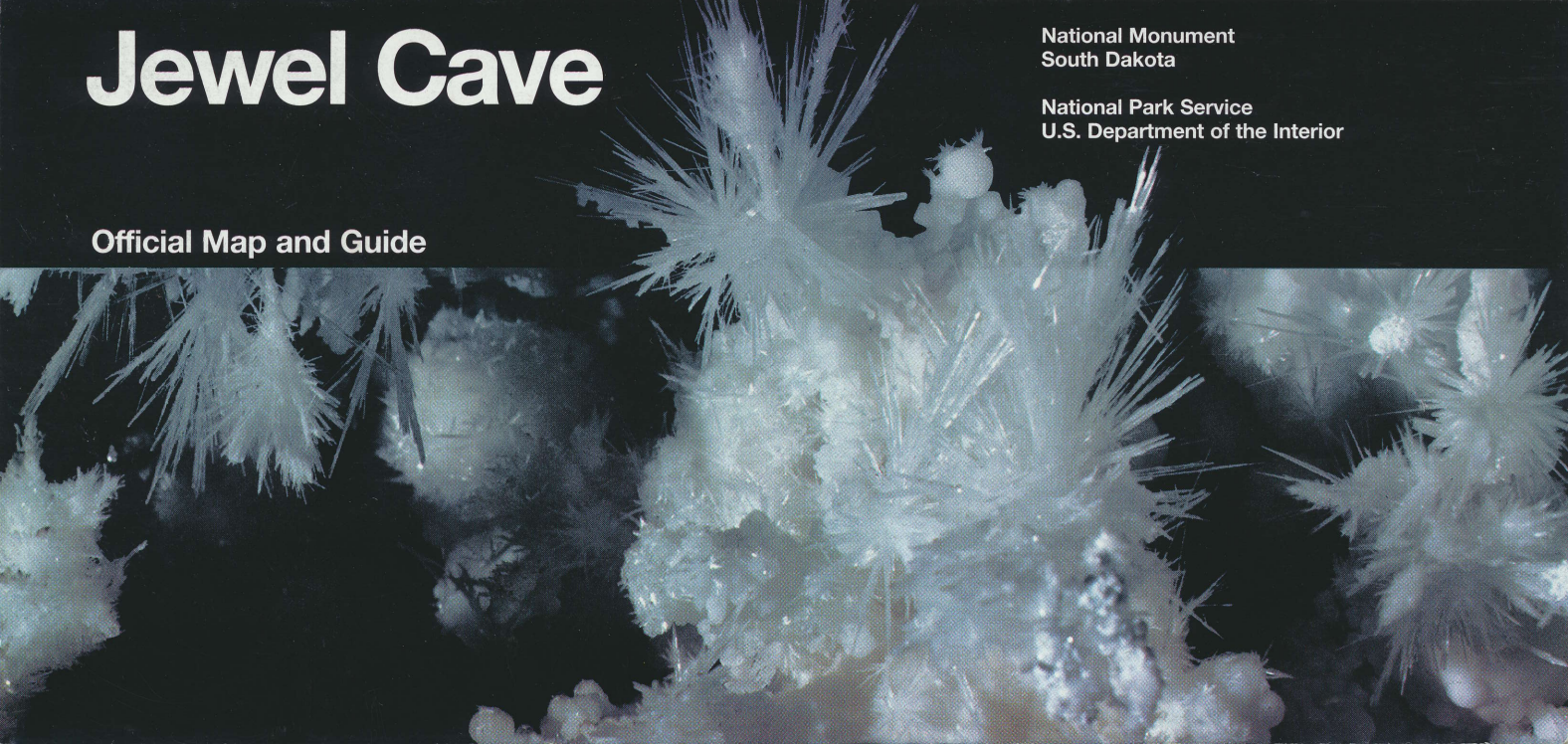


Jewel Cave

National Monument
South Dakota

National Park Service
U.S. Department of the Interior

Official Map and Guide



Water: Jewel Cave's master builder and interior designer.



Buried beneath the Black Hills of South Dakota is the fascinating underground world of Jewel Cave. It delights, it perplexes, and it always lures you on to further explorations: to see a chamber decorated with glittering calcite crystals; to sample the variety of beautiful,

colorful, and strange cave formations for which Jewel Cave is justly famous; or to experience a small part of its vast and intricate maze-like network of passages. Discover the spirit of adventure in Jewel Cave.

Underground Delights

In 1908, when Jewel Cave National Monument was established, only a few of the cave's wonders had been discovered. Less than one mile of passages was known, and the primary attractions were chambers of jewel-like calcite crystals.

Explorations in the past 30 years have revealed more of Jewel Cave's underground delights. Because the cave is a scientific gem, much of it is set aside for research and is not open

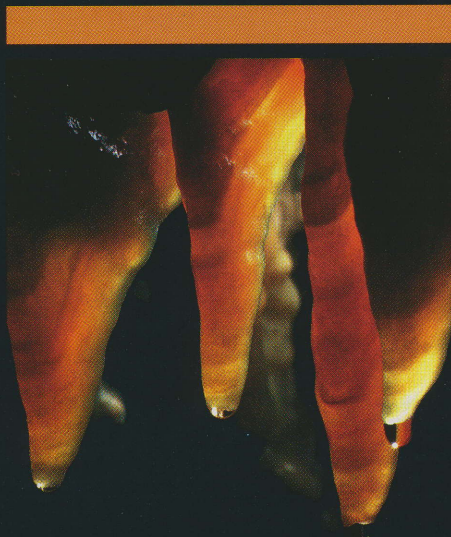
to the public. But tour routes are designed so you can see many of the cave's wonders.

On a tour you can sense that Jewel Cave is not the small cave it was once thought to be. Today it is the third longest known cave in the world, a labyrinth that twists and turns for miles. The most common theory is that Jewel Cave's creation was a process that took millions of years, starting with the formation of the Black Hills,



Crystal-gazing on the Scenic Tour.

when mountain-building forces made faults in the Earth. About 30 to 50 million years ago, slightly acidic groundwater seeped into the faults, dissolving the surrounding limestone and, over a period of several million years, hollowing out the passages of Jewel Cave. A variety of cave formations was created during the later stages of cave development. You will see some of these splendid formations on your cave tour.



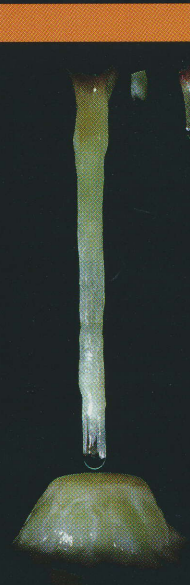
High off the floor on the Scenic Tour, these draperies are about three feet long. The formations continue to grow as the drops of water deposit calcite.

Drop by Drop

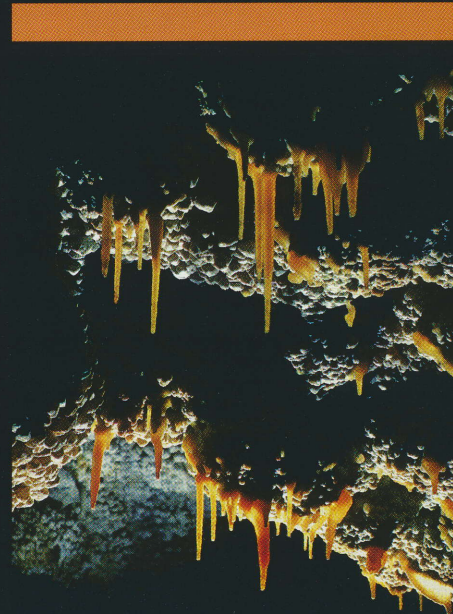
Water dripping into Jewel Cave over time created its variety of formations. Crystals of the mineral calcite, deposited from millions of droplets, make up the formations.

Where drops fall from the ceiling, stalactites form; where drops hit the floor, stalagmites grow; and where stalactites and stalagmites have merged, columns appear.

Water trickling down a slanted ceiling creates translucent draperies, and water flowing over a wall leaves behind flowstone. Where water continues to seep into the cave, these formations are still taking shape.



This soda straw stalactite has nearly reached its companion stalagmite.



Stalactites on the cave ceiling eventually meet stalagmites on the cave floor and become a single column. These are seen on the Scenic Tour.

Calcite Crystals

Jewel Cave is named for its many rooms and passages that are covered with jewel-like crystals, some of which sparkle like gems when illuminated. This extraordinary underground spectacle is created by the cave's abundant formations—the calcite crystals known as dogtooth spar and nailhead spar. Examples of dogtooth and nailhead spar can be seen on all of the cave tours.



Dogtooth spar (right): each crystal is elongated, many-sided, and pointed at the end.



Nailhead spar (above): each crystal is elongated, many-sided, and has a flat or blunted end.



Calcite crystals: the "jewels" of Jewel Cave.

Almost every chamber of Jewel Cave has an impressive collection of calcite crystals. Although these crystals are found in other cave systems, Jewel Cave has one of the most extensive crystal displays known. The crystals typically cover the walls in crusts between two and six inches thick, or occur in deep pockets in the walls. Individual crystals may be as small as a grain of rice, as big as your finger, or the size of a goose egg.

Pure calcite crystals are translucent white. When iron oxides, other minerals, or impurities are mixed in, crystals may be yellow, red,

or opaque white. Large sections of the cave's crystal lining appear gray, and these do not sparkle. These are covered with silt left from ancient times when the cave was filled with water. Water still seeps down into the cave, and some crystals are being cleansed of this gray coating.

The origin of these geometrically intriguing cave formations is only partially understood by speleologists—cave scientists. Today they believe that both the dogtooth and nailhead spar were developed under water and beneath the Earth's surface. Dogtooth spar, most scientists believe,

was formed hundreds of million years ago in small, deep, water-filled pockets. These crystal-lined pockets later became part of Jewel Cave. The nailhead spar was created more recently about one to 40 million years ago, during the many times that Jewel Cave was completely or partially flooded. In the dogtooth spar and nailhead spar, dissolved calcite derived from limestone precipitated from the water and formed into the shape of calcite crystals.



Hydromagnesite balloons are found in only about six caves in the world.

Remarkable and Rare

Jewel Cave's collection of underground formations includes some that are rare and unusual. Helicites are one such oddity. Only a few inches long, they twist and turn in all directions without regard for gravity. Like most cave formations, helicites are made up of calcite, as is popcorn, which grows in small knobby clusters.

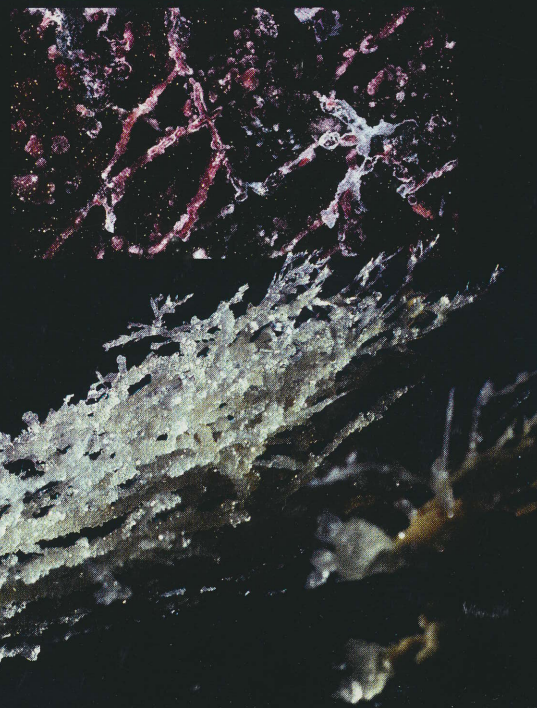
Delicate, needle-like cave decorations that are known as frostwork can be composed of calcite or a similar mineral called aragonite. Criss-crossing patterns of calcite veins called boxwork also occur in Jewel Cave, although they are more abundant in nearby Wind

Cave. Another mineral, gypsum, fancifully appears in the shape of flowers, needles, spiders, and cottony beards.

Scintillites, a type of formation unknown until discovered in Jewel Cave, are composed of the reddish rock called chert and a coating of sparkling clear quartz crystals. Two other particularly intriguing formations discovered in Jewel Cave are hydromagnesite balloons—fragile silvery bubbles only an inch or so in diameter—and moonmilk, a powdery substance resembling cottage cheese.

Scintillites (*right*): underground sparklers of tiny quartz crystals.

Some cave formations are as fragile as blown glass.



Exploring Jewel Cave

*The excitement of discovery,
the elation and despair,
The thrill of pushing forward
to discover what is there.*

Jan Conn, Jewel Cave explorer, ca. 1975

The exploration of Jewel Cave began about 1900 when Frank and Albert Michaud, two South Dakota prospectors, and their friend, Charles Bush, heard wind rushing through a hole in the rocks in Hell Canyon. Enlarging the hole, they found a cave full of sparkling crystals. They filed a mining claim on the "Jewel Lode," but they found no valuable minerals. Instead, they tried turning

the cave into a tourist attraction. The business was never a success, but the cave did attract attention, and in 1908 Jewel Cave National Monument was established as part of the National Park System to protect the small but extraordinarily beautiful cave. Fifty years later exploration of the cave intensified. Led by the husband-and-wife team of Herb and Jan Conn, modern-day cavers have discovered new wonders and explored additional miles of passages. Today the cave is among the world's longest and is renowned for its variety of formations.

Brothers Frank (standing) and Albert Michaud, ca. 1890.



Courtesy of Ira Michaud

Into the Unknown

When Herb and Jan Conn were asked to join a Jewel Cave expedition in 1959, the couple responded without enthusiasm. Their passion was rock climbing—not crawling around in dark, underground tunnels. Little did they know that they would spend much of the next 21 years in Jewel Cave, lured by the thrill of discovering yet another mile of never-before-seen cave.

The caving parties led by this husband-and-wife team would make 708 trips into the cave and log 6,000 hours of exploring and mapping. "Our exploration of Jewel Cave, which started out as a mild diversion, quickly mushroomed into all-absorbing interest," the Conns explained in their book, *The Jewel Cave Adventure*. On a typical day,

the Conns and their fellow cavers spent 12 to 14 hours underground. Outfitted in hard hats, carbide lamps, gloves, loose fatigues, elbow and knee pads, and boots, the explorers squeezed, crawled, and climbed their way through Jewel Cave's complicated maze. The going was rough. During rest stops they munched on mangled sandwiches and fruit while massaging their sore muscles. Names they gave to passages, such as Contortionist's Delight and The Miseries, tell the story.

As more miles of cave were discovered it became apparent that Jewel Cave was one of the world's most extensive caves, full of scenic and scientific wonders. The explorers found chambers with exquisite calcite crystals and rare



Herb and Jan Conn: "The thrill of discovery made everything else worthwhile."

cave formations. One decorated room discovered by the Conns—the Formation Room—is a highlight of the Scenic Tour today. They also found rooms as large as 150 by 200 feet, passageways as long as 3,200 feet, and a place where the cave wind blows at speeds up to 32 miles per hour. The cave, they discovered, is truly a rare and precious jewel.

In 1980, after discovering more than 65 miles of cave, the Conns retired. A new generation of cavers has pushed the known boundaries of Jewel Cave to more than 100 miles. But the mystery remains. As the Conns said, "We are still just standing on the threshold."

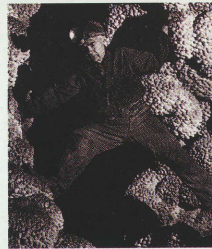
Arthur Palmer



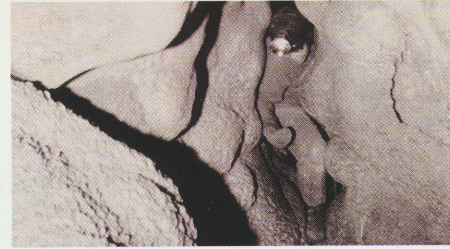
Arthur Palmer

Going the Distance

Exploring Jewel Cave is challenging. "To move from one spot to another," the Conns say, "requires an ever changing succession of maneuvers varying from mountain-climbing techniques to the undulating oozing of an earthworm."



Larry D. Dilts



Cave Tours

You can explore Jewel Cave on any ranger-guided tour. A limited number of persons is allowed on each cave tour. Tours often sell out when there are large numbers of park visitors. The busiest times tend to be mid-June through August at midday.

You may purchase tickets for the Scenic and Candlelight tours at the visitor center on the day of the tour; they are available on a first-come, first-served basis. Advance reservations are required for the Spelunking Tour; you can make them up to two months in advance by calling, writing, or stopping by the visitor center.

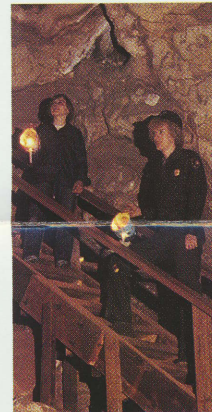
Scenic Tour This ½-mile, 1¼-hour loop tour begins at the visitor center with an elevator ride into the cave. You follow a paved, lighted path and climb up and down more than 700 stairs on this moderately strenuous trip. Tours are offered daily year-round; each is limited to 30 persons.

Candlelight Tour This ½-mile, 1¼-hour tour follows the paths of early explorers. You are able to see the cave's calcite-coated passages lit up by candle lanterns. The tour begins at the Historic Ranger Cabin above the historic entrance in Hell Canyon. Strenuous with steep stairs, this tour requires bending and stooping. The tour is offered several times daily from early June through Aug-

ust; it is limited to 20 persons. Children under six are not allowed.



The Scenic Tour visits chambers decorated with calcite crystals and colorful stalactites, stalagmites, and draperies.



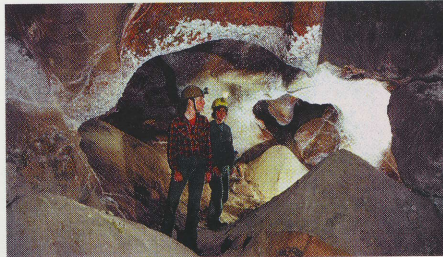
The Candlelight Tour is lit by candle lanterns.

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Spelunking Tours

This ½-mile, 4-hour tour gives you a feel of cave exploring in a wild, undeveloped portion of Jewel Cave. The round-trip tour begins at the visitor center with an elevator ride into the cave. Old clothes and kneepads are highly recommended. Gloves and ankle-high lace-up boots with lug soles are required. The park will supply hard hats and

headlamps. To qualify for the tour you must crawl through an 8½ by 24-inch opening in a concrete block. This tour is offered only once daily, mid-June through mid-August; limit 5 persons. Children 15 years old and younger are not allowed; 16- and 17-year-olds must have parent or guardian's written permission.



Arthur Palmer

Cave Safety and Regulations

- Low-heeled, rubber-soled shoes are recommended because trails can be slippery and some stair climbing is required on each tour.
- Wear a sweater or jacket to keep comfortable in the 49°F temperature of the cave.
- Persons who have heart or respiratory problems, have recently been hospitalized, or have a fear

of heights or closed-in spaces should talk with a park ranger before selecting a tour.

- Damaging or even touching cave formations is prohibited by law because the formations are fragile and irreplaceable.
- Pets and smoking are prohibited.
- Cameras are permitted but tripods are not.

Surface Activities and Information

While visiting the park, take time to experience the world above the cave. In the park's two square miles you can have a picnic, take a nature hike, and discover some plants and animals of the rugged hills-and-canyon country of the Black Hills. In the ponderosa pine forest you may see mule deer, white-tailed deer, porcupines, squirrels, chipmunks, and several species of birds. Plants of both the prairie and mountains grow here, and in spring and summer wildflowers color the landscape.

Visitor Center The visitor center has information, publications, and exhibits on the area and the underground world. Rangers can answer your questions and help you plan your visit. Up-to-date cave information and tour tickets are available. Rangers occasionally give informal talks at the visitor center.

ter. Nearby, a path leads to an overlook with a panoramic view of Lithograph Canyon. The visitor center is open daily year-round, except Thanksgiving, December 25, and January 1.

Historic Area and Cabin The Historic Area is one mile west of the visitor center. The park's first ranger station—a cabin built by the Civilian Conservation Corp in 1935—offers brochures and a limited bookstore. Rangers wearing reproduction 1936 National Park Service uniforms provide information, answer questions, and give informal talks. A trail to the cave's historic entrance and to Hell Canyon beyond begins at the cabin. The Historic Area is open from mid-June through August.

Picnic Areas The park has two shaded picnic areas—one near the visitor center and the other

near the Jewel Cave historic entrance. Both areas have picnic tables and are near drinking water and restrooms. No campfires are allowed, but the use of self-contained camp stoves is permitted in picnic areas only.

Hiking There are many hiking trails in the park. Check with a park ranger for the routes.

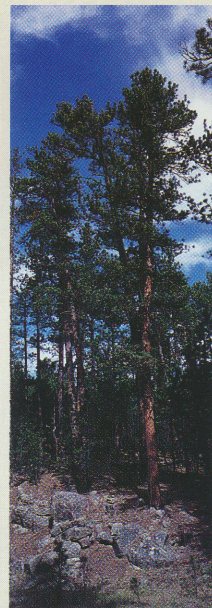
Nearby Accommodations and Services Neither campgrounds nor lodging are provided in the park, but they are available in public lands and in communities nearby. The nearest campground, one of many in the Black Hills National Forest, is seven miles east of the park. Custer, S.Dak, 13 miles to the east, has commercial campgrounds with hookups for recreational vehicles. Other area campgrounds include several at Custer State Park and one at

Wind Cave National Park. Lodging and visitor services such as restaurants, grocery stores, and gasoline are provided in Custer; in Newcastle, Wyo., 24 miles west of the park; and in other area communities. For information on services, contact the park or area chamber of commerce.

Safety and Regulations

- Destroying or removing any natural or cultural object is prohibited.
- Do not disturb or feed wildlife.
- Firearms and other weapons are not allowed in the park.
- Fires are permitted only in picnic areas and in self-contained campstoves.
- Pets must be on a leash.

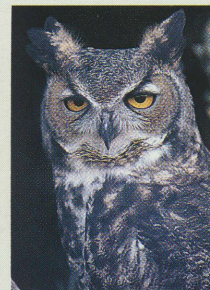
More Information
Jewel Cave
National Monument
Route 1, Box 60AA
Custer, SD 57730-9608
605-673-2288
www.nps.gov/jeca



Jewel Cave National Monument's other world: ponderosa pine forest (above).



Kent and Donna Damien



Connie Toops

arrowleaf balsamroot (top right), and great horned owl (bottom right).

