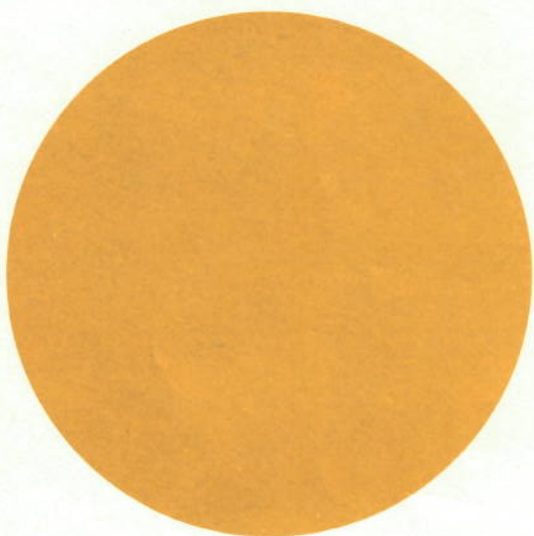
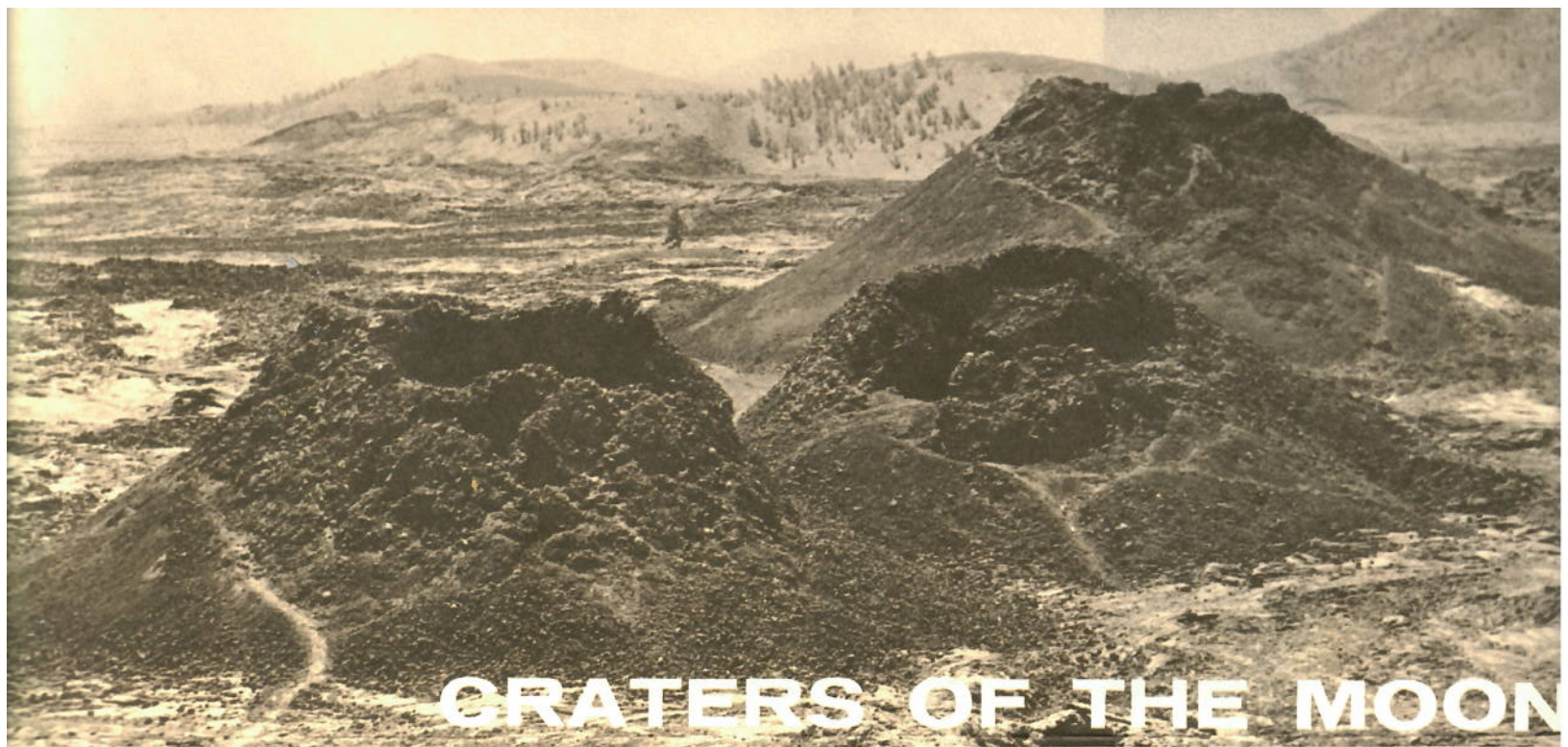




CRATERS OF THE MOON

NATIONAL MONUMENT • IDAHO



CRATERS OF THE MOON

NATIONAL MONUMENT

South central Idaho has one of the most astonishing landscapes in America. Vast lava fields are studded with cinder cones and form large central depressions that resemble the craters seen on the moon. Upon walking among the lava flows, you discover they have a variety of surface patterns and formations typical of basaltic lava the world over.

The lava floods destroyed all vegetation in their paths. Barren and sterile, they presented a harsh environment which at first only the hardiest plants could successfully invade. In time, as we see today, many kinds of plants, and animals too, have established themselves here.

Eighty-three square miles of this extraordinary volcanic region has been established as Craters of the Moon National Monument. Its features are readily accessible for your exploration, study, and enjoyment.

How was this landscape formed? For the answer we suggest you start in the visitor center. Then go outdoors to see and to read the meaning of the landscape along the roads and trails of this National Monument.

THE 7-MILE LOOP DRIVE

Where can typical examples of these volcanic landscapes be seen? A 7-mile loop drive passes by some of them, while a variety of trails leads to others. We encourage you to explore this outdoor museum. Walk some of the trails and attend the naturalist activities provided for your greater understanding and appreciation of this unusual area.

To acquaint yourself with the monument, we recommend that you take the 7-mile loop drive and the side-trips leading from it. Most of this drive is a one-way road through the more interesting places. Five trailheads lead from the road or the end of the side roads to entice you to become an explorer on foot. You can make the drive, stopping to take several short walks, in about 1 hour.

The first stop along the drive is at the **NORTH CRATER FLOW**. A short trail crosses the flow to a group of monoliths or crater wall fragments transported by lava flows. The North Crater Flow is interesting because it is one of the youngest in the monument. Geologists believe the lava erupted during many thousands of years and ceased only about 1,600 years ago. The Triple Twist Tree can attest to this! Scientists counted 1,350 annual growth rings to the rotted heart

of this veteran pine. Since about 150 rings are missing, and another 100 years would be needed for ample soil to form for growth of the seed, the lava last flowed in the fourth century. Unfortunately this gnarled patriarch died in 1961.

It may surprise you that over 200 species of plants are native to this seemingly desolate area. Big sagebrush, antelope bitterbrush, and rubber rabbitbrush dominate the older flows, while mockorange and tansybush fill the deeper crevices on the younger flows.

Some fine examples of ropy pahoehoe lava may be seen on the North Crater Flow. When active, the lava is about 2,000° F. and soon forms a crust or scum as it cools. This surface is wrinkled as the molten material continues to flow underneath. Generally pahoehoe has a smooth, billowy, or ropy surface but it presents a variety of configurations including twists, folds, pleats, bumps, and holes. Where lava drained away beneath a lava surface, pit craters or sinks were formed.

At the edge of the North Crater Flow is a series of aa lava flows. Unlike the pahoehoe, this lava is clinkery and extremely rough. It is broken into irregularly shaped blocks with jagged corners and sharp spines. A flow similar to this possibly carried the crater wall fragments from North Crater.

From this point the road skirts the edge of Paisley Cone. On the opposite side is Devils Orchard, a weird-appearing group of lava fragments from a crater wall. The fragments mark the possible vent of an ancient cinder cone. A short spur road leads to a self-guiding trail through these interesting features. The cinders are hardened lava froth, **NOT** the burnt remains of other material. The cinders form by the expansion of gases within the rising magma (molten rock). Shot into the air as fire fountains, the frothy lava cools and solidifies into cinders that fall around the vent, building symmetrical, graceful cones.

Look for bombs scattered about the cinder slopes. These curious objects were formed from ejected blobs of less frothy lava that ranged in diameter from a quarter of an inch to several feet. The blobs hardened sufficiently while in the air to retain a globular or spindle shape. Some of them had long slender tails that generally broke off, forming ribbon bombs.

In spring, wildflower displays are spectacular in the cinder gardens. Silvery pads of leaves of

dwarf eriogonum (dwarf buckwheat), topped with yellow or pink pompom flowers dominate the open cinder slopes. Dwarf monkeyflowers mat the ground in June and early July and add a magenta cast to wide areas of cinder.

The view from **INFERNO CONE VIEWPOINT** encompasses the distant mountain ranges and a volcanic landscape of cinder cones. Some cones being older than others have more vegetation on their slopes. The cool, moist north slopes generally harbor a sparse limber pine forest, while the more open slopes have less plantlife.

A short distance from Inferno Cone is the **BIG CRATERS-SPATTER CONE AREA**. A short walk to the south rim of Big Craters offers a fine view of the spatter and cinder cone chain along the Great Rift. In the distance, towering 800 feet above the lava plain, is Big Cinder Butte, one of the largest purely basaltic cinder cones in the world. It is easy to see that the volcanic activity centered along this Great Rift—a weakened zone of fissures or cracks in the earth's crust, extending northwest-southeast through the monument. Spatter cones formed along the fissure where clots of pasty lava stuck together when they fell. It is not difficult to imagine molten, gas-charged rock under pressure, moving upward along a fissure and spewing out upon the surface as lava. The material and the forces of such eruptions as these originate at depths of 20 to 30 miles.

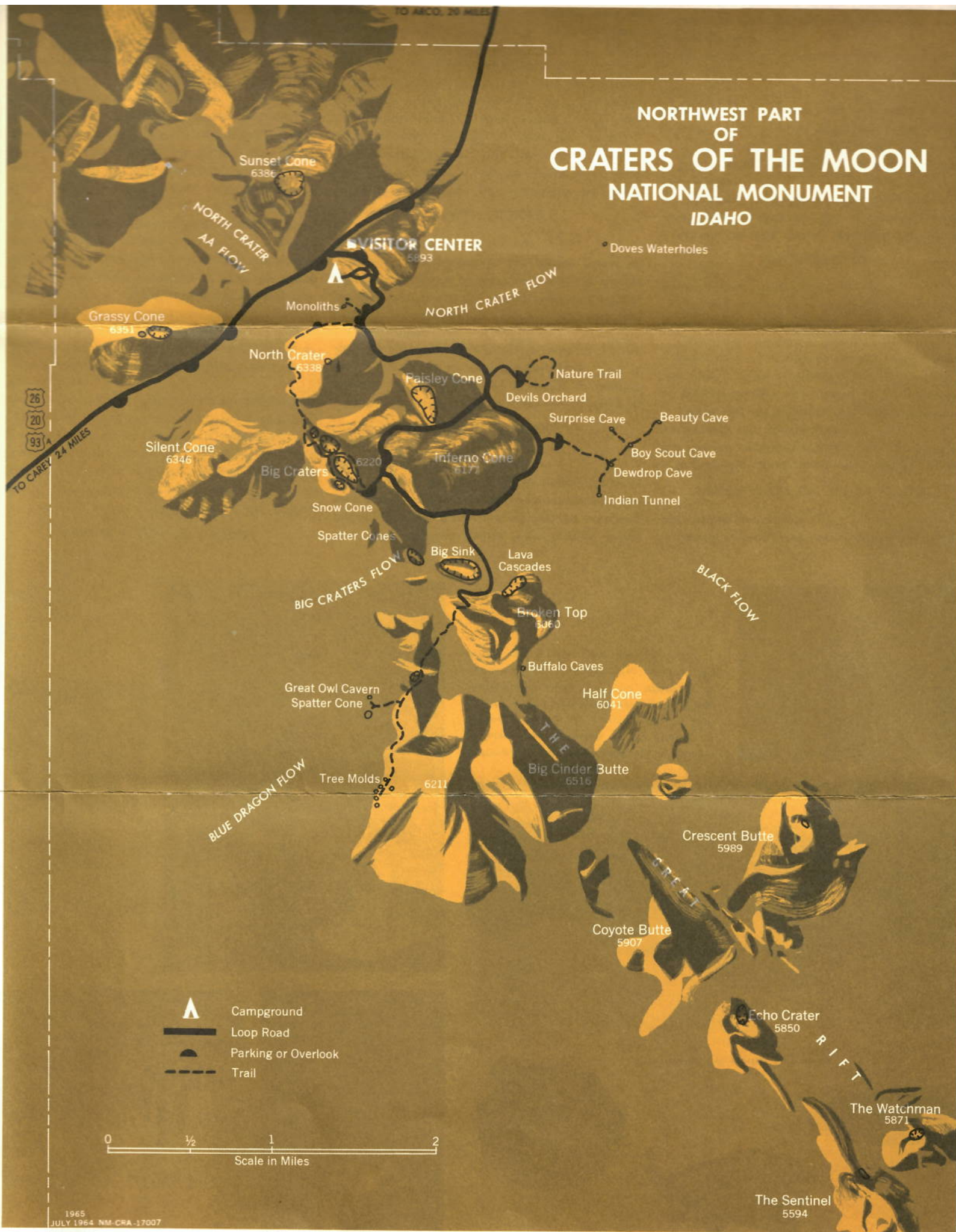
The drive continues around the east slope of Inferno Cone to a spur leading to **BROKEN TOP**, a ruptured cinder cone. On either side of the road are unusual formations of pahoehoe lava including one place where the molten rock poured from a large flow to form a lava cascade.

A roadcut at Broken Top reveals numerous cinder layers indicating that eruptions took place at intervals, while soil layers suggest long lapses occurred between these eruptions. From Broken Top a 1½-mile trail leads to **GREAT OWL CAVERN** and the **TREE MOLD AREA**.

From the loop drive, limber pine appears to be the only tree, but some juniper, aspen, and Douglas-fir are also present.

The next point of interest along the drive is the **CAVE AREA**. A wayside exhibit explains how lava tubes form, and an easy ½-mile walk leads you to these features. The lava tubes are beneath a large lava dome produced by non-violent flows from a fissure opening, possibly near the Indian Tunnel lava tube.

NORTHWEST PART OF CRATERS OF THE MOON NATIONAL MONUMENT IDAHO





"Bombs," or ejected lava blobs.



1 Naturalist trips are conducted in summer. 2 Some lava wrinkled as it flowed. 3 Eroded remnants of crater walls. 4 Outline of a tree enveloped by lava. 5 Fragmented lava dominates this approach to Spatter Cones. 6 An explorer examines the prickly ceiling of a lava tube.



OTHER PLACES OF INTEREST

You may want to walk one of the several trails that range from a 20-minute walk in Devils Orchard to a 2-hour hike to Great Owl Cavern and the tree mold area. Or if you are a veteran explorer, a vast lava wilderness lies waiting in the southern end of the monument. Be sure to check with a ranger for suggestions on this trip.

THE DEVILS ORCHARD NATURE TRAIL is a delightful $\frac{1}{3}$ -mile walk through a weird array of cinder fields and crater-wall fragments. A folder, available at the trailhead and the visitor center, tells the story of animal and plant communities. Some of the small mammals to look for along the trailside are the yellow-pine chipmunk, golden-mantled ground squirrel, red squirrel (chickaree), and yellow-bellied marmot. Other animals less frequently seen are the mule deer (look for his trails), coyote, and bobcat. In early morning or late afternoon, listen for the songs of the rock wren, Clark's nutcracker, and mourning dove. The brilliant mountain bluebird and acrobatic violet-green swallow frequent the area during midday.

THE GREAT OWL CAVERN-TREE MOLDS TRAIL covers about 4 miles and requires around 2 hours to complete. Great Owl Cavern is a lava tube about 500 feet long, 40 feet high, and 50 feet wide. The beginning of this tunnel marks the source of a lava dome. The surface of a pahoehoe flow may harden while the lava continues to flow beneath it in a self-made tube. When the eruption diminishes, the lava may drain out of the tube, leaving a cavern, similar to that of Great Owl Cavern. Although a stairway leads into the cavern, a lantern is necessary for exploration.

THE TREE MOLDS AREA is farther down the trail. It was here that a pahoehoe flow slowly enveloped a group of living trees. The lava cooled and hardened sufficiently upon contact with the moist wood to form tree molds. Smooth-sided vertical molds mark the location of ancient tree trunks while horizontal charred wood molds indicate where treetops fell.

AT THE CAVE AREA a short trail crosses a pahoehoe flow to a series of lava tubes or caves. The largest of these is Indian Tunnel which is over 830 feet long. Nearby is a group of

mer. This natural icebox was formed when melting snow and rain seeped into the cave and was cooled to a subfreezing temperature by the long winters. Entrance to these smaller caves is difficult and a lantern is necessary.

NATURALIST ACTIVITIES

A 1-hour auto caravan is scheduled daily in summer. Stops are made at points of interest while the naturalist explains volcanism. This is also an excellent opportunity to learn about the colorful wildflowers.

Each evening during summer, an illustrated program is given at the campground on geology, plants, or wildlife of the monument. A shorter program is scheduled in the visitor center at regular intervals during the day.

HUMAN HISTORY

An ancient Indian trail followed the Great Rift, while caves along the route were used as temporary shelters and probably, at times, as strongholds. At Indian Tunnel the semicircular arrangements of stone indicate that they were either used for protection from the winds or as firebreaks. Arrowheads and other stone implements were previously found in this vicinity.

The lava fields in general, and the rugged area of Craters of the Moon in particular, have been barriers to westward migration and to local settlement. All early travelers avoided crossing the rougher areas. The old wagon road from Arco to Carey, which skirted the lava flows, was 76 miles long. Today's route, crossing some of the most rugged parts of these flows, is only 43 miles.

It was not until about 1925 that these extensive lava formations attracted other than local visitors. Since then, after the National Monument was established, thousands of people have come from all parts of the world to enjoy and study this once-shunned place.

FACILITIES

A campground a short distance inside the monument entrance is open from about April 15 to October 15. It has fireplaces, tables, drinking water, and flush toilets. Campsites cannot be reserved.

The visitor center contains a series of fine

Gasoline, food, and souvenirs are **NOT** available in the monument.

PRESERVATION OF THE MONUMENT

Regulations have been designed to protect the natural condition of the monument, and your safety and convenience.

Please do not damage the volcanic features or disturb flowers, trees, and rocks, or molest the wildlife. Use of firearms is not permitted.

Drive only on established roads and turnouts. Camp and picnic in the established campground. **HELP KEEP THE MONUMENT CLEAN.**

Pets are allowed, provided you keep them under physical restraint at all times.

ADMINISTRATION

Craters of the Moon National Monument, established on May 2, 1924, is administered by the National Park Service, U.S. Department of the Interior.

The National Park System, of which this area is a unit, is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and enjoyment of all people.

A superintendent, whose address is Box 2, Arco, Idaho, 83213, is in immediate charge of the monument.

Entrance fees are collected under the provisions of the Land and Water Conservation Fund Act of 1965. The Recreation/Conservation Sticker will admit the driver and passengers of a private automobile. Individual daily and seasonal permits can also be purchased.

THE DEPARTMENT OF THE INTERIOR—the Nation's principal natural resource agency—has a special obligation to assure that our expendable resources are conserved, that our renewable resources are managed to produce optimum benefits, and that all resources contribute to the progress and prosperity of the United States, now and in the future.



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At the cave area a short trail crosses a pahoa flow to a series of lava tubes or caves. The largest of these is Indian Tunnel which is over 830 feet long. Nearby is a group of crescent-shaped rockpiles used by Indians as firebreaks and protection from the wind. Signs explaining interesting features are placed along the path leading through the tunnel. No lantern is necessary since the tunnel ceiling has collapsed in several places. Among the other caves are Boy Scout, Beauty, Surprise, and Dewdrop. Boy Scout Cave has a floor of ice, even in sum-

to October 15. It has fireplaces, tables, drinking water, and flush toilets. Campsites cannot be reserved.

The visitor center contains a series of fine exhibits explaining the volcanic formations, plants, animals, and the history of the monument. Also in this building are the administrative offices and restrooms; it is open to the public the year round.

The 7-mile loop road is normally open throughout the year, though heavy snows may temporarily close it in winter.



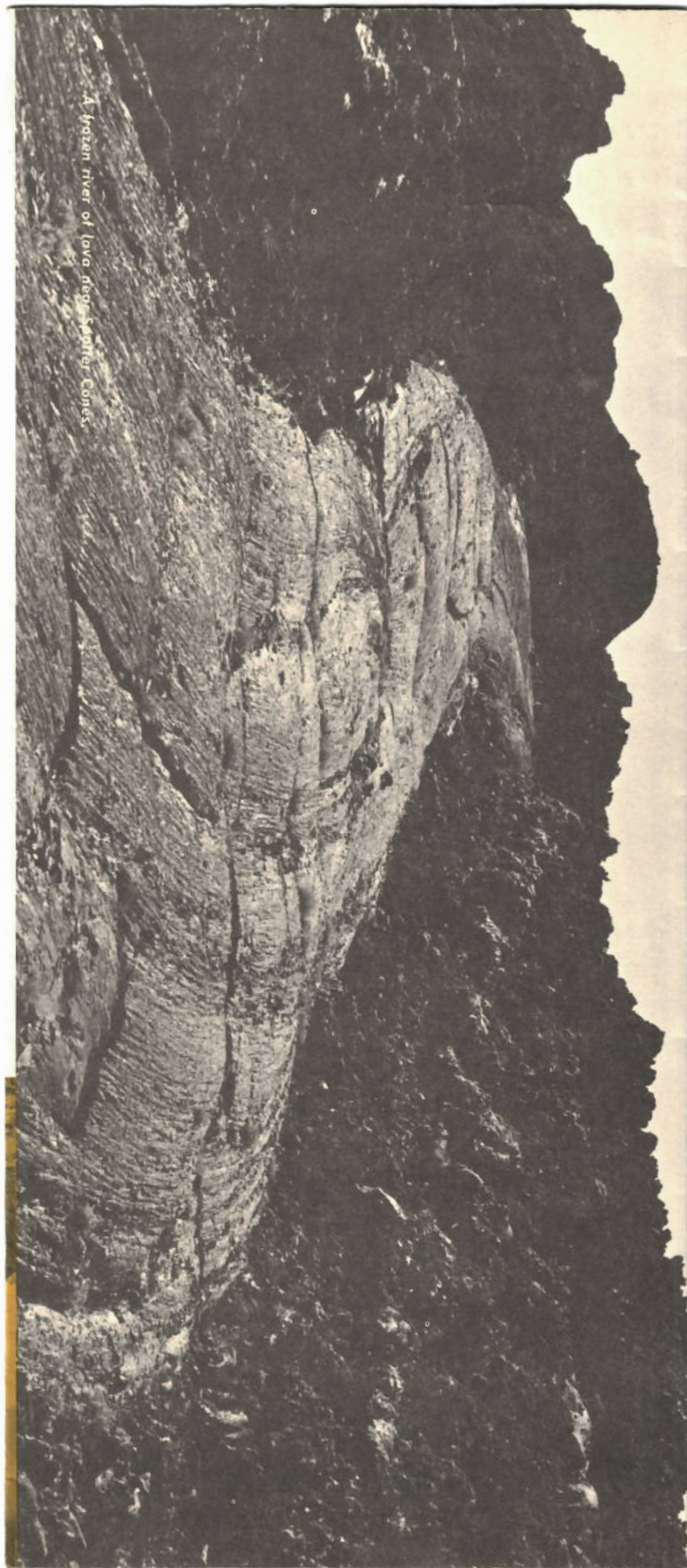
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A frozen river of lava from Mount St. Helens.