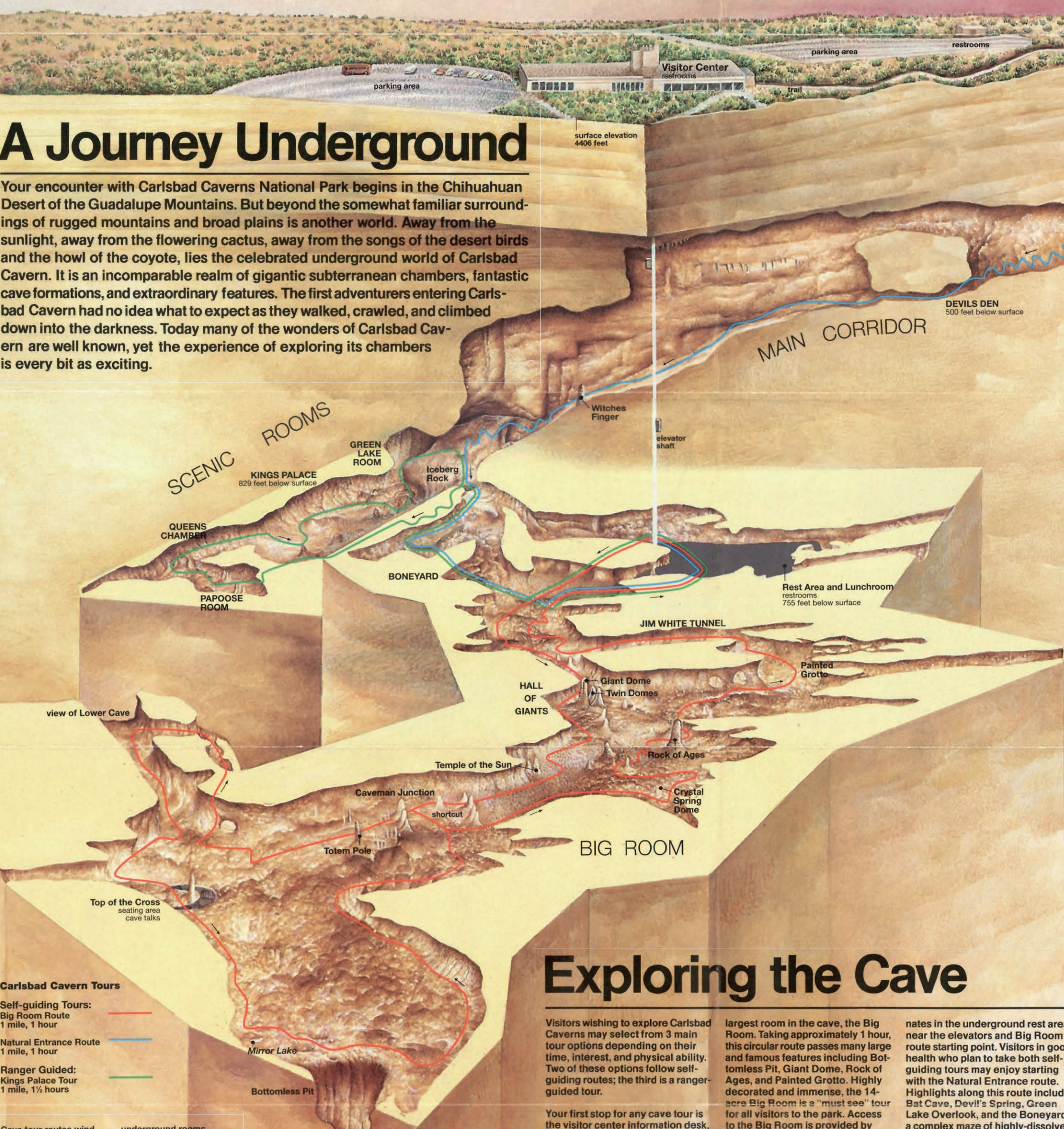


A Journey Underground

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 the 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 Cavern. It is an incomparable realm of gigantic subterranean chambers, fantastic cave formations, and extraordinary features. The first adventurers entering Carlsbad Cavern had no idea what to expect as they walked, crawled, and climbed down into the darkness. Today many of the wonders of Carlsbad Cavern are well known, yet the experience of exploring its chambers is every bit as exciting.



Carlsbad Cavern Tours

- Self-guiding Tours:
 - Big Room Route 1 mile, 1 hour
 - Natural Entrance Route 1 mile, 1 hour
- Ranger Guided:
 - Kings Palace Tour 1 mile, 1 1/2 hours

Cave tour routes wind through the chambers of Carlsbad Cavern shown in the illustration above. Only a part of the cave can be viewed on public tours. Beyond these passages are more underground rooms, many of them just as exquisitely decorated. Altogether more than 30 miles of caves have been explored. The deepest chamber is 1,027 feet below the surface.

Safety in the Cave

- To ensure that your tour of Carlsbad Cavern is a comfortable, enjoyable, and safe one, you are asked to follow some important rules and recommendations.
- Wear low-heeled, non-skid shoes for walking on the paved cave trails, which are sometimes steep and slippery. Use handrails where available. Take along 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 unlighted passages where you could get lost. Also, fragile formations on the floor, walls, and ceilings can be damaged by persons straying from the trails.

Exploring the Cave

Visitors wishing to explore Carlsbad Caverns may select from 3 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 questions about your tours, and you may purchase tickets. The basic entry fee allows access to either, or both, self-guiding tour routes. Rangers at the information desk can provide current information on special ranger activities, and they can tell you about wild cave tours that may be available, staff permitting.

Big Room Route

The basic tour through Carlsbad Cavern is the Big Room Route, a 1-mile, self-guiding, underground stroll around the perimeter of the

largest room in the cave, the Big Room. Taking approximately 1 hour, 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. Access to the Big Room is provided 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 wheelchairs, with a 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 1-mile tour follows the traditional explorer's 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 culminates in the underground rest area, near the elevators and 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. Visitors should 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 1 1/2-hour ranger-guided tour through 4 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 1-mile tour does require descending, and later climbing, an

The Bat Flight

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

Preserving a National Treasure

The protection and preservation of Carlsbad Cavern 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. Please assist the National Park Service in preserving Carlsbad Cavern by observing park regulations. Touching cave formations 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 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 between foreign objects, the water, and the rock can leave permanent stains. Photography is permitted when you tour on your own but not when you accompany a ranger-guided tour. Photographers should not rest tripods or other camera equipment on formations or step off the trails. Strollers are not permitted because parts of the trails are steep and narrow.

Other Park Activities

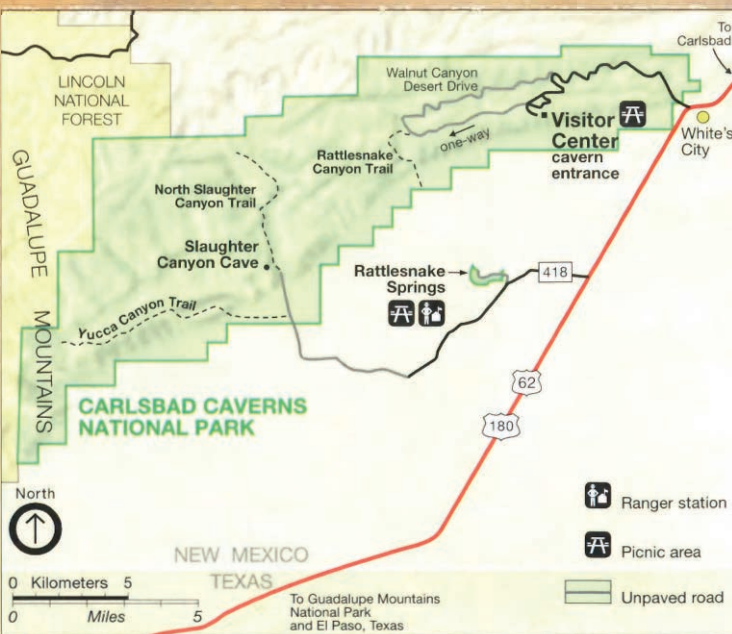
The Visitor Center
The visitor center has a variety of information on all features of the park, including not only those found underground but also those of the mountains and desert. Books, brochures, topographic maps, exhibits—including a three-dimensional model of Carlsbad Cavern—and park activity schedules are available. Park rangers can assist you in planning what to see and do both on the surface and underground. A restaurant, gift shop, and kennel are available at the center. Services are available all year except on December 25. For more information write: Carlsbad Caverns National Park, 3225 National Parks Highway, Carlsbad, NM 88220-5354; or call 505-785-2232.

Scenic Drive
The 9 1/2-mile Walnut Canyon Desert Drive is a gravel, one-way

loop through dramatic desert mountain scenery. Passenger cars 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. A good supply of water and a topographic map are essential.

Camping and Picnicking
There is no developed campground in the park, but the nearby towns of White's City and Carlsbad have several. (These towns also have lodging, restaurants, gasoline stations, and other services.) Free



backcountry permits are available at the visitor center. Picnic tables are located 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 the summer average highs are in the 90s°F; in the winter they are in the 50s and 60s°F. Intense thunderstorms occur in the summer, posing the danger of lightning in higher areas and of floods in low-lying areas.

Hiking in the Guadalupe Mountains (above right).
A strawberry cactus, one of many native desert plants (right).
Discovering the beauty of Slaughter Canyon Cave (far right).



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 broken only by the light of lanterns carried by rangers and flashlights carried by tour members. Highlights of the 2-hour, 1 1/2-mile tour are the 89-foot-high Monarch, one of the world's tallest columns; 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. Tours are given daily in the summer and on weekends the rest of the year. A fee is charged. Reservations must be made at the visitor center or by calling the park. You have to hike a strenuous 1/2-mile trail to the cave entrance, where the tour begins. Sturdy walking shoes, flashlights, and water are required.

Carlsbad Caverns: Chamber of Wonders



Illustration by Robert Hynes

- 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 Helicities
- 11 Aragonite formations
12 Rimstone dams

The Creation of the Cavern

The story of the creation of Carlsbad Cavern begins 250 million years ago with the creation of a 400-mile-long reef in an inland sea that covered this region. This horseshoe-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. Rain-

water, made slightly acidic from the air and soil, seeped down into the 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 was migrating 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 the passageways. The exposed reef became part of the Guadalupe Mountains and the underground chambers became the wonder of Carlsbad Cavern.

The Cave is Decorated, Drop by Drop

The decoration of Carlsbad Cavern 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. The 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 downward

the drop dissolved a little limestone, absorbing a bit 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 and billions of drops later, thousands of cave formations had taken shape. And, oh, the shapes they took! Where water dripped slowly from the ceiling, soda straws and larger stalactites appeared. Water falling on the floor created stalagmites. Sometimes a stalactite and stalagmite joined, forming a col-

umn. Draperies were hung where water ran down a slanted ceiling. Water flowing over the surface of a wall or floor deposited layers of calcite called flowstone. Cave pearls, lily pads, and rimstone dams appeared where pools of water or streams occurred in the cave. Like oyster pearls, cave pearls were made 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 to occur in Carlsbad Cavern are helicities, 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 of aragonite, a mineral chemically identical to calcite but with a different crystal structure. These formations tend to be small, delicate, and needle-like.

Cave formations are commonly made up of calcite crystals; some well developed crystals are shown (left).

The World of Bats

Carlsbad Caverns is a sanctuary for about 1 million Mexican free-tail bats. During the day they crowd together on the ceiling

of Bat Cave, a passageway near the natural entrance of Carlsbad Cavern. In this darkened home they are seen only by scientific researchers. At nightfall, however, 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 character-

istics of the bat—its natural sonar system and its ability to fly—make this creature of darkness one of great interest.

Echolocation

Like most species of bats, Mexican free-tails navigate and locate their prey by emitting ultra-high frequency sounds. Known as echolocation, this nat-

ural 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 tiny moth or swerving to avoid a tree limb.

The Mexican Free-tail

As many as seven types of bats may roost in Carlsbad Cavern, but none is as prevalent as the Mexican free-tail. Gray or sometimes brown, this

bat is distinguished by its long, narrow wings and a free-dangling, skinny tail. Only a part-time resident of Carlsbad Cavern, this migratory bat stays here, and in other Southwest caves, from early spring through October. It flies south to tropical Mexico for the winter.

In the Bat Cave

The Bat Cave serves as a warm-weather home, as a daytime refuge, and perhaps most importantly, as a maternity roost, for Mexican free-tail bats. The bats migrate from Mexico to Carlsbad Cavern each year to give birth and raise their young. Under cover of darkness, away from predators or disturbances, the young are born in June. A female usually has just one offspring. Each birth occurs on the ceiling as the mother hangs by her

toes and thumbs. The newborn, too, clings to the ceiling, or to its mother. For the next four to five weeks the youngster remains on the ceiling. During the day mother and young 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. In July or August, each young bat takes its first flight, joining the adults on

nightly feeding forays. Throughout their stay in Bat Cave the bats share their quarters with only a few insects and spiders. Finally in late October or early November adults and young leave Bat Cave until next year for their wintering grounds in Mexico.



Mother and offspring.

The Night Flight

The spectacular night flight of the Mexican free-tail begins with a few bats fluttering out of the natural entrance of Carlsbad Cavern. 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 20 minutes or as long as 2½ hours. Once out of the cave the undulating mass of thousands of bats flies, in serpentine fashion, toward the southeast to feed in the Pecos and

Black River valleys. Once there, they begin gorging themselves on moths and other night-flying insects. Using echolocation, its sophisticated 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 Cavern, making a strange buzzing sound as it does. One by one, the bats return to the safety of the Bat Cave, where they sleep until reemerging in the dusk of the next day.

Lure of the Unknown

More than 1,000 years ago prehistoric Indians ventured into Carlsbad Cavern seeking shelter. They left behind no record of what their impressions of the cave were, but they did leave some mysterious drawings on cave walls near the natural entrance. Much later, 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 to mine the huge deposits of bat guano in the cave and sell it as a natural fertilizer. One such man, a cowboy named Jim White, became fascinated by the cave and spent hour after hour exploring it. White was eager to show the many natural wonders of this extraordinary place to others, but few persons believed his improbable tales of a huge underground wilderness full of unusual cave formations. It took photographs to convince skeptics that Carlsbad Caverns was everything it was said to be, and more.

Black and white pictures taken by Ray V. Davis, who accompanied White on a cave trip, were displayed in the town of Carlsbad in 1915. They created a sensation. People suddenly clamored to see the marvelous cave for themselves. White took them on tours that began with an unceremonious 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 investigate and see whether Carlsbad Cavern 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 Divine Creator's work which pre-



Cave explorer Jim White.



Early cave sightseers in a guano bucket.



Visitors touring Carlsbad Cavern in 1920s by the light of kerosene lamps.



A caver in the Bifrost Room, a recently discovered chamber of Carlsbad Cavern.

sents to the human eye such a complex aggregate of natural wonders. . . .

Later that year Carlsbad Cavern was proclaimed a national monument. White, who was to continue his cave explorations for most of his lifetime, became its first chief ranger. Seven years later Carlsbad Caverns National Park was created to protect the cave. Through illustrated articles published in magazines such as National Geographic and by word of mouth, Carlsbad Cavern became one of the world's most celebrated caves. Since its establishment, the park has been expanded and today includes 46,755 acres and more than 80 other smaller caves.

And the exploration of Carlsbad Cavern continues. 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. Carlsbad Cavern attracts many men and women who are eager to shed light on some of its mysteries. Teams of cavers well versed in safe exploration techniques continue to discover new portions of the cave. Their finds in recent years include the Guadalupe Room, Carlsbad Cavern's second largest room, in 1966; the exceptionally colorful and much-decorated Bifrost Room, in 1982; and Chocolate High, one of the most recent discoveries, in 1993.

Scientific discoveries by speleologists, or cave scientists, are expanding our knowledge of Carlsbad Cavern in other ways. Research is answering some of the questions about the complex creation of Carlsbad Cavern, about the unfamiliar world of bats and other members of the cave community, and about the effects of man's activities on the cave.