

Oregon Caves may surprise you. Small in size, it is rich in diversity. That richness can be found both underground amidst narrow, winding passageways and above ground where old growth forest harbors a fantastic array of animals and plants found nowhere else. You will discover a land rich in conifers, wildflowers, birds, and amphibians. An active marble cave and underground stream reveal the inside of one of the world's most diverse geologic realms.

Discovery, Development, and Rebirth

As his last match flickered out, 24-year-old hunter Elijah Davidson found himself in the total blackness of the cave. Davidson was chasing after his dog Bruno, who in turn was pursuing a bear. One following the other, the dog and bear entered a dark hole high on the mountain side. Davidson stopped at the mysterious dark entrance. He could see nothing, but an agonizing howl pulled him into the cave to save his dog. Now the matches were gone and Davidson was in total darkness. Fortunately, he was able to wade down a gurgling, ice-cold stream and find his way back into daylight. Bruno soon followed. It was 1874.

Later, other brave souls explored deeper into the cave, returning home to tell of its great beauty and mystery. In 1907, a party of influential men, including Joaquin Miller, the "poet of the Sierras," visited the cave. Charmed by it, Miller wrote of the "Marble Halls of Oregon." The ensuing publicity alerted federal officials to the possibility of preserving the cave. In



Cover: Paradise Lost is one of the outstanding features of the cave. Its flattened, parachutelike top shows that water has dropped from a great height, the force of its fall preventing a more rounded appearance. The brownish color is more likely from organic staining, not rust.

Left: Elijah Davidson (1849-1927), seen here in a hand-colored photograph taken in the 1920s by Fred Kiser, poses many years after the attempt to rescue his dog led to the discovery of the cave.

1909 President William Howard Taft proclaimed a tract of 480 acres as Oregon Caves National Monument. In 1922 an automobile road reached the park, and 12 years later a six-story hotel, the Chateau, was constructed. The very same year, 1934, Oregon Caves National Monument was transferred from the Forest Service to the National Park Service, which still administers it.

Workers blasted tunnels and widened passages in the cave during the 1930s. They put waste rocks in side passages, covering many limestone formations. Changes in air flow patterns altered the growth of formations and caused greater swings in temperature. Freezing water now cracked rock layers. Lights in the cave promoted the growth of algae, which turned portions of the cave green and dissolved some formations. Smoke from torches and lint coming off visitors' clothing blackened other portions.

Since 1985 the National Park Service has removed more than a thousand tons of rubble in its effort to restore the cave. Transformers, asphalt trails, and cabins were removed to prevent sewage or oils from leaking into the cave from the surface. Thousands of formations buried under rubble were uncovered. Crystal clear water once again cascades over white marble. Some broken formations have been repaired with epoxy and powdered marble. Airlocks have restored natural cave winds by blocking airflow in artificial tunnels. Spraying with bleach keeps the algae under control. The new lighting and trail system will reduce evaporation and unnatural foods, which have attracted surface insects and driven out native species. Not everything has been or can be restored. For example, the dissolution and formation of cave decorations are in delicate balance with the amount of carbon dioxide in the air and water. A global increase of this gas in the atmosphere, caused largely by deforestation and burning of fossil fuels, is affecting this balance. Still, one can now see a renewed cave, a valuable benchmark against which we can measure human impacts, now and in years to come.

Exploring Underground

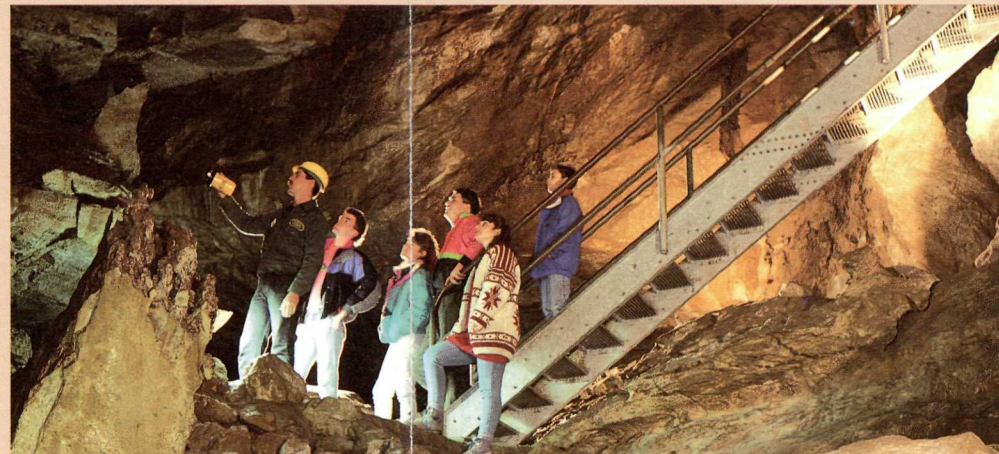
A tour through Oregon Caves is an adventure in geology. A myriad of calcite formations decorate the cave. You will find striking parachute-like flowstone at Paradise Lost and what appear to be giant ribs as you squeeze through the Passageway of the Whale. Tiny rimstone dams resemble miniature waves on the sea.

It is the drip, drip, drip of water that decorates the cave, building the bizarre and eerie sculptures. How the water moves—seeping, dripping, flowing—and how many crystals come out of the individual drops of water dictate the shape and size of formations made of calcite, the same mineral found in cement and eggshells.

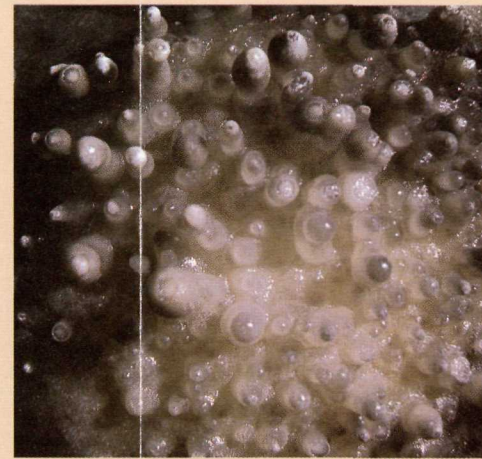
Some formations provide information about the cave. Water evaporated by air flowing in from outside leaves a residue of bumpy cave pop-

corn. Cavers use popcorn as a compass to find new passages or, when lost, their way out. Moonmilk is made of tiny calcite crystals but has the look and feel of cottage cheese. From early times it was a folk medicine smeared on livestock to heal wounds and is created by the same type of bacteria used to make today's antibiotics.

Rising warm air condenses on the cold ceiling and is acidified by carbon dioxide in the cave. This water dissolves formations, leaving behind cave ghosts, the nubbins of former stalactites.



Ghost room



Cave popcorn



Bats Some bats in Oregon Caves hold the world record for their species, living up to 26 years. The population peaks in the fall when bats swarm to breed. Healthy numbers of Townsend's big-eared bats, and Pallid bats (left) contrast with areas outside the park where pesticides and disturbed nursery sites have taken a deadly toll. To further help the bats and protect the cave, specially designed gates were installed at the entrances. Horizontal rungs, rather than vertical ones, allow bats with their long wings to maneuver through the gates.

Touring the Cave

Touring Oregon Caves has been a tradition for more than a century. Today, tours are conducted by the Oregon Caves Company, a private concessioner. Guides lead you through a one-half mile marble passage and discuss the cave's natural and cultural history and its preservation. Tours are scheduled regularly in spring, summer, and fall. In winter they may not be available due to heavy snowfall. A fee is charged, and prices are subject to change. Tours last about 75 minutes. Waiting times can reach 90 minutes in the summer.

For a Safe Tour Wear warm clothing and good walking shoes with nonslip soles. Cave temperatures are in the 40s year-round, and the floor is wet and slippery in places. Though lighted with an improved trail, the cave is a natural environment with potential hazards such as



Cave pearls



Moonmilk



Rimstone dams

uneven walking surfaces, steep grades and stairs, and low rock ceilings.

Accessibility The first room of the cave is accessible to visitors using canes and wheelchairs.

Not for Everyone The half-mile cave tour route includes more than 500 stairs, many of which are steep and wet. Several passages are narrow with low ceilings. The tour is strenuous and is not recommended for people with walking, breathing, or heart problems.

Special Regulations Children must be at least 42 inches tall and able to climb a set of test stairs unassisted. Children may not be carried through the cave and childcare services are not available.

Visiting the Park

Oregon Caves National Monument is 20 miles southeast of Cave Junction, Oregon, on Ore. 46. The park is 50 miles south of Grants Pass, Oregon, and 76 miles northeast of Crescent City, California, via U.S. 199. Ore. 46 is narrow and mountainous, with sharp curves; drive at a safe and legal speed. Leave trailers at the Illinois Valley Visitor Center or at the Grayback Campground in Siskiyou National Forest. The park is open daily except December 25.

The **Illinois Valley Visitor Center** in Cave Junction has videos, exhibits, maps, and brochures that highlight local attractions.

Hiking Trails at elevations of 3,800 to 5,500 feet require you to be in good physical condition. The trails are not maintained in snowy weather. Check with a ranger before setting out.



The Chateau



Big Tree

Camping There is no campground in the park. The Forest Service operates Grayback and Cave Creek campgrounds, on Ore. 46, in the adjoining Siskiyou National Forest from late-May to mid-September. Cave Creek campground cannot accommodate large vehicles. There are no showers or utility connections.

Accommodations In the park lodging and food are available at **The Chateau** from mid-June to early September. For information or reservations write: Oregon Caves Company, 20000 Caves Hwy., Cave Junction, OR 97523.

Information For more information write: Superintendent, Oregon Caves National Monument, 19000 Caves Highway, Cave Junction, OR 97523-9716; or call 503-592-2100.

Regulations The National Park Service wants you to have a pleasant, safe visit and to assist in protecting the park for the future. Please follow these rules. ● Keep wildlife wild by not feeding them. Mammals can carry rabies or bubonic plague. Ticks may carry Lyme disease or Rocky Mountain spotted fever. ● Pets frighten wildlife and may disturb others. They are allowed only on paved roads and must be attended and kept on a leash while outside your vehicle. Do not take pets on the trails.

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The World Below

Moonmilk, dripstone, boxwork, cave "ghosts"; strange names for a strange place that seems out-of-this-world. Oregon Caves, though, is clearly of this world, being linked directly to powerful forces shaping the Earth inside and out. Violent geologic events spanning millions of years have created a cave nestled within an unusually diverse array of rock types.

Cave Development

The Rock Millions of years ago, plates of continent and ocean rock sideswiped, opening an ocean basin. The remains of sea creatures living in the basin formed muds that hardened into limestone. The plates then smashed head-on, obliterating the basin and creating molten rock that cooked the limestone, creating marble. The rocks cooled into granite-like rock with pockets of marble. The rocks rose into the Siskiyou Mountains, twirled by sideswiping plates to point east and west.

The large cutaway diagram of the cave (right) is not of any specific portion but shows a composite of formations and conditions to be found throughout. As you tour the cave look for the formations shown here: boxwork, clay worms, cave popcorn, and cave ghosts. You may also see roots of trees growing above the cave. Finally note the keyhole-like shape of the cave formed by the roundish chamber and the notch caused by the downcutting of the stream.

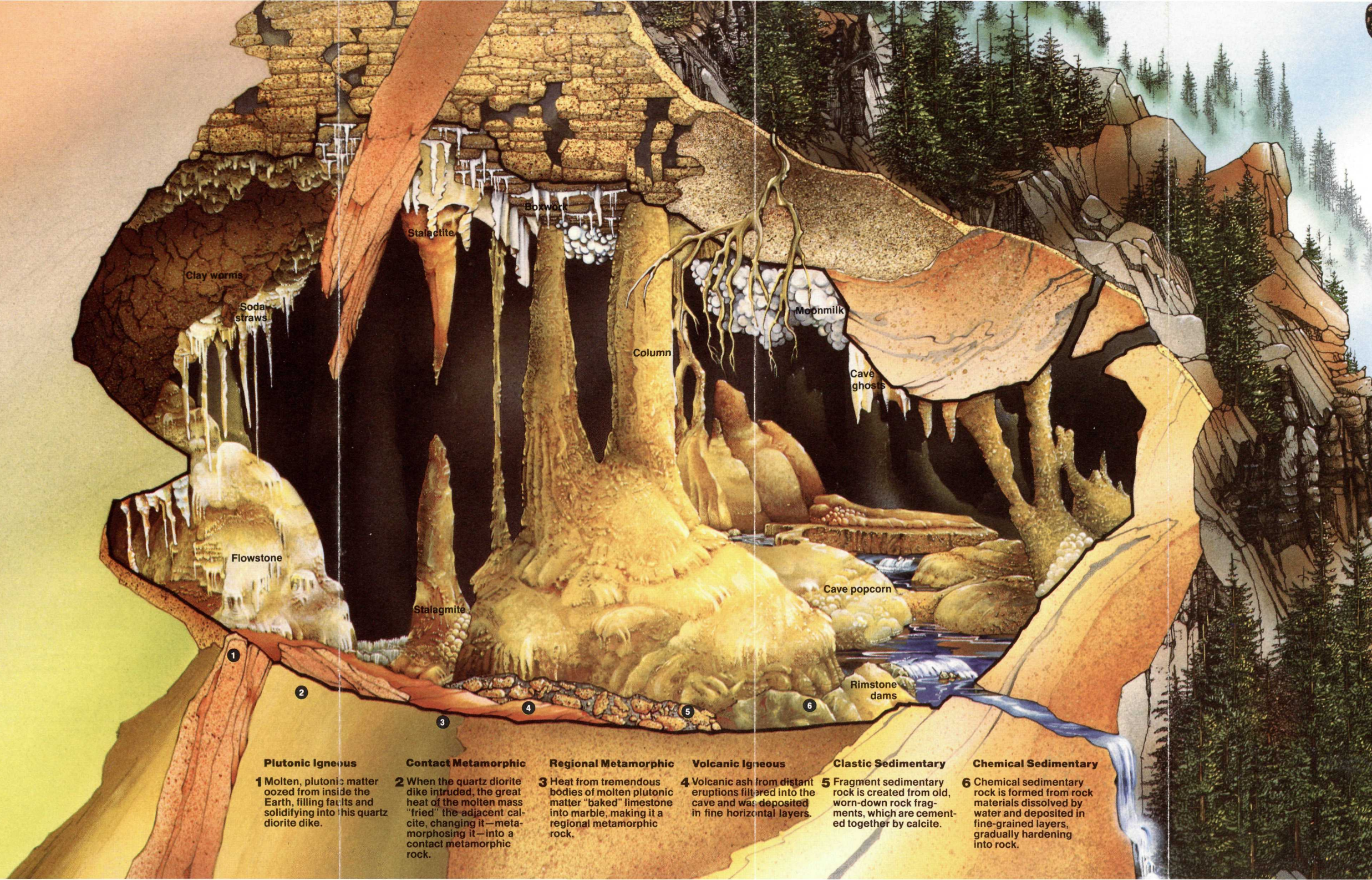
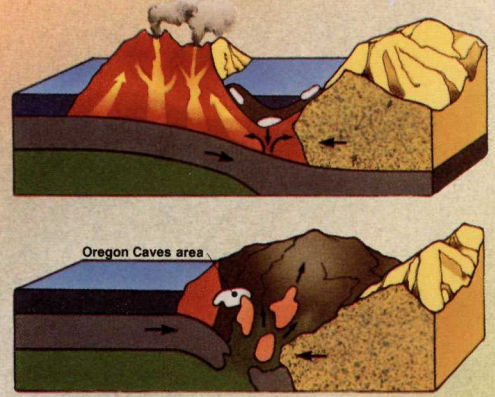
The block diagrams (left) show two phases in a geological process that have taken more than 200 million years. The top diagram shows the ocean basin torn open by sideswiping continental and oceanic rock. The bottom diagram shows the uplifted marble mountains—the Siskiyou—torn into their east-west orientation. The colors depict the different types of rock: gray denotes basalt, pink is the quartz diorite, and white is the marble in which the cave formed.

An Array of Rock Types

The forces that created Oregon Caves also created an array of rock types in this mountain range. Perhaps more unusual than the cave formations themselves, six different rock types (two each of the basic rock types—igneous, sedimentary, and metamorphic)—are exposed within Oregon Caves. The origins of these are described beneath the diagram at right.

The Cavern During the mountain uplift, rock moved along faults. Groundwater, acidified by carbon dioxide, found its way through cracks in the marble. Slowly, as acidic water dissolved the marble, the underground channels grew larger.

The Formations When surface erosion opened a cave entrance and the water table descended, the channels became air-filled caverns. Today, as mineralized ground water seeps into the cave, the water loses its acid, causing minerals dissolved in the water to precipitate and create formations.



- 1 Plutonic Igneous** Molten, plutonic matter oozed from inside the Earth, filling faults and solidifying into this quartz diorite dike.
- 2 Contact Metamorphic** When the quartz diorite dike intruded, the great heat of the molten mass "fried" the adjacent calcite, changing it—metamorphosing it—into a contact metamorphic rock.
- 3 Regional Metamorphic** Heat from tremendous bodies of molten plutonic matter "baked" limestone into marble, making it a regional metamorphic rock.
- 4 Volcanic Igneous** Volcanic ash from distant eruptions filtered into the cave and was deposited in fine horizontal layers.
- 5 Clastic Sedimentary** Fragmentary sedimentary rock is created from old, worn-down rock fragments, which are cemented together by calcite.
- 6 Chemical Sedimentary** Chemical sedimentary rock is formed from rock materials dissolved by water and deposited in fine-grained layers, gradually hardening into rock.

The World Above

The surface world at Oregon Caves mirrors the diversity found underground, for the variety of rocks and soils have created a varied landscape. Serpentine rock serves as a refuge to some plant species and at the same time is intolerant of, even poisonous to, many others. The cave itself drains water away from the marble-based soils making them more suited to shrubs than to trees. The result is a mosaic of habitats that in turn supports a diversity of animals.

Yet climate overshadows the role of rocks and soils. Low elevations and south-facing slopes support fire- and drought-resistant oaks, while fir reign on cold, damp slopes high above the park. Late snowpacks, flood occur, and fire create meadows amidst virgin forest. In these age-old mountains limited glaciation has preserved one of the most ancient plant communities west of the Mississippi River where several plant zones meet just south of an Ice Age Purge. There is also a wealth of wildlife, the greatest diversity of birds and amphibians in Oregon. Steller's jays, deer, squirrels, and chipmunks are often seen. Other more secretive species call the park home including the northern spotted owl, mountain beaver, Pacific giant salamander, and a host of butterflies.

The Big Tree (left) is old, even for a Douglas-fir. A spring near its base may have shielded it from centuries of fires that killed its siblings. But even monarchs die. Its broken top attests to strong winter storms that may someday topple this forest giant.

The Madrone is the park's most easily recognized tree. Its adaptations may be endless. The peeling bark pops off burning embers during a fire, protecting the living tissue beneath. If the tree is burned to the ground,

sprouts soon rise up. Thick wax protects the leaves from drought, enabling the tree to survive on the dry and thin-soiled marble. Madrone even uses chemical warfare. Its leaves contain a growth inhibitor that prevents most other seedlings from sprouting nearby.

The northern spotted owl (above) prefers the dense stands found in old growth forests. It feeds on flying squirrels and red-backed voles. The Takelma Indians believed that the owl brought good news. Hunters prayed to the bird, promising the fat and blood of as many deer as they needed to catch the next day.

Since a mountain beaver's primitive kidneys need ample water, a decrease in rainfall over 30 million years has confined this living fossil to the wet Pacific Northwest.

The Pacific giant salamander (above) barks when in danger, one of the few amphibians known to vocalize. Like a canary in a mine, a salamander warns us of changes in our environment. Today its cry tells of a mysterious worldwide decline in amphibians.

For a rodent, the flying squirrel (above) has a huge brain, the better to enable it to escape the outstretched talons of its chief predator, the spotted owl.

