

# Discovered in 1939—Rediscovered Daily



“When the smoke and dust cleared... Charles Brigham, Lance Dodge, Wayne Lampman and Stacy Collins were the first to climb over the fallen rock... Theirs were the first human eyes to see the wonders and spectacular beauty...” —Alonzo Pond, from the original guidebook

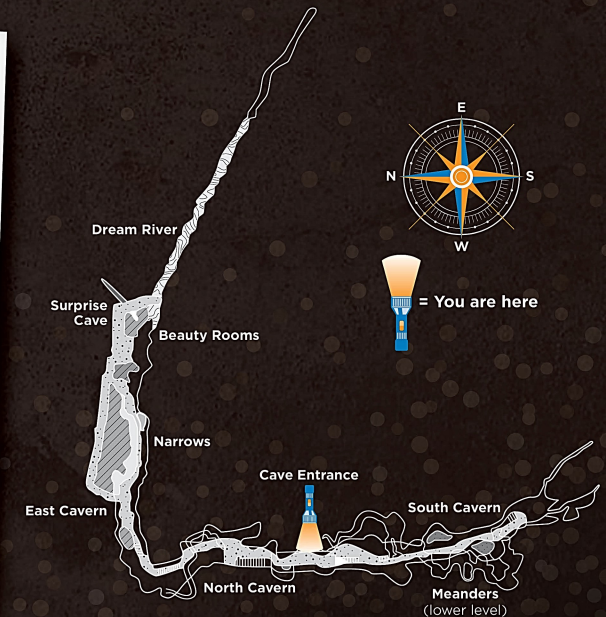
The cave was accidentally discovered after a limestone quarry blast on August 4, 1939. When the dust and smoke cleared, the workers saw two gaping holes in the quarry face. A few hours later, the cave was entered for the very first time.



Quarry workers look on after discovery blast.



Imagine what it must have felt like to peer into this cave for the first time—maybe similar to the feeling of excitement you have today as you begin to explore!





# Limestone Formation

 Geologists have a saying—rocks remember.” —Neil Armstrong

You are now surrounded by some of the oldest rock in Wisconsin. This rock, called *limestone*, forms the bedrock of our great state. Most of North America was covered by an ancient sea 400-500 million years ago. This *Ordovician* sea was teeming with life... mostly shelled animals who were ancient relatives of modern day sea creatures. Over time, the *calcium carbonate* shells compacted in layers with other sediments and formed the limestone that we see here today.



Look at the limestone all around you. Notice the various holes throughout the surface of the rock. These holes are called *vugs*. Can you see the layers in the limestone rock? Which layers do you think would be the oldest? The youngest?





# Ordovician Fossils

“Geology is the science which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature.” —Charles Lyell



Some ancient shells left behind evidence of their existence in the surrounding limestone. These are *fossils*. The ceiling here holds the imprint of a *cephalopod*, an ancient relic related to the modern nautilus. The widest end of the impression would have been where the head and tentacles were. Throughout the cave, you might catch a glimpse of other common Ordovician fossils such as the *gastropod* and *crinoid*.

Gastropod



Crinoid



Cephalopod



Carefully observe the cephalopod fossils here. Notice the shell segments, called *septa*. A segment grew approximately every year when the animal was alive. How old do you estimate this cephalopod would have been?



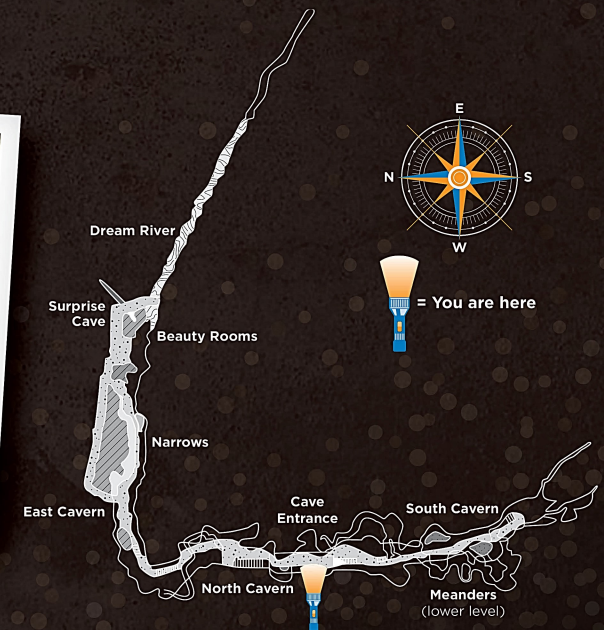
# Limestone Cavern Formation

“...one can look down into the... lower passages resembling shelves and corkscrews intermingled in a maze which the cave waters followed as they worked their way deeper into the earth.” —Alonzo Pond, from the original guidebook

Cave of the Mounds is a *limestone solution* cave formed by erosion. The openings in the rock that you have been walking through today were first formed chemically, by a solution of water and carbon dioxide, also known as *carbonic acid*. Some areas were formed from bubbling sulfuric acid, produced from lead and other mineral deposits in the rock below. Later, cavern size increased by the action of flowing water, washing away sediments, hollowing out more areas of cave.



Look under the ledge behind you in this room to see the continuing water-carved passageways littered with rubble—residual evidence of the discovery day blast that remains today.





# Stone Statues in Silent Darkness

“Here, we have an opportunity to see a cave as nature made it. This is really an unspoiled Natural Wonder.” —Dr. E.F. Bean, Wisconsin State Geologist, circa 1940

Limestone's porous nature provides spaces for water from rain and melting snow to seep through the rock and into the cave. Dissolved calcium carbonate, *calcite*, is carried into the cave as single drops of mineral-rich water. Calcite crystals are precipitated, leaving behind various deposits on ceilings, floors and walls in the form of stalagmites, stalactites, flowstone and *drapery*.

See if you can imagine forms in the rock as things from the world above us—a seal on the flowstone, straws in the ceiling, or perhaps a giant footprint or a face. This imagery is an enjoyable experiment in the associations we make with a hearts and minds perspective. Cave tours everywhere are often filled with imaginative names for formations as we strive to make sense of the fantastical scenes we see before us in this underground wonderland.





# Extremophiles: Life in the Cave

“When one tugs at a single thing in nature, he finds it attached to the rest of the world.” —John Muir

Manganese and iron minerals in the soil and rock contribute a richness of color, adding hues of blue, gray, red and brown to the creamy white calcite formations. *Oxidation*, the process by which this occurs, is aided in the cave by microscopic life in the form of bacteria. These bacteria nourish our one and only native cave animal, *Coecobrya tenebricosa*, a *springtail*. Discovered in 1941 and identified in 1958, these tiny *hexapods* live in and around the most colorful areas of the cave—often in pools of water—where they have easy access to their food source.

Source: Kenneth Christiansen, Collembola Database, Grinnell College, 2006



Can you see the reflection of the ceiling by looking into the pool at the base of the waterfall? The dome above gives the illusion that the pool is deeper than it is in reality. Keep a lookout for additional reflections in pools of water as you move through the next few areas of the cave.





# Geologic Change through Time

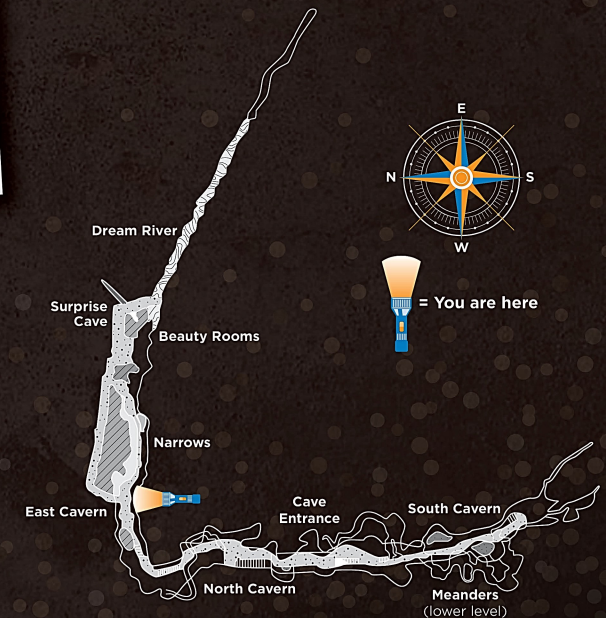
“The Earth was transformed through time by imperceptibly slow changes, passing through regular cycles of destruction and rebuilding, many of which we can see around us today.” —James Hutton “Father of Geology”, circa 1788



Over the course of millions of years, conditions changed both above and below ground. Periodic dramatic events affected underwater sediments leaving layers of forgotten life forms to turn into a record of fossils within the developing rock. Ancient seas subsided, and rocks were raised above sea level to form dry land, shrinking and cracking over time. Water falling on the surface traveled through rock layers dissolving and forming the cave below. Thousands of years of *permafrost* and *glaciation* nearby carved through the landscapes, reshaping the cave passageways through intervals of ice and flowing water.



This is an area that has evidence of long periods of gradual change punctuated by extreme events over thousands or millions of years. Look for the stalagmite that resembles a perched bird. Entering the “Narrows,” notice the speleothem segments on the floor of the cave on your left.



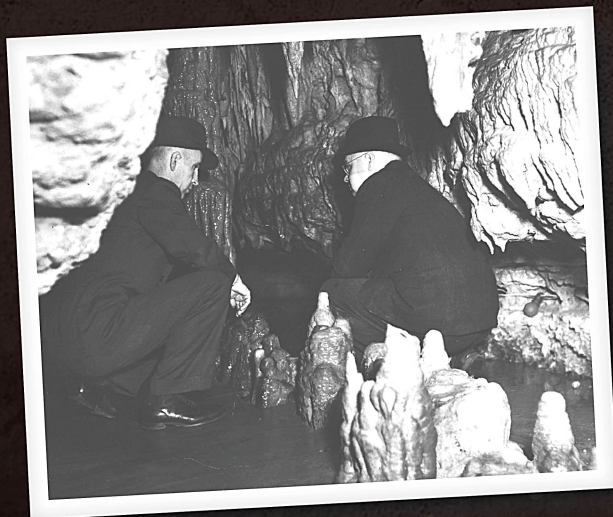
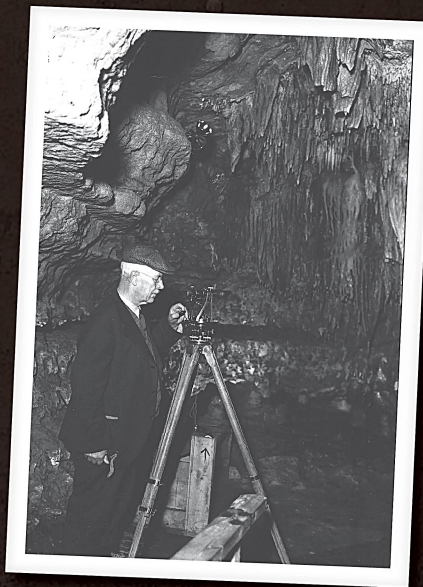


# Protecting Cave Treasures

“Look deep into nature, and then you will understand everything better.” —Albert Einstein



Contemplation and planning were necessary to make the magnificent hidden passageways throughout the east cavern accessible to visitors. In the early 1940s, it was decided to carefully forge a man-made tunnel alongside the constricted, winding natural passages. Openings into the most stunning of rooms were created to facilitate viewing while also minimizing visitor impact. In 1948, the first of the east cavern “Beauty Rooms” was opened to the public. Named the “Centennial Room,” it marked Wisconsin’s 100-year statehood celebration.



See how many different types of cave formations you can observe here. Note the colorful *veining* of manganese and iron oxide present in some of the calcite formations.





# Time Travel—One Formation at a Time

“I think people look at stalagmites and stalactites and think they’re beautiful formations, but they don’t realize the wealth of knowledge they also hold about Earth’s climate through time.” —Cameron Batchelor, University of Wisconsin-Madison Geoscience Department



Cave of the Mounds collaborates with the University of Wisconsin-Madison Geoscience Department in both education and research. Recently, studies have been conducted to evaluate the relationship between the active growth of cave formations, speleothems, and local climate change over time. The oldest stalagmite dated inside Cave of the Mounds is 257,000 years old, and the youngest is 2,000 years old. That’s nearly a quarter of a million years of growth history recorded in this cave! The main goal of this study is to reconstruct what climate has been like on the mid-continent of North America for the last 250,000 years by using speleothems.



Look closely at the small opening in the rock. Many familiar formations can be observed here in this miniature cave. Do you see shelfstone on some of the speleothems? Near this “Surprise Cave” is one of the areas where speleothem samples were taken for the current UW Geoscience study.

