

A Journey Underground

Your encounter with Carlsbad Caverns National Park begins in the Chihuahuan Desert of the Guadalupe Mountains. But beyond the somewhat familiar surroundings of rugged mountains and broad plains is another world. Away from sunlight, away from the flowering cactus, away from the songs of the desert birds and the howl of the coyote, lies the celebrated underground world of Carlsbad Caverns. It is an incomparable realm of gigantic subterranean chambers, fantastic cave formations, and extraordinary features. The first adventurers entering Carlsbad Caverns had no idea what to expect as they walked, crawled, and climbed down into the darkness. Today many of the wonders of Carlsbad Caverns are well known, yet the experience of exploring its chambers is every bit as exciting.

The Bat Flight

The evening flight of the bats of Carlsbad Caverns is a natural phenomenon as fascinating as the cave itself. In a mass exodus at dusk, thousands of Mexican free-tailed bats fly from the cave for a night of feasting on insects. You can view this exciting spectacle from the outdoor amphitheater at the cave's natural entrance. Before each flight a park ranger gives a short talk on bats. Because the bats winter in Mexico, the flights occur only from early spring through October. Check at the visitor center for the scheduled time.

Preserving a National Treasure

Protection and preservation of Carlsbad Caverns is the mission of the National Park Service and the responsibility of every visitor. Unfortunately many of the cave's smaller and more delicate formations have been damaged over the years by careless visitors. Experimental techniques, such as those that enable rangers to match pieces of broken stalactites and painstakingly glue them back together, are sometimes successful, but in practically all cases damage is irreversible.

Cave Regulations
Please help the National Park Service preserve Carlsbad Caverns by observing park regulations.

Touching any cave formation is prohibited. Formations are easily broken, and the oil from your skin permanently discolors the rock.

Smoking or any use of tobacco is not permitted. Eating and drinking are not permitted except in the underground rest area and lunchroom.

Throwing coins, food, or other objects in cave pools is forbidden. Foreign objects ruin the natural appearance of the pools and are difficult to remove. Also, the chemical reaction among the foreign objects, the water, and the rock can leave permanent stains.

Photography is permitted on most cavern tours. Photographers should not step off the trails or rest tripods or other camera equipment on formations.

Strollers are not permitted because parts of the trails are steep and narrow.

Exploring the Cave

Visitors wishing to explore Carlsbad Caverns may select from three main tour options, depending on their time, interest, and physical ability. Two of these options follow self-guiding routes; the third is a ranger-guided tour.

Your first stop for any cave tour is the visitor center information desk, where rangers can answer your questions about tours, and you may purchase tickets. The basic entry fee allows you to take either, or both, self-guiding tour routes. Rangers at the information desk can provide information on special ranger activities. They can tell you about wild cave tours that may be available, staff permitting.

Big Room Route
The basic tour through Carlsbad Caverns is the Big Room Route, a one-mile, self-guiding, underground stroll around the perimeter of the largest room in the cave. Taking approximately 1½ hours, this circular route passes many

large and famous features, including Bottomless Pit, Giant Dome, Rock of Ages, and Painted Grotto. Highly decorated and immense, the 14-acre Big Room is a must-see tour for all visitors to the park. You can get to the Big Room by elevators located in the visitor center. The relatively level and well-lighted trails make this the ideal tour for visitors with limited time or walking difficulties. The Big Room is accessible to visitors in wheelchairs; ask for the special map available at the visitor center information desk.

Natural Entrance Route
The Natural Entrance route is a self-guiding tour available to visitors with plenty of time and in good physical condition. This one-mile tour follows the traditional explorers' route, entering the cavern through the large historic natural entrance. The Natural Entrance route descends more than 750 feet into the Earth following steep and narrow trails through a tall and spacious trunk passage called the Main Corridor. The route culmi-

nates in the lunchroom and underground rest area, near the elevators and the Big Room route starting point. Visitors in good health who plan to take both self-guiding tours may enjoy starting with the Natural Entrance route. Highlights along this route include Bat Cave, Devil's Spring, Green Lake Overlook, and the Boneyard, a complex maze of highly dissolved limestone rock reminiscent of Swiss cheese. Watch for Iceberg Rock, a single 200,000-ton boulder that fell from the cave ceiling thousands of years ago.

Kings Palace Guided Tour
A third option is the Kings Palace tour, a 1½-hour ranger-guided tour through four highly decorated scenic chambers. Departing from the underground rest area, the Kings Palace tour descends to the deepest portion of the cavern open to the public, 830 feet beneath the desert surface. Although not as difficult as the Natural Entrance route, this one-mile tour does

require descending, and later climbing, an eight-story hill. Look forward to viewing a variety of speleothems or cave decorations including helictites, draperies, columns, and soda straws. Rangers often conduct black-out programs during this tour, briefly turning off all artificial lights to reveal the permanent inky blackness of the natural cave environment. Reservations are suggested; contact the park or see our website. A separate fee is charged for this tour.

All trails in the cave are paved and adequately lighted. You should wear comfortable, closed-toe shoes with rubber soles for maximum safety and traction. The cave temperature varies little from the annual 56°F average, making a sweater or light jacket appropriate year-round. You may also wish to bring a camera and a flashlight. Strollers are not allowed in any underground cave area, but infant backpacks are permitted.

A pre-tour restroom stop is advisable because restrooms are only available in the visitor center and at the underground rest area and lunchroom. All tours are preceded by a mandatory cavern orientation briefing to promote resource protection and cavern safety. All tours exit the cave by elevator.

Rangers are available throughout the cave to protect park resources and to assist you with information and to answer questions. On both self-guiding tours, *Audio Guide* message players provide you with interesting, in-depth information about ecology, history, and cave formation.

The cavern is open daily except December 25 and operates on summer and non-summer hourly schedules. The summer season runs from Memorial Day through the third Sunday in August. For current hours and information contact the park before your visit.

Safety in the Cave

To ensure that your tour of Carlsbad Caverns is comfortable, enjoyable, and safe, please follow these important rules and recommendations.

•Wear low-heeled, non-skid shoes for walking on the paved cave trails; they can be steep and slippery. •Use handrails where available. •Take a jacket or sweater to keep warm in the constant cool 56°F temperature of the cave. •Stay on trails. Beyond the trails are steep drop-offs where you could fall and injure yourself, and there are unlighted passages where you could get lost. Also, fragile formations on the floor, walls, and ceilings can be damaged by anyone straying from the trails.

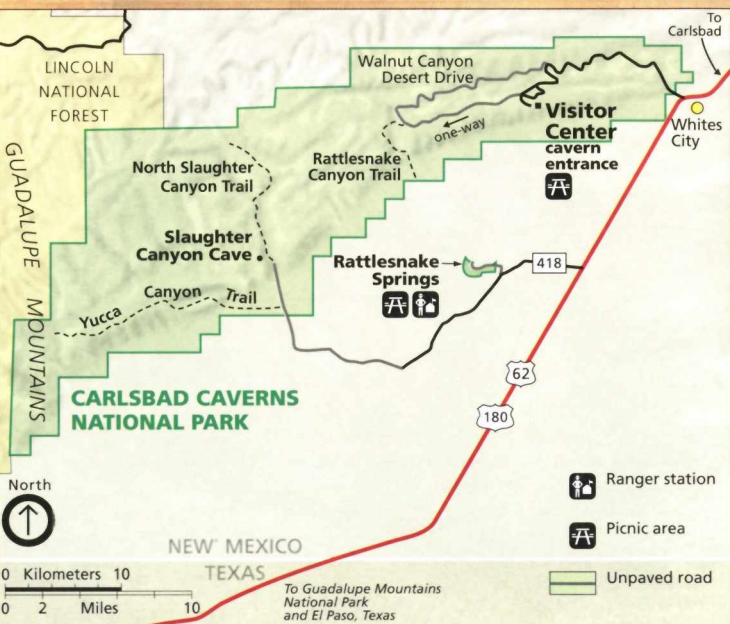
Other Park Activities

Visitor Center
The visitor center has information about the park's underground, mountains, and desert. Publications, topographic maps, a list of activity schedules, and exhibits—including a three-dimensional model of Carlsbad Caverns—are available. Rangers can help you plan your visit. A restaurant, gift shop, publications, and kennel are available at the visitor center. Services are available all year except December 25.

For More Information
Carlsbad Caverns National Park
3225 National Parks Highway
Carlsbad, NM 88220-5354
505-785-2232
www.nps.gov/cave

Scenic Drive
The 9½-mile Walnut Canyon Desert Drive is a gravel, one-way loop through dramatic desert mountain scenery. Passenger vehicles can travel the road easily—but the narrow, twisting route is not recommended for trailers or motor homes. A guide booklet is available at the visitor center.

Trails
The park's trail system includes a short nature trail and, for experienced hikers, more than 50 miles of primitive backcountry trails. Trailheads are located along each of the park roads. Backcountry hikers should register at the visitor center. An ample supply of water (one gallon of water per person daily) and a topographic map are essential.



Camping and Picnicking
There is no developed campground in the park, but the nearby towns of Whites City and Carlsbad have several. These towns have lodging, restaurants, gasoline stations, and other services. Free backcountry permits are available at the visitor center. Picnic tables are near the visitor center and in Walnut Canyon. Rattlesnake Springs has a picnic area with tables, grills, drinking water, and restrooms.

Climate
The park's climate is characterized by warm summers and mild winters. In summer average highs are in the 90s°F; in winter they are in the 50s and 60s°F. Thunderstorms occur in summer, posing the danger of lightning in higher areas and of floods in low-lying areas.



Ranger-guided tours of Slaughter Canyon Cave take you into an underground wilderness without electricity, paved walkways, or modern conveniences. In this wild cave, darkness is penetrated only by the light of flashlights carried by tour members. Highlights of the two-hour tour are the sparkling, crystal-decorated Christmas Tree column and the Chinese Wall, a delicate, ankle-high rimstone dam. Old bat guano mining excavations can be seen. You must hike a strenuous ½-mile trail to the cave entrance where the tour begins. Sturdy walking shoes, flashlights, and water are required. Tours are given daily in the summer season and weekends the rest of the year. A fee is charged; reservations are required. For details contact the park or check our website.

Exploring the Chambers of Wonders



- 1 Stalactites
2 Stalagmite
- 3 Soda straws
4 Draperies
- 5 Flowstone
6 Column
- 7 Lily pads in cave pool
8 Cave pearls
- 9 Popcorn
10 Helictites
- 11 Aragonite formations
12 Rimstone dams

The Cave is Created and Decorated, Drop by Drop

The story of Carlsbad Caverns begins 250 million years ago with the creation of a 400-mile-long reef in an inland sea that covered this region. This horse-shoe-shaped reef formed from the remains of sponges, algae, and seashells and from calcite that precipitated directly from the water. Cracks developed in the reef as it grew seaward. Eventually the sea evaporated, and the reef was buried under deposits of salts and gypsum.

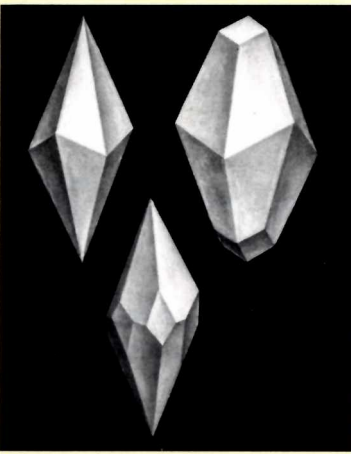
Then, a few million years ago, uplift and erosion of the area

began to uncover the buried rock reef. Rainwater, made slightly acidic from the air and soil, seeped down into cracks in the reef, slowly dissolving the limestone and beginning the process that would form large underground chambers. At the same time, hydrogen sulfide gas migrated upward from vast oil and gas deposits beneath the ancient reef. This gas dissolved in the percolating ground water to form sulfuric acid. The added power of this corrosive substance explains the size of these passageways. The exposed reef

became part of the Guadalupe Mountains, and the underground chambers became the wonder we see today in Carlsbad Caverns.

The decoration of Carlsbad Caverns with stalactites, stalagmites, and an incredible variety of other formations began more than 500,000 years ago after much of the cavern had been carved out. It happened slowly—drop by drop—at a time when a wetter, cooler climate prevailed. Creation of each formation depended on water that dripped or seeped down into the limestone bedrock

and into the cave. As a raindrop fell to the ground and percolated downward, it absorbed carbon dioxide gas from the air and soil, and a weak acid was formed. As it continued to move down, the drop dissolved a little limestone, absorbing some of the basic ingredient needed to build most cave formations—the mineral calcite. Once the drop finally emerged in the cave, the carbon dioxide escaped into the cave air. No longer able to hold the dissolved calcite, the drop deposited its tiny mineral load as a crystal of calcite. Billions



Calcite crystals

and billions of drops later, thousands of cave formations had taken shape. Oh, the shapes they took!

Where water dripped slowly from the ceiling, soda straws and larger stalactites appeared. Water falling onto the floor created stalagmites. Sometimes a stalactite and stalagmite joined, forming a column. Draperies were hung where water ran down a slanted ceiling. Water flowing over the surface of a wall or floor deposited layers of calcite is called flowstone.

Cave pearls, lily pads, and rimstone dams appeared where pools of water or streams occurred in the cave. Like pearls from oysters, cave pearls developed as layer upon layer of calcite built up around a grain of sand or other tiny object. Lily pads formed on the surface of pools, while dams formed where water flowed slowly on the floor.

Another type of cave formation that decorated cave walls and even other formations was popcorn, which may have formed

when water evaporated and left behind calcite deposits. Some of the more unusual formations that occur in Carlsbad Caverns are helictites, which grow seemingly without regard to gravity, their twisting shapes governed by crystal shapes, impurities, and the force of water under pressure. Other rare formations are those composed not of calcite but aragonite, a mineral chemically identical to calcite but with a different crystal structure. These formations tend to be small, delicate, and shaped like needles.

The World of Bats

Carlsbad Caverns is a sanctuary for hundreds of thousands of Mexican free-tailed bats. During the day they crowd together on the ceiling of Bat Cave, a passageway near the natural entrance of

Carlsbad Caverns. In this darkened home they are seen only by scientific researchers. At nightfall the bats leave the cave in gigantic swarms. Silhouetted against the night sky like a dark, swift-moving cloud, the bats make

their most dramatic display. Other extraordinary characteristics of bats—their natural sonar system and their ability to fly—make these creatures of darkness one of great interest.

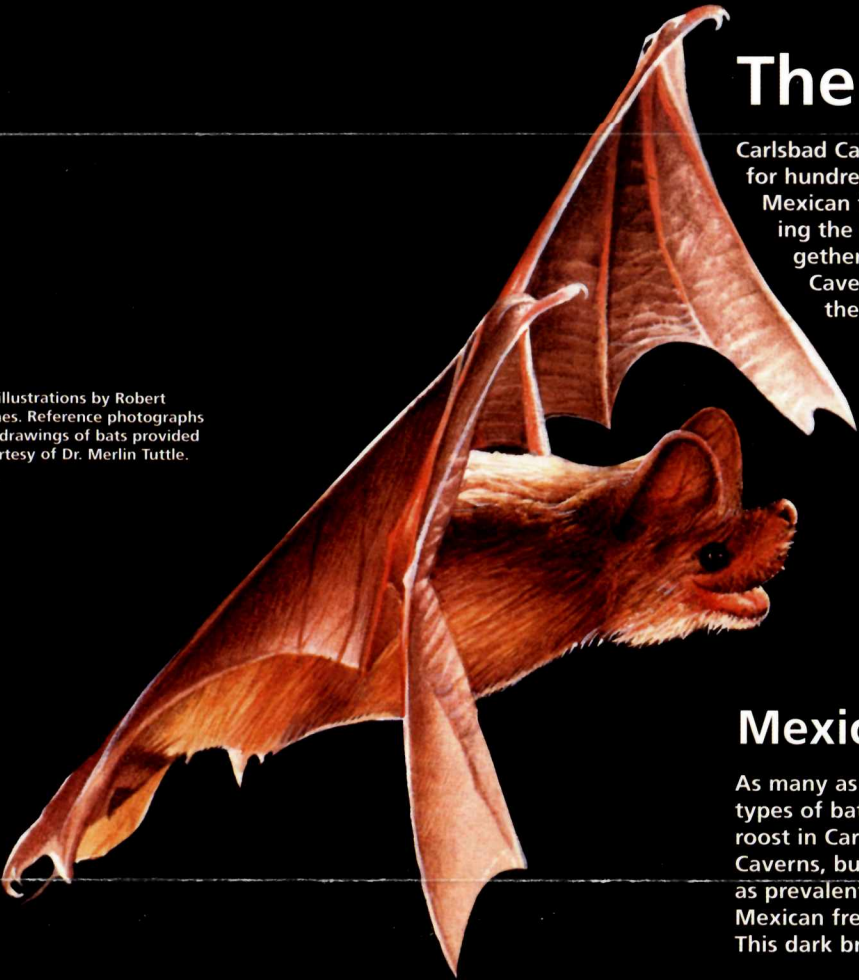
Echolocation

Like most species of bats, Mexican free-tailed bats navigate and locate their prey by emitting ultra-high frequency sounds. Known as echoloca-

tion, this natural sonar system is similar to that used by dolphins and whales. When a bat's signals strike an object, they are reflected back and heard by the bat.

The bat then takes whatever action is appropriate, whether it be zeroing in on a moth and other flying insects or swerving to avoid a tree limb.

All illustrations by Robert Hynes. Reference photographs for drawings of bats provided courtesy of Dr. Merlin Tuttle.



Mexican Free-tailed

As many as seven types of bats may roost in Carlsbad Caverns, but none is as prevalent as the Mexican free-tailed. This dark brown to

gray bat is distinguished by its long, narrow wings and a free-dangling, skinny tail. Only a part-time resident of Carlsbad Caverns this migratory bat stays here

and in other Southwest caves from early spring through October. It flies south to tropical Mexico for the winter.



Bat Families in the Cave

Bat Cave serves as a summer home, a daytime refuge, and, perhaps most importantly, as a maternity roost for Mexican free-tailed bats. The bats, which are mammals, migrate from Mexico to Carlsbad Caverns each year to give birth and raise their young. Young are born in June, under the cover of darkness and away from predators or disturbances. A female usually has just one offspring. Each birth occurs on the

ceiling as the mother hangs by her toes and thumbs. The baby (called a pup) clings to its mother or to the ceiling. For the next four to five weeks, the youngster stays on the ceiling. During the day, mothers and pups hang in clusters on the ceiling, resting, napping, and nursing. As many as 300 bats may crowd into one square foot. At night the young are left in the cave while the adults leave to feed. How does

a mother ever find her own baby in the teeming mass of pups? She remembers her pup's location, its scent, and the sound of its cry. In July or August each young bat takes its first flight, joining the adults on nightly feeding forays. While in Bat Cave, bats share their quarters with only a few insects and spiders. In late October or early November the adults and young leave for Mexico—until they return again next year.



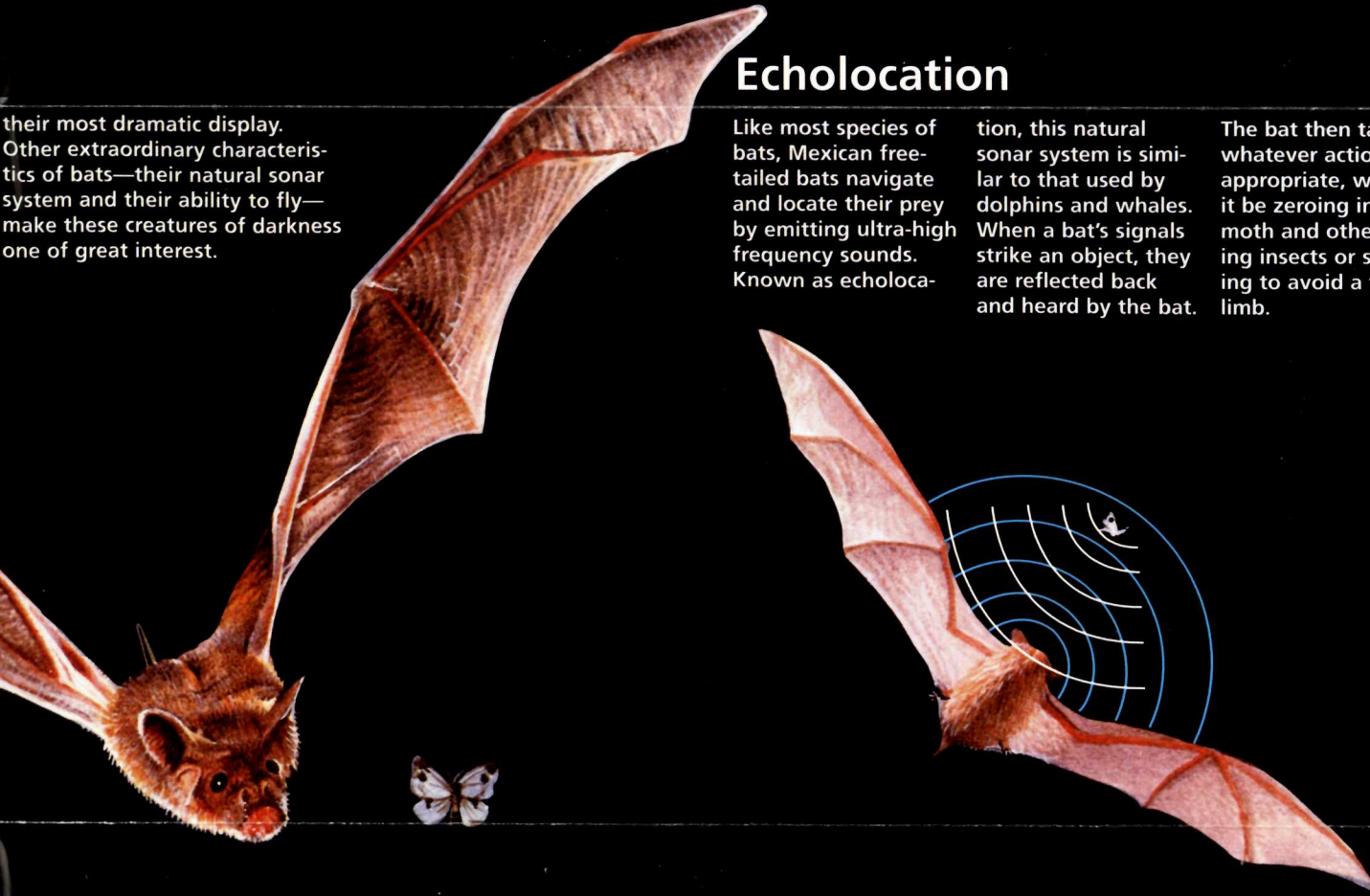
Mexican free-tailed bats are born naked. Their fur grows in by the time they can fly.

Night Flight

The spectacular flight of the Mexican free-tailed bat begins with a few bats fluttering out of the natural entrance of Carlsbad Caverns. Then, in a matter of minutes, a thick whirlwind of bats spirals out of the cave up into the darkening night sky. The exodus can last from 20 minutes to 2½ hours. Once out of the cave the mass of thousands of bats undulates, serpen-

tine fashion, toward the southeast to feed in the Pecos and Black River valleys. Once there, they gorge on moths and other night-flying insects. Using echolocation, its sonar system, each bat may catch and eat several stomachfuls of insects in a single night. With the coming of dawn, the bats begin flying back to the cave individually or in small groups. They reenter the cave in

a fashion almost as remarkable as their departure. Each bat positions itself high above the cave entrance. It then folds its wings close to its body and plummets like a hailstone into the blackness of Carlsbad Caverns, making strange buzzing sounds as it does. One by one, the bats return to the safety of Bat Cave, where they sleep until reemerging in the dusk of the next evening.



Lure of the Unknown

More than 1,000 years ago prehistoric Indians ventured into the entrance of Carlsbad Caverns. They left no record of entering the dark zone of the cave, but they did leave mysterious drawings on cave walls near the natural entrance. In the 1800s, settlers discovered the cavern, drawn to it by the spectacle of hundreds of thousands of bats rising up out of the natural entrance in the evening. Some stayed on to mine the huge deposits of bat guano in the cave and sell it as a natural fertilizer. One man, a cowboy named Jim White, became fascinated by the cave and spent hours exploring it. White was eager to show the natural wonders of this extraordinary place to others, but few believed his improbable tales of a huge underground wilderness full of unusual formations. It took photographs to convince skeptics that Carlsbad Caverns was everything it was said to be.

In 1915 black-and-white pictures taken by Ray V. Davis, who accompanied White on a cave trip, were displayed in the town of Carlsbad, N.M. They created a sensation. People clamored to see the marvelous cave. White took them on tours that began with a 170-foot descent in a bucket once used to haul bat guano from the cave. Word of the cave spread, finally reaching Washington, D.C. Again, there were nonbelievers, but in 1923 the U.S. Department of the Interior sent Inspector Robert Holley to see whether Carlsbad Caverns was truly an outstanding natural scenic wonder. Originally a skeptic, Holley wrote in his final report: "I am wholly conscious of the feebleness of my efforts to convey in words the deep conflicting emotions, the feeling of fear and awe, and the desire for an inspired understanding of the



Cave explorer Jim White.



Early cave visitors.



National Geographic Society expedition, 1924, climbs a stairway made of guano bags.



Chandelier Ballroom in Lechuguilla Cave has spectacular gypsum formations.

Divine Creator's work which presents to the human eye such a complex aggregate of natural wonders."

Later that year Carlsbad Caverns was proclaimed a national monument. White, who continued cave explorations for most of his life, became its first chief ranger. In 1930, the U.S. Congress created Carlsbad Caverns National Park. Through illustrated articles in magazines such as *National Geographic* and by word of mouth, Carlsbad Caverns became one of the world's most celebrated cave systems. Since its establishment the park has expanded; today it includes 46,766 acres and more than 90 other caves.

Experienced underground explorers, or cavers, and cave scientists are the Christopher Columbuses of today—journeying beyond the boundaries of what is known into the realm of the unknown. For

many years cavers felt a strong breeze blowing from the floor of a small cave known as Misery Hole. In 1986 they received permission to explore and break through this level. Their discoveries opened what is now known as Lechuguilla Cave. This cave extends more than 100 miles and holds a spectacular but fragile ecosystem. To protect this system, entry into Lechuguilla is restricted to exploration and scientific groups. Lechuguilla Cave will probably not be opened to the public. Within the cave scientists have discovered microbes that produce enzymes capable of destroying cancer cells. Scientific discoveries continue to give us clues about the complex creation of the area's caves, about bats and other members of the cave community, and how human activities affect these fragile underground worlds.