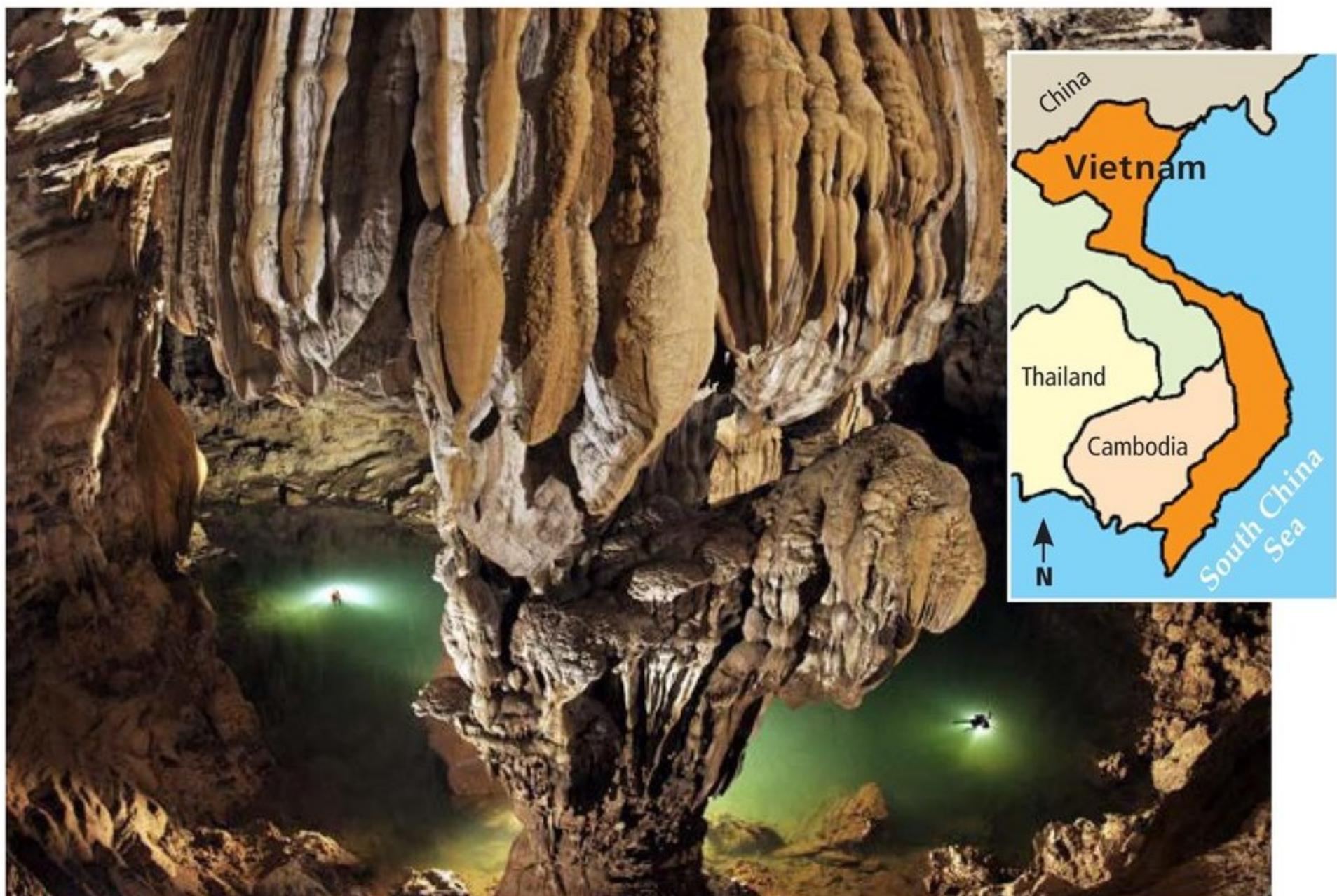


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British cave explorers are dwarfed by a gigantic flowstone column deep inside a Vietnamese cave.

A New Underground World

In 2009, a team of British cave explorers traveled to Vietnam. Vietnam is a long, narrow country that borders a portion of the South China Sea. It has many beautiful bays, large rock formations, forests, and rivers.

These cave explorers, or **spelunkers** (spee-LUNK-ers), had already visited several large caves in the area. But this time, they were exploring a cave that was brand new to science. Only a local farmer, Ho Khanh, knew its location, and he had led them to the jungle-covered opening. They went in and walked for miles, into nothing but total darkness.



A shaft of sunlight helps explorers ready to climb up the cave cliff called the Great Wall of Vietnam.

Suddenly, they saw light. A shaft of sunlight was cutting through the darkness ahead of them. As they moved closer, they could tell that part of the cave roof had **collapsed** long ago, leaving a hole that let in this patch of sunlight.

The sunlight revealed the room's amazing size. They soon realized that they stood in the biggest cave room known to exist. One single area of the room was over 90 meters (300 ft) wide, 180 meters (600 ft) high, and over 4 kilometers (2.5 mi) long. An entire city block of 40-story buildings could fit inside.



The entrance to the massive Hang Son Doong cave was hidden by dense jungle.

This cave, called Hang Son Doong, or Mountain River Cave, is enormous. Where the roof collapsed, letting in sunlight and rain, dense hidden jungles grow. There is also a 60-meter (200-ft) cliff they named the “Great Wall of Vietnam.” The cliff stopped the cavers at first. They returned with equipment to scale the cliff, and continued their journey into the interior.

This cave is the biggest yet found, but it may not be the biggest in the world. Adventurous explorers find new caves every year. In this book, you will learn about caves. You will read about how they form, the unusual formations and living things within them, and other caves that are just as wondrous as Hang Son Doong.

What Are Caves?

A cave is any natural hollow space in the earth. Usually when people talk about a cave, they mean a space big enough for a person to go inside, and deep enough so sunlight never reaches part of it. Caves can occur in rock, in ice, and underwater. Caves are found all over the world.



Cave explorers want to see what's inside.

We may think of all caves as being dark and barren. But caves can be gorgeous, filled with amazing formations and unusual animals. Caves lure adventurous people who love the excitement and challenge of seeing a place no one has ever seen before. We know that humans lived in caves as long as 30,000 years ago.



Montana's Lewis and Clark Caverns contain some of the largest limestone formations in the United States.

Types of Caves

Caves can form in several ways. Nature uses basic tools such as rock, water, and heat to carve these **chambers** in the earth.

Karst Caves

The ground is made of different types of rock. Some types, such as limestone, can dissolve in water.

Water from the surface seeps through the soil or trickles through cracks in the ground. If the water hits limestone underground, it slowly dissolves the rock, creating a hollow space. Over millions of years, the water eats away at the rock and creates a karst cave.



Molten lava spills into the sea from a lava tube at Kilauea, Hawaii.

Primary Caves and Lava Tubes

In karst caves, seeping water dissolves existing rock and eventually creates a hole. But in **primary caves**, the rock contained a hollow space from its beginning. The rock was born with a cave-sized hole in it.

Another type of rock cave forms when liquid magma or lava in volcanoes cools and turns solid. In some volcanoes, liquid lava flows over the ground in a stream. The surface of the lava stream quickly cools and turns solid. But the lava underneath stays hot and liquid, and keeps flowing. The flowing hot lava creates long tunnels through the solid lava rock. These long tunnel caves are called **lava tubes**.



Sailors explore a vast sea cave on the island of Corfu, Greece.

Erosional Caves and Sea Caves

Moving water, such as rivers or ocean waves, can carry grains of sand. Ever so slowly, these tough little grains grind away rock in a process called **erosion**. Erosion creates caves called erosional caves. Erosional caves are different from karst caves in that water physically grinds away the rock. In karst caves, water chemically dissolves the rock.

A common kind of erosional cave is a sea cave. Sea caves form when ocean waves continually crash against cliffs, eventually digging out a hollow space.



Inside a massive ice cave formed beneath the Mendenhall Glacier, in the state of Alaska

Caves don't always form in rock. Glaciers are enormous moving masses of solid ice. At the top of a glacier, the Sun can melt some of the ice, which becomes a stream of warm water. The warm water flows down through cracks in the glacier toward the soil layer beneath. As it runs, the warmer water melts the ice around it, forming a glacier cave.

You can also find caves underwater. Most underwater caves formed in the same way as caves on land, except the rock was under a lake or ocean. Some underwater caves were once dry caves that flooded when the sea level rose in an area.



Hikers have natural light at the entrance to Milodon Cave, near Puerto Natales, Chile.

Inside Caves

Caves are made up of three main areas: the entrance, the twilight zone, and the dark zone.

The entrance to a cave may be large or small. It can be a doorway into a mountain, a hole straight into the ground, or a crack in a boulder.

The twilight zone is any part of the cave where some sunlight still seeps in. If you can see without a flashlight, you're in the twilight zone. This zone is often cool and damp, and you can find animals and some plants living there.

As you might guess from the name, there is no light at all in the dark zone. No plants grow there, but some fungi, molds, and animals have adapted to the total darkness.



Karst caves are the most common type of cave, so let's take a closer look inside one. Water and dissolved limestone create all kinds of fantastic **formations** in these caves.

Many people are familiar with **stalactites** and **stalagmites**. These form when water drips from a cave ceiling to the floor. The drops contain dissolved limestone. When the water dries or evaporates, it leaves behind bits of limestone. Bit by bit, the limestone builds up, creating stalactites on the ceiling and stalagmites on the floor. These formations only grow about 2 millimeters (about 0.08 in) a year. But they can reach over 10 meters (33 ft) long. Sometimes a stalactite and a stalagmite join to form a **column**.

Helpful Hint

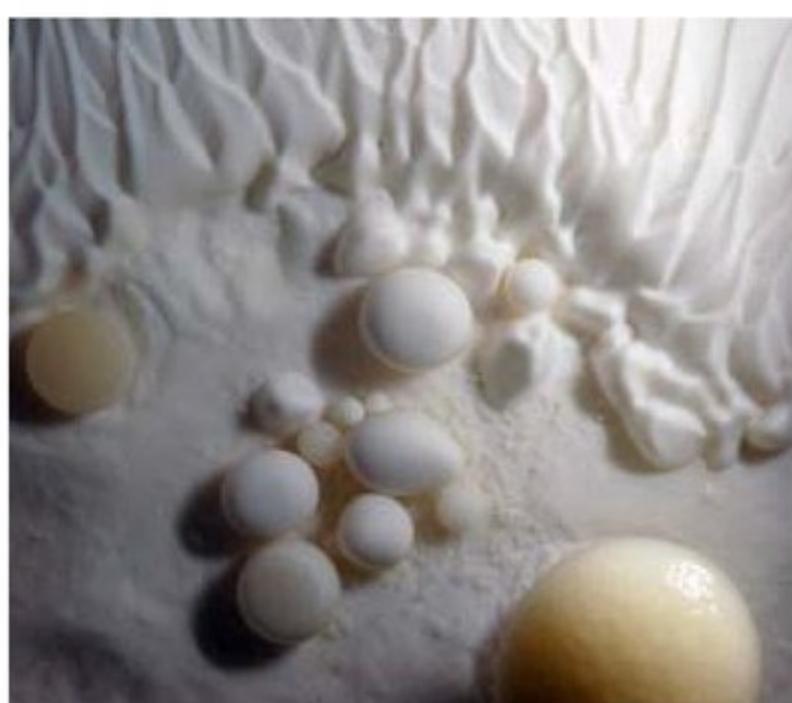
Do you forget which is a *stalactite* and which is a *stalagmite*? The word stalactite contains the letter c. Think of it as standing for *ceiling*. Stalactites hang from the top of the cave. Stalagmite contains the letter g, which can stand for *ground*. Stalagmites point up from the ground of a cave.



drapery



soda straws



cave pearls

When water drops run down the sides of a cave, they leave behind trails of limestone. These trails can build up to form a **drapery**, or curtain of rock. Draperies can grow more than 3 meters (10 ft) long, and may be so thin that they are transparent.

A soda straw formation is thin and hollow, like a straw for drinking soda pop.

Another rare shape is called a cave pearl. These round formations may start as a grain of sand. The grain gets wet with water that contains dissolved limestone. When the water evaporates, the limestone is left behind. Over time,

the limestone deposits build up and form thin layers—just like a pearl.

It takes a very long time to build a formation, drop by drop—over many thousands of years.

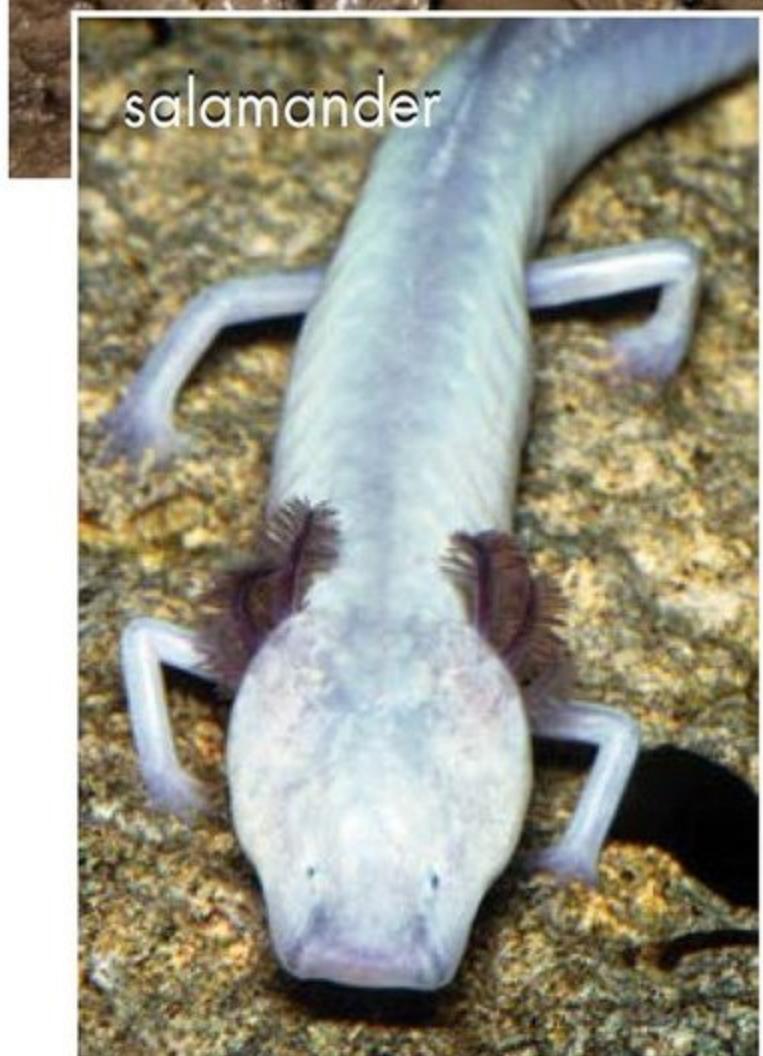
Cave Inhabitants



Creatures small and large make their homes in caves. Many scientists divide cave animals into three groups: animals that spend their entire lives in caves, animals that spend part of their lives in caves but can be found elsewhere, and animals that only visit caves.

Some types of animals spend their entire lives in caves, and aren't found anywhere else. They include certain millipedes, centipedes, spiders, insects, crayfish, salamanders, and fish. These animals have adapted to survive in total darkness. Many of them are blind, and some have no eyes at all.

Other kinds of animals live both in caves and outside. A good example of this are bats. Bats may spend every night in a cave but must go outside to find food. Other examples are some beetles, millipedes, centipedes, and salamanders.





Ancient cave-dwellers used this doorway in the Great Hall of Bulls, Lascaux, France.

Many animals spend most of their time outside but visit caves for shelter, to rest, or to hunt for food. This group includes bears, foxes, pack rats, snakes, raccoons, moths, groundhogs, vultures, crickets, and of course, humans.

Many humans have found the enclosed space of a cave to be a good place to live. In Andalucia, Spain, hundreds of people live in caves, while northern China has millions of human cave dwellers. Other places where people live in caves include Turkey, North Africa, and France. Artwork on cave walls and the remains of campfires show that humans have used caves as shelter for tens of thousands of years.



Prehistoric cave-dwelling artists painted beautiful horses and bulls on the walls of the famous Lascaux Cave in France.

Do You Know?

In 1940, four boys accidentally discovered one of the most famous art caves, France's Lascaux Cave. They squeezed into a small hole, entering a large cavern with beautiful paintings of deer and bulls. Luckily, the boys were not hurt, but entering a cave without an experienced cave explorer or guide is a dangerous idea. Later, one of the boys became the cave's main guide.

Caves are very fragile habitats. Many have almost no contact with the world outside. If something new comes into a cave, it can cause trouble for the animals that live there.

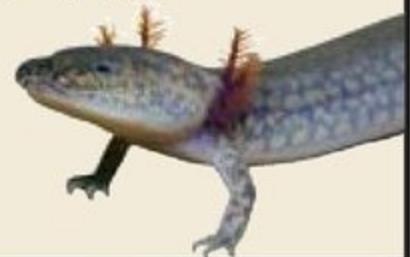
Bats hibernate in caves. During hibernation, a bat's body slows down, allowing it to go months without eating. Recently, frightening numbers of hibernating bats have been getting sick and dying.

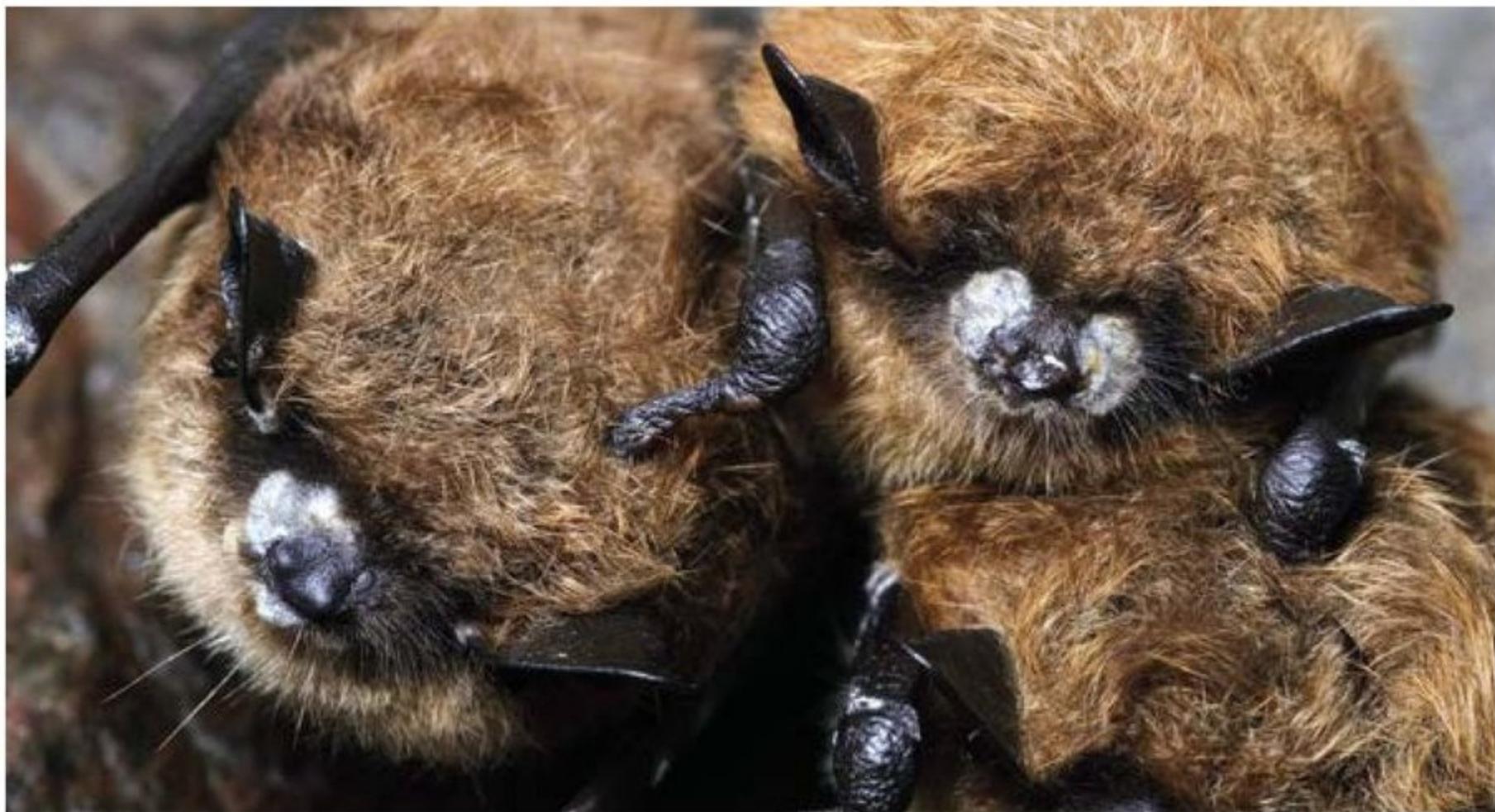


Under normal conditions, hibernating bats huddle together in caves all winter long.

Do You Know?

Caves are too deep to be affected by seasons. Cave temperatures tend to be between 24 degrees C (75° F) and 1 degrees C (30° F). Animals that live in caves adapt to this unchanging environment.





Bats with White Nose Syndrome

Cave visitors first spotted the problem in 2006 outside Albany, New York. Bats there had a strange white fuzz around their mouths and noses. Instead of hibernating, they woke up and flew out of the cave. Waking up during winter is dangerous. Without food, the bats starve or freeze.

Scientists call this condition White Nose Syndrome. Since 2006, it has spread across the entire eastern United States. White Nose Syndrome can kill over 90 percent of the hibernating bats in a cave in a single winter.

Scientists have identified a fungus that causes White Nose Syndrome, but they don't know how to cure it. Some scientists fear that even common types of bats may soon go extinct. They urge cave explorers to stay away from caves with bats in order to keep the fungus from spreading.



Geologist studying the largest known crystals in the world

Famous Caves

Caves throughout the world are famous for their outstanding features. The Cave of Crystals in Mexico contains rooms full of gigantic sparkling crystals—the largest ever found. Some are 10 meters (33 ft) long! Mammoth Cave in Kentucky contains more than 480 kilometers (300 mi) of **passageways**, making it the largest known cave system in the world. The deepest cave found is Krubera Cave in the Eastern European nation of Georgia. It is over 2,000 meters (7,000 ft) deep, and spelunkers aren't done exploring!

One of the most world-famous caves is the Chauvet (shaw-VAY) Cave in France. Discovered in 1994, it contains over 300 of the world's oldest paintings. Dated as approximately 30,000 years old, the paintings include horses, lions, and bears.



Safety equipment, lights, and proper climbing gear are a must on any cave exploration.

Exploring Caves

Why do spelunkers go into caves? Some do it for the thrill of physically challenging themselves by climbing down ropes, crawling through tiny tunnels, or scuba diving in underground caverns. Scientists enter caves to learn more about Earth.

Experienced cave explorers equip themselves with helmets, flashlights, warm clothing, rope, and kneepads. As the spelunkers go deeper, they may have to wriggle through tiny tunnels. They may wade through underground pools or rivers. In the cave, they hear water drip-drip-dripping, but no other sound. The only light is the glow of their flashlights.



Lacey sprays of gypsum crystals are found only in the Lechuguilla Cave in Carlsbad Caverns Park, New Mexico.

A cave is exciting, but it can definitely be dangerous. It is easy to get lost in the twisting, pitch-black tunnels or trapped in a narrow space. Cave floors can be steep and rocky, or slick with mud. It takes the skills of a hardy rock climber to explore many caves.

Cave formations can be extremely delicate. Thoughtless cave visitors have broken off stalactite tips as souvenirs, destroying in a second something that may have taken 40,000 years to form.

If you ever plan to visit a cave, take a guided tour. The guide can explain the many wonders of the cave and keep both you and the formations safe.



An explorer climbing a flowstone formation inside the Ultra Primo Chamber of Lechuguilla Cave, in Carlsbad Caverns Park, New Mexico

Conclusion

The world of caves is fascinating. Where else on Earth can you find unexplored land, discover otherworldly formations, and see artwork from thousands of years ago? As long as we treat them respectfully, we can continue to experience the wonder of caves indefinitely.

Glossary

chambers (<i>n.</i>)	a room or other enclosed space, either natural or artificial (p. 8)
collapsed (<i>adj.</i>)	fallen apart or fallen down (p. 5)
column (<i>n.</i>)	a pillar on a building; a cave formation created when the gap between a stalactite and a stalagmite closes (p. 13)
drapery (<i>n.</i>)	a curtain; a cave formation in the shape of a thin sheet that hangs from the cave wall or ceiling (p. 14)
erosion (<i>n.</i>)	the gradual wearing away of rock or soil by water, wind, or ice (p. 10)
formations (<i>n.</i>)	something that is shaped, formed or created (p. 4)
lava tube (<i>n.</i>)	a cave formed when the outside of a lava flow cools and hardens while the still-molten interior flows away (p. 9)
passageways (<i>n.</i>)	narrow tunnels, halls, paths, alleys, or routes to get from one place to another (p. 20)
primary cave (<i>n.</i>)	a cave formed when new rock is created with a hollow space inside (p. 9)
spelunkers (<i>n.</i>)	people who explore caves (p. 4)
stalactite (<i>n.</i>)	a pointy rock formation that hangs down from the ceiling of a cave (p. 13)
stalagmite (<i>n.</i>)	a pointy rock formation that sticks up from a cave floor (p. 13)

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