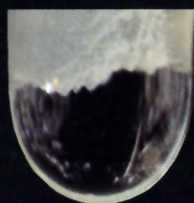


# Jewel Cave

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 always it lures you on and on to further explorations: to see a chamber decorated with glittering calcite crystals; to sample the

outstanding variety of beautiful, colorful, and strange cave formations for which Jewel Cave is famous; or to experience a small part of its more than 80 miles of intricate maze-like 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 wonders of Jewel Cave had been discovered. Less than ½ mile of passages was known then and the primary attractions were chambers of jewel-like calcite crystals. Explorations in the past 30 years have revealed many 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 have been designed so you can experience some of the best of Jewel Cave.

On a tour you can begin to sense that Jewel Cave is not the small cave it was once thought to be. It is the world's fourth longest known cave, a labyrinth that twists and turns for more than 80 miles below the surface. Its creation took millions of years, starting with the formation of the Black Hills, when mountain-



Crystal-gazing on the Scenic Tour.  
Arthur Palmer

building forces created faults in the Earth. Beginning 30 to 50 million years ago, slightly acidic groundwater seeped into these 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 on your cave tour. Many of these splendid formations are described below.



Draperies in Jewel Cave can be 30 feet long. Penny Knuckles (above and water droplet)

## Drop by Drop

Among Jewel Cave's many formations are those that have been created by water dripping or trickling into the cave. Millions of particles of the mineral calcite deposited from millions of water droplets make up each formation. Where drops fell from the ceiling, stalactites have formed; where they hit the floor, stalagmites have grown; and where stalactites and stalagmites have merged, columns have appeared. Water trickling down a slanted ceiling has created translucent draperies, while water flowing over a wall has left behind deposits of flowstone. The Scenic and Spelunking Tours have examples of some of these beautiful and sometimes colorful features. Where water continues to seep into the cave, these formations are still taking shape.



Soda straw stalactites



Stalactites, stalagmites, and columns  
Dave Schnute (above and left)

## Calcite Crystals

Jewel Cave got its name because many of its rooms and passages are lined with jewel-like crystals, some of which sparkle like brilliant gems when illuminated. This extraordinary and impressive underground spectacle is created by Jewel Cave's most abundant cave formations—the calcite crystals known as dogtooth spar and nailhead spar.



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



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



Calcite crystals: the "jewels" of Jewel Cave.  
Arthur Palmer

Almost every chamber of Jewel Cave has an impressive collection of calcite crystals. Although these crystals are found in other caves, including several in the Black Hills, Jewel Cave has one of the most extensive displays known. The crystals typically cover Jewel Cave's walls in 6-inch-thick layers or occur in deep, recessed pockets in the walls. Individual crystals may be as small as a grain of rice, as big as your finger, or, in some cases, the size of a goose egg. Some calcite crystals—ones made up of pure calcite—are translucent white. Some may be yellow, red, or an opaque white when iron oxides or other minerals are mixed in. Large sections of the cave's crystal lining that appear

gray and do not sparkle are covered with silt left over from ancient times when the cave was flooded with water. Because water still seeps down into the cave, some crystals today are being cleansed of this gray coating. Examples of dogtooth and nailhead spar can be seen on all of the park's cave tours.

The story of the origin of these geometrically intriguing cave formations is only partially understood by speleologists, or cave scientists. Today speleologists believe that both the dogtooth and nailhead spar were created underwater beneath the Earth's surface. The dogtooth spar, scientists believe, was formed hundreds of millions of years ago in

small, deep, water-filled pockets in the Earth. These crystal-lined pockets later became part of Jewel Cave. The nailhead spar was created more recently, about 1 to 40 million years ago, during the many times that Jewel Cave was completely or partially flooded. In both the case of the dogtooth spar and the case of the nailhead spar, dissolved calcite derived from limestone precipitated out of the water and formed into the shapes of calcite crystals.

## Remarkable and Rare



Hydromagnesite balloons: a cave phenomenon that has yet to be explained.  
Dave Schnute

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

lites, 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 discoveries in Jewel Cave are hydromagnesite balloons—fragile silvery bubbles only a few inches in diameter—and moonmilk, a powdery substance resembling cottage cheese. You may see some of these extraordinary formations on a Jewel Cave tour.

Scintillites: underground sparklers.  
Dave Schnute



Some cave formations are as fragile as blown glass.  
Arthur Palmer



# 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 two South Dakota prospectors, Frank and Albert Michaud, and a friend, Charles Bush, happened to hear 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, so they tried turning the cave into a tourist attraction instead. The business was never a success, but the cave did attract attention, and in

1908 Jewel Cave National Monument was established to protect the small but extraordinarily beautiful cave. Fifty years later exploration of the cave suddenly intensified. Led by the husband-and-wife team of Herb and Jan Conn, modern-day cavers have discovered new wonders and more than 80 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 first persuaded to join a caving expedition in Jewel Cave in 1959, the couple responded without enthusiasm. Their passion was rock climbing, not crawling around in dark, gloomy holes. Little did they know they would spend much of the next 21 years in Jewel Cave, lured by the thrill of discovering the secrets of 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 exploring and mapping. "Our exploration of Jewel Cave, which started out as a mild diversion, quickly mushroomed into an all-absorbing interest," the Conns explain 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 often munched on mangled sandwiches and squashed fruit while massaging sore muscles. Names they gave to some passages, such as Contortionist's Delight and The Miseries, tell the story.

As years passed and more miles of cave were found, it became apparent that Jewel Cave was one of the world's most extensive caves, full of scenic and scientific wonders. The



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

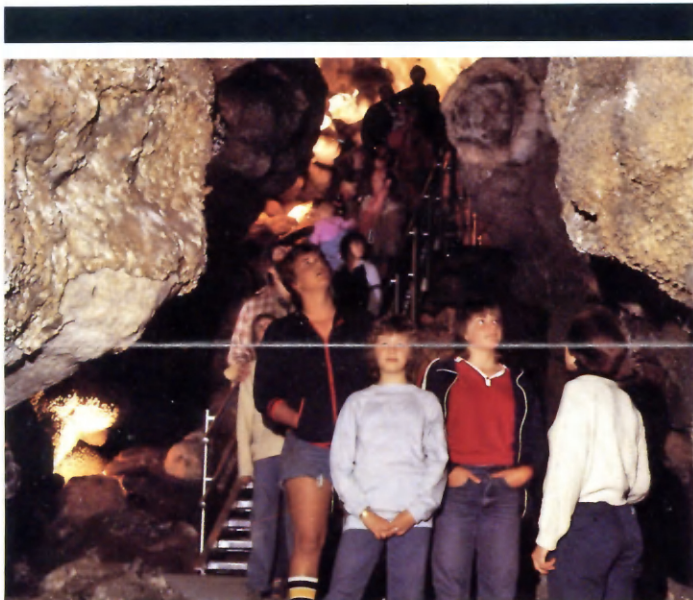
explorers found chambers with exquisite calcite crystals and rare cave formations. One much-decorated room discovered by the Conns—the Formation Room—is a highlight of the Scenic Tour today. They also found rooms as large as 150 by 200 feet, passageways as long as 3,200 feet, and a place where the cave wind blows at speeds of 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 already pushed the known boundaries of the cave to more than 80 miles. But the mystery remains. As the Conns have said, "We are still just standing on the threshold."



## Going the Distance

Exploring Jewel Cave can be 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."



The Scenic Tour

## Cave Tours

You can explore Jewel Cave on any of the park's ranger-guided cave tours. Tickets for the Scenic and Historic Tours must be purchased at the visitor center on the day of the tour. Reservations for the Spelunking Tour are strongly recommended; they can be made up to two months in advance by calling, writing, or stopping by the visitor center.

**Scenic Tour**  
This ½-mile, 1 ¼-hour tour visits chambers decorated with calcite crystals and colorful stalactites, stalagmites, and draperies. The 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. The tour is conducted several times daily from May to September and is limited to 25 persons.

**Historic Tour**  
This ½-mile, 1 ¼-hour tour follows the paths of Jewel Cave's earliest explorers and lets you see the cave's calcite-coated passages by the light of old-style candle lanterns. The roundtrip tour begins at the cave's historic entrance in Hell Canyon. This moderately strenuous tour has many steep stairs and requires bending and crawling, so wear old clothes. The tour is offered daily from mid-June to late August and is limited to 25 persons. Children under 6 years old are not allowed.



## Spelunking Tour

This ½-mile, 4-hour tour gives you a taste of modern-day 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 gloves are recommended; ankle-high laced boots with lug soles are required. The park supplies hard hats

and headlamps. To qualify for the tour you will be required to crawl through an 8 ½ x 24-inch concrete block tunnel. This tour is offered daily from mid-June to mid-August and is limited to 10 persons. Children 15 years old and younger are not allowed; 16- and 17-year-olds are permitted with written permission from a parent or guardian.



The Spelunking Tour

## 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. •A jacket or sweater will keep you comfortable in the 47°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 because the formations are fragile and irreplaceable. •Pets and smoking are prohibited. •Cameras are permitted but tripods are not.

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## Surface Activities and Information

You may want to take some time on your visit to Jewel Cave National Monument to experience the world above the cave. In the 2 square miles that make up the park you can have a picnic, take a crosscountry hike, and enjoy some of the plants and animals of the rugged hills-and-canyon country of the Black Hills. In the ponderosa pine forest that covers the park you may see mule deer, whitetail deer, elk, coyotes, porcupines, squirrels, marmots, chipmunks, and several species of birds, including golden eagles and hawks. Plants of both the prairie and mountains grow here, and in spring and summer wildflowers color the landscape.

**Visitor Center**  
The park visitor center has information on all aspects of Jewel Cave National Monument.

Various books and brochures are available, and park rangers are on duty to assist you with planning your visit and to answer your questions. Up-to-date cave information and tour tickets are available. Exhibits on the underground world are displayed. Rangers occasionally give informal talks at the visitor center. Nearby, a short path leads to an overlook with a panoramic view of Lithograph Canyon. The visitor center is open daily from about mid-April through September and intermittently the rest of the year.

**Picnic Areas**  
The park has two shaded picnic areas—one near the visitor center and the other near Jewel Cave's historic entrance. Both have picnic tables and are located near drinking water and restrooms. Fires are per-

mitted only in self-contained camp stoves.

**Hiking**  
There are no maintained hiking trails in the park, but you can hike crosscountry. Check with a ranger for possible routes.

**Nearby Accommodations and Services**  
Neither campgrounds nor lodging are provided in the park, but they are available in public lands and communities nearby. The nearest campground is one of several in Black Hills National Forest; it is located 7 miles east of the park. The town of Custer, located 13 miles to the east, has several commercial campgrounds with hookups for recreational vehicles. Other campgrounds in the area include several at Custer State Park and one at Wind Cave National Park. Lodging

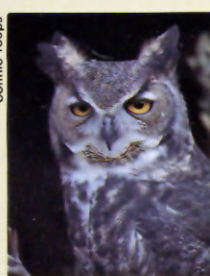
and visitor services such as restaurants, grocery stores, and gasoline are provided in Custer, in Newcastle, Wyo., 24 miles to the west of the park, and in other area communities. For more information on services, contact the park or area chambers of commerce.

**Safety and Regulations**  
The destruction or removal of any natural object is prohibited. •Do not disturb or feed the wildlife. Firearms and other weapons are not allowed in the park. •Fires are permitted only in picnic areas and only in self-contained camp stoves. •Pets must be leashed at all times.

**Information**  
For additional information, write: Jewel Cave National Monument, Route 1, Box 60AA, Custer, SD 57730; or call (605) 673-2288.



Jewel Cave National Monument's other world: ponderosa pine forest (left); arrowleaf balsam



root (top right); great horned owl (bottom right).

