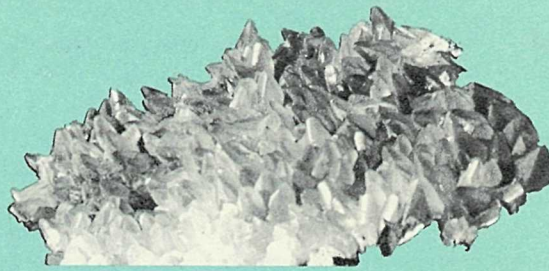


Jewel Cave

NATIONAL MONUMENT • SOUTH DAKOTA



Dogtooth spar

In the lovely hill country of western South Dakota, in a fragrant green setting of ponderosa pine, is a glittering underground world—Jewel Cave.

The small opening to this cool subterranean realm is in the depths of Hell Canyon. It was the sound of cool air rushing out of a hole in the cliffs into a hot summer day that attracted two brothers to Jewel Cave. Prospectors Albert and Frank Michaud originally recorded it as a mining claim, known as Jewel Lode, after its discovery on August 18, 1900.

In the hope of finding valuable minerals, they, with the help of Charles Bush, enlarged the small opening in the limestone on the east side of Hell Canyon.

They explored the cave but did not unearth any minerals of great monetary value. However, they did find jewel-like calcite crystals of great esthetic value, and the Michaud brothers decided to turn their efforts toward developing a tourist trade. A log building was constructed for visitors near the cave entrance on the rim of Hell Canyon.

At that time, frequent and reliable transportation in the West was in its infancy. The population was sparse and scattered. Today, trips that we consider just afternoon drives were major journeys. The brothers were unable to attract enough people to the cave to show a profit and were forced to abandon the venture.

The 516-hectare (1,275-acre) park area was included in the Black Hills National Forest when it was established in 1908. The parkland remained under the administration of the U.S. Forest Service until August 10, 1933, when President Franklin D. Roosevelt, by executive order, transferred the cave area to the National Park System.

Systematic exploration of Jewel Cave continues. So far, spelunkers have explored, surveyed, and mapped more than 84 kilometers (52 miles) of passageways on four different levels.

ON THE SURFACE

The park's terrain is basically rough and rocky with two dominating canyons. Hell Canyon, the larger of the two, runs southeast, while Lithograph Canyon trends southwest. The two join just inside the park's southern boundary.

Several small springs provide water for animals and people all year. The thin soil is a mixture of sand and clay, well drained and quick drying.

The climate is relatively stable; winters are moderate and summers are cool. Average annual precipitation is 43 centimeters (17 inches). The air temperature in the cave averages 8.3°C (47°F) with 95 percent relative humidity. This cool, damp

atmosphere is remarkably constant regardless of the season. A sweater or light jacket is desirable while on the cave tours.

Jewel Cave National Monument and the Black Hills are ecologically significant. There is a mingling of both eastern and western and prairie and mountain species of plants and animals.

Ponderosa (western yellow) pine is the predominant tree in the southern Black Hills. The ponderosa pine comprises the climax forest in the region. Young ponderosas have a characteristic dark bark and are sometimes given the nickname "blackjack pine." The overall appearance of the dense ponderosa forests, when seen from a distance, is responsible for the name "Black Hills."

Scattered clumps of boxelder and snowberry grow in several ravines. Mountain-mahogany and other shrubs thrive on the dry hillsides.

Wildflowers bloom profusely during spring and early summer. The first to appear are pasqueflower (crocus), shooting-star, and phlox. The evening primrose, kinnikinnick, western wallflower, and anemone are the next to bloom.

In early June the roadsides and meadows are filled with the segolily, scarlet globemallow, white penstemon, and bluebell. Later in the summer cone-flower, daisy, aster, goldenrod, and common sunflower may be seen.

Animals characteristic of the Transition Life Zone, between plains and mountains are native to the park. Mule deer, white-tailed deer, coyotes, bobcats, weasels, porcupines, marmots, ground and tree squirrels, chipmunks, cottontails, wood (pack) rats and other common rodents are to be seen.

Birds are abundant and include the golden eagle, wild turkey, great horned owl, hawks, woodpeckers, crossbills, Clark's nutcrackers, juncos, sparrows, warblers, nuthatches, chickadees, jays, flycatchers, and turkey vultures.

CAVES ARE FORMED . . .

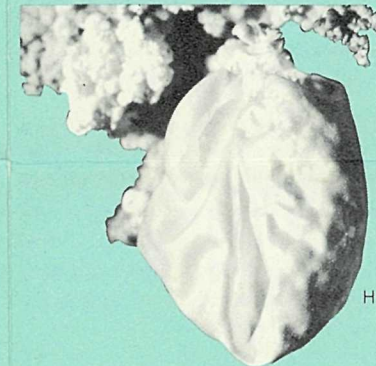
The Black Hills, an eroded dome approximately 193 kilometers (120 miles) long and 97 kilometers (60 miles) wide, rises above a "sea of plains." The long axis of the dome runs north-south along the western boundary of South Dakota and extends into northeastern Wyoming. The weather-resistant granite and schist of the central hills have been etched by wind and water through eons. This granitic core culminates in Harney Peak, which is just southwest of Mount Rushmore National Memorial. At 2,207 meters (7,242 feet) above sea level, Harney Peak is the highest point in the United States east of the Rocky Mountains.

Around this central highland lies a peripheral layer of limestone. This Pahasapa (Sioux Indian name for Black Hills) Limestone covered the entire region and is believed to have been deposited in an ancient inland sea about 300 million years ago. Uplift associated with the formation of the Rocky Mountains and subsequent erosion have exposed the igneous interior of the hills and left the remnant sedimentary cover tilted, cracked, and gouged. Jewel, Wind, and numerous other caves were formed by acidic surface and ground water seep-

ing into cracks and crevices. The acidic water dissolved part of the limestone and formed caves. Eventually conditions changed and the limestone, instead of being dissolved, began to form deposits of calcite crystals ("dogtooth spar") on the cave walls. More acidic water entered the cave and some of the calcite crystals were dissolved. The caverns finally drained as the water table lowered and some of the ceilings collapsed. Rooms, corridors, and the crystal lining remained.

. . . AND DECORATED

Water then began to decorate these voids. The process usually went like this: Precipitation, passing first through the air and then through decaying vegetation on the ground, combined with some quantities of carbon dioxide to form carbonic acid. As the slightly acidic water percolated downward through cracks and crevices, it dissolved small amounts of the mineral calcite (CaCO₃) in the limestone rock. This calcite, in solution, was—and still is—carried into the air-filled cavities of the cave. Loss of carbon dioxide from the calcite solution to the cave atmosphere decreased the amount of carbonic acid, and flowstone formed. Flowstone is composed of thin films of microscopic calcite crystals deposited on the ceilings, walls, or floors of the cave. As long as water seeps in, flowstone crystal formations continue to form.



Hydromagnesite bubble

The cave derives its name from the myriads of jewel-like calcite crystals called dogtooth spar. Icicle-like stalactites hang from the ceilings; when joined with stalagmites "growing" up from the floor, columns or pillars are formed. Numerous other interesting, often minute, cave deposits may be seen. Among these are:

Boxwork—Veins of calcite. At first the calcite was deposited in narrow fractures in limestone. Later, the limestone was dissolved and left the veins standing in sharp relief.

Frostwork—Clusters of needlelike crystals of calcite, aragonite, and rarely, gypsum.

Globulites—Bunchlike, knobby nodules of calcite commonly called "popcorn."

Gypsum "flowers"—Flowerlike growths of parallel gypsum crystals.

Helictites—Calcite formations of varying shapes and sizes, all exhibiting a disregard for gravity and assuming twisted, spiraled, and curved shapes.

Hydromagnesite bubbles—Unexplained bubbles of the mineral hydromagnesite with wall thicknesses of about 8 to 10 thousandths of a centimeter thick. These are currently known only in Jewel Cave and Carlsbad Caverns.

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WE'RE JOINING THE METRIC WORLD

The National Park Service is introducing metric measurements in its publications to help Americans become acquainted with the metric system and to make interpretation more meaningful for park visitors from other nations.

ADMINISTRATION

Jewel Cave National Monument is administered by the National Park Service, U.S. Department of the Interior. The superintendent of Wind Cave National Park is in charge of the monument. His address is Hot Springs, SD 57747.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

National Park Service
U.S. DEPARTMENT OF THE INTERIOR

Flowstone of calcium carbonate, commonly called draperies.



Many parts of the cave display a variety of natural colors: shades of brown, red, orange, yellow, green, and lavender. The black of manganese dioxide contrasts with the white of gypsum in some passageways and chambers.

Some sections of the cave have measurable air currents. These are believed to be caused by differences in atmospheric pressure. The air moves from areas of higher pressure to areas of lower pressure. A 30-mile-per-hour wind blows through one constricted area, called "The Horn."

Many people who visit caves for the first time are surprised that animals and plants live in the cave. Five species of bats, the bushy-tailed wood rat, the white-footed mouse, and some cave crickets and several other types of invertebrates inhabit Jewel Cave. Plantlife is limited, but some species of algae and fungi live in this cool, damp, and artificially lighted environment.

ACCOMMODATIONS AND FACILITIES

The visitor center, open from 8 a.m. to 5 p.m. daily, April through October, has an information and sales counter, an exhibit room, restrooms, a visitor lobby, and administrative offices.

The park is strictly a day-use area; it has no overnight accommodations or camping facilities. Overnight parking is not allowed. Motels, restaurants, service stations, and garages are available in Custer, S. Dak., Newcastle, Wyo., and other outlying communities. There are several campgrounds near these towns. The park does not have dining facilities but does maintain a small picnic area with water, tables, and pit toilets.

UNDERGROUND TOURS

Portions of the cave are open to the public and interpretive tours are conducted daily from Memorial Day through Labor Day. Tour schedules, if any, during the remainder of the year are irregular and subject to change without notice.

The *Scenic (Modern) Tour* is moderately strenuous. You enter and leave the cave by elevator in the visitor center lobby. Some uphill walking and climbing long flights of steps are necessary. The trail is paved and has aluminum stairs and handrails. Indirect electric lighting provides illumina-

tion and emphasizes the countless colors seen along the tour route.

Here is an opportunity to see the cave's natural colors, different types of crystals and formations, and large rooms that are connected by long passageways.

On the *Historic (Primitive) Tour*, you enter and leave the cave through the natural entrance in Hell Canyon. It is an unimproved trail with steep, wooden, ladderlike steps and does not have electric lighting. Visitors may be asked to carry a kerosene lantern. Old clothes are appropriate. The trail is quite strenuous and requires much climbing, bending, stooping, and sometimes crawling. Individuals who have a fear of narrow spaces may become uncomfortable. Colors and formations are not as apparent as on the Scenic Tour.

The *Spelunking Tour* gives physically able persons a short introduction to the sport of caving. Sturdy, ankle high, lace boots are required. Old clothing should be worn since some of this trip will be on hands and knees, and some of it on one's stomach. Those who take this tour will not, as a result of their brief experience, be qualified as cave explorers. Advance registration is required.

Tours are limited to 25 persons. Reservations cannot be made. A guide fee is collected for each tour. Tickets are sold on a first-come, first-served

basis. For your safety and the cave's protection, no one is permitted in the cave unless accompanied by a park ranger.

Smoking is not permitted in the elevators or in the cave. Umbrellas and tripods may not be taken into the cave. Permission to carry a cane or walking stick is granted by the superintendent or one of his representatives only to those who cannot make the trip without one.

Leave such unneeded items as handbags and cameras without flash attachments in your *locked* car.

CAUTION

The tours are not recommended for individuals who have heart trouble or respiratory ailments, or for those who are recovering from a recent operation or hospitalization. Consider each tour description *carefully* before making a choice.

Never leave a child or a pet locked in a sealed vehicle.

LEAVE NO TRACES

Rules and regulations are designed for your safety, the preservation of natural features, and the protection of property.

All natural features of the park are integral parts of a complex ecosystem. The possession, de-

struction, injury, defacement, removal, or disturbance of any of them is illegal.

The park is a wildlife sanctuary. Firearms, traps, or any other implements or devices designed for or capable of destroying or capturing animal life are prohibited.

Pets must be leashed and under physical restraint at all times. Pets are not permitted in public buildings or the cave.

Fire is a constant threat to the Black Hills. An area fire protection zone prohibits fires in other than established fireplaces.

Operating any vehicle off parking areas or roads destroys scenery and contributes to soil erosion. Drive carefully at all times to protect yourself, other visitors, and wildlife.

Enjoy your park, but keep in mind an old Indian proverb: *Where I go I leave no sign.*

ACCESS TO THE PARK

There is no regularly scheduled public transportation to Jewel Cave. The area is accessible by U.S. 16, which crosses the northern part of the park between Custer, S. Dak., and Newcastle, Wyo.

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A SPECIAL SAFETY NOTE

While touring the cave, wear low-heeled walking shoes with non-slip soles. Do not wear sandals or shoes with leather or hard composition soles or with high heels. A light sweater or jacket is desirable—the cave temperature is about 8.3 C (47 F) year round.

METRIC MEASUREMENTS

The scales show the ratio between customary measurements and metrics. Altitudes are in meters, distances in kilometers. One meter is 3.3 feet, 1 kilometer is 0.62 miles.

