

A photograph of a field of purple flowers, likely lupines, in bloom. In the background, there is a dense line of evergreen trees. The sky is blue with scattered white clouds. The title "Devil's Orchard Nature Trail" is written in a white, cursive font across the middle of the image.

Devil's Orchard Nature Trail

Published by

CRATERS OF THE MOON
NATURAL HISTORY ASSOCIATION, INC.
ARCO, IDAHO 83213



*Produced in cooperation with the
National Park Service*



Craters of the Moon Natural History Association is a nonprofit organization pledged to assist the National Park Service in the preservation and interpretation of the scenic and scientific features of the Monument.

COVER: Dwarf monkeyflower blooming in a cinder garden

DEVILS ORCHARD

Self-Guiding Nature Trail

Illustrations by Janice Tanner

You are cordially invited to take a 20-minute nature walk around Devils Orchard. This delightful walk is through an outdoor museum of volcanic landscapes where natural processes go undisturbed by man. Along the trail you will see how plant life begins after devastation by volcanic activity and how, in time, soil and vegetation develop.

This booklet is an aid for your greater enjoyment, understanding and appreciation of the features being preserved in the Monument. The numbers along the margin of the text correspond to the numbered posts along the trail.

You may use the booklet and return it to the box when you leave, or you may purchase it for 10 cents. Have an enjoyable walk!

CRATERS OF THE MOON NATIONAL MONUMENT, IDAHO

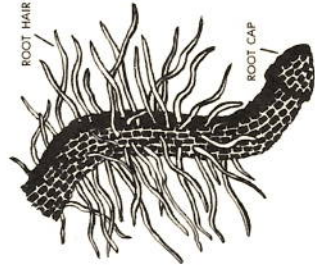
1. THE LANDSCAPE of Devils Orchard was created by volcanic activity. Here you find crater wall remnants marking the site of an old vent. As volcanism continued, pahoehoe and cinder eruptions added to the weird appearance of the area. When activity ceased 1,600-2,000 years ago, there was no life upon the lava or cinders. But after this material cooled, pioneer life began to appear, and this is the beginning of our story.

2. CINDER HABITAT. Pioneer plants on the cinder habitat must adapt themselves for hot and dry conditions. The scanty annual precipitation of 10-15 inches rapidly sinks into the porous soil, so plants must have either deep or wide spread roots. They must also have leaves that will resist the loss of moisture by being small, thick-skinned, light-colored or hairy. For example, dwarf buckwheat roots go down as far as 48 inches and its leaves are adapted to conserve moisture. Still other plants like dwarf monkeyflower, with no adaptations, bloom during ideal conditions and die before the hot summer months arrive.



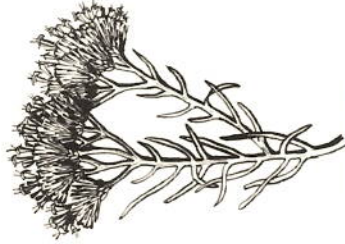
DWARF MONKEYFLOWER

3. LIMBER PINE ROOTS. Surprisingly, the limber pine has shallow roots. They spread out widely from the tree probing for moisture. Since the older roots are covered with a layer of cork cells, they are unable to absorb water and minerals. Absorption of these materials takes place primarily by root hairs and surface root cells at or near the root tips. Because limber pine compete for moisture in this way, they are scattered and do not grow close together. Competition for moisture is an important influence in plant succession.



4. SHRUB COMMUNITY. At this point shrubs have replaced pioneer plants. They provide a windbreak for the accumulation of wind-blown material, and they produce more humus than do pioneer plants. As soil thus begins to accumulate and the cinder material weathers, the ground surface changes from black to gray or yellow. Less heat is then absorbed, ground temperatures are cooler and evaporation is reduced.

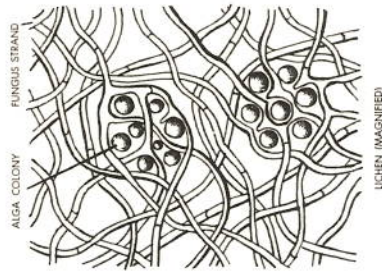
5. RUBBER RABBITBRUSH (*Chrysothamnus nauseosus*) is one of the most common shrubs in the Monument. The narrow, grasslike leaves help to conserve moisture. This member of the sunflower family produces a massive display of yellow flowers in August and September. It is easily recognized in spring and summer by old flower stalks which give it a flowery appearance. Some Indians chewed the bark and wood to produce a primitive chewing gum called chrysil, while others used the flowers for dye.



RUBBER RABBITBRUSH

6. PAHOEHOE HABITATS. The pahoehoe flows have four types of habitats: (1) bare lava; (2) minute cracks; (3) shallow crevices; and (4) deep crevices. These crevices and cracks produce favorable growing conditions since they fill with soil and store moisture. The deeper crevices provide a cooler environment and reduce water evaporation for the larger plants. In time the crevices will fill with soil material and plants such as sagebrush and antelope bitterbrush will move in.

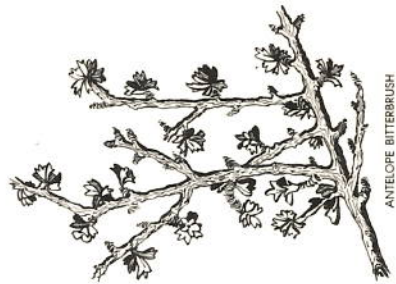
7. LICHENS are interesting plants since they are composed of two cooperating plants, an alga and a fungus. The alga furnishes food through the process of photosynthesis, while the fungus provides the body structure, water and minerals. On the rocks you will find the crustose type of lichen, while on the tree you find the fruticose type. Lichens assist in weathering rock by producing carbon dioxide which, combined with water, produces a weak acid that etches rock. The lichens are the first form of plant life on barren rock and prepare the habitat for other plants to follow.



LICHEN (MAGNIFIED)

8. MOSSES AND FERNS. Weathering produces small niches in the rock. Here soil accumulates and moisture is held permitting mosses and ferns to grow. Their organic material enriches the young soil, in time making it capable of supporting other kinds of plants. This is another phase in a succession of vegetation changes.

9. ANTELOPE BITTERBRUSH (*Purshia tridentata*), like rubber rabbitbrush, is one of the common shrubs in the Monument. This shrub is a pioneer in the invasion of the herb community on the south slopes of cinder cones. It acts as a soil stabilizer and is able to withstand partial burial by growing elongated branches through wind transported cinder material. As antelope bitterbrush becomes more abundant and has helped in the accumulation of fine-textured surface material, sagebrush then becomes important in the shrub community.



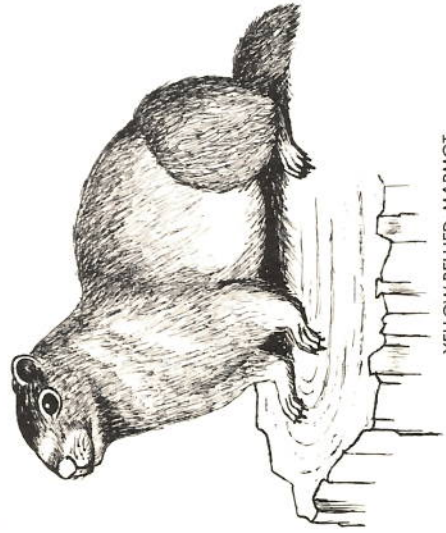
ANTELOPE BITTERBRUSH

10. LIMBER PINE (*Pinus flexilis*) forms the third plant community on the cinder habitat. It invades the herb community on north cinder slopes where moisture conditions are favorable, especially in depressions and near the cone bases. As the cinder soil continues to weather, the limber pine will disappear, and grasses will increase to form the final plant community along with sagebrush. The scientific species name for this five-needle pine is *flexilis* because the branches are very limber or flexible.



LIMBER PINE

11. ANIMAL LIFE. As vegetation develops on this landscape, food is provided for other forms of life. Soon insects, reptiles, birds and mammals find suitable conditions in which to live. The seed of the limber pine is an important food for the yellow pine chipmunk, golden-mantled ground squirrel, bushy-tailed woodrat and other rodents. Antelope bitterbrush is the favorite food of the mule deer. (Have you seen any deer trails?) Shelter is provided by the numerous crannies in the rocks or in the cinders. Here is a marmot's hole! Other animals such as the red fox, coyote, and bobcat are attracted into the area by the abundance of lesser animal life upon which they prey. Thus a biological community evolves.



YELLOW-BELLIED MARMOT

12. **WITCHES' BROOM.** Deformation of this limber pine was caused by a parasite, dwarf mistletoe. Effects of infection are premature death, reduced growth, and poor seed production. This small, waxy plant with yellow-green, scalelike leaves, absorbs water and nutrients from the tree and stimulates it to grow a mass of additional branches called witches'-broom. The mistletoe produces small, white fruits which, in August, explode when disturbed and expel their sticky seeds a distance up to 50 feet or more.



13. **BIRDS** are attracted to this location by a variety of insect and plant foods. Early in the morning is the best time to observe them, but even in the afternoon you may see the rock wren, mourning dove, and mountain bluebird. The red-shafted flicker, common nighthawk, violet-green swallow, Say's phoebe, Clark's nutcracker, and Brewer's sparrow are seen frequently, and the sage thrasher and brown-headed cowbird occasionally.



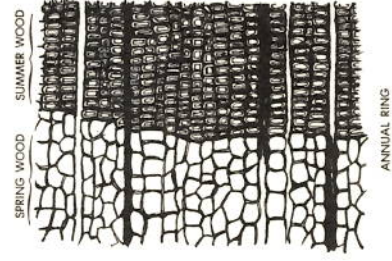
14. **TANSYBUSH.** (*Chamaebatiaria millefolium*) Feel the foliage of this fragrant shrub. Its stickiness helps the plant conserve moisture by limiting evaporation, and thus enables it to grow in this arid climate. Some people call this shrub fernbush because its foliage resembles that of ferns. In June this member of the rose family has numerous white blossoms that persist into July.



15. **SOIL HUMUS.** Compare the soil beneath this pine with that of the open cinder habitat. The accumulation of organic litter under the trees enriches the cinders and increases the water-holding capacity. In this arid climate the rate of decomposition by bacteria, fungi and soil animals is extremely limited. Thus the formation of soil is a slow process. Soluble matter and finely weathered particles are washed downward and accumulate beneath the surface gradually improving the cinder soil.

16. **SURVIVAL.** Here a limber pine was blown down, but managed to survive when some of the roots remained intact. One of the branches has become the main trunk of the tree, meeting the challenge of survival. The struggle for survival is a constant factor in plant succession. This type of branching is a natural reaction by a plant when the main trunk or stem is killed.

Beyond this point the trail passes through sections of old crater walls. Keep on the lookout for animals!



17. **ANNUAL RINGS.** This limber pine furnished wood for an early pioneer campfire, before the area became a Monument. If you examine the stump you should be able to count 376 annual rings. The rings were formed by wide growth in the spring and dense (dark) growth in the summer. Growth of the tree was slow due to severe conditions and maturity was reached in 200-300 years.

- 18. BEETLE GALLERIES.** Natural enemies of the pines are numerous. Sawflies, weevils, bark beetles, tip moths, mistletoe, and blister rust destroy many of them. Here you see many galleries produced by beetle larva that have eaten their way through the cambium (growing layer) and part of the sapwood. Often a healthy tree is able to resist the entry of beetles by clogging their holes. However, when the tree is weakened by drouth, disease or parasitism, its resistance is reduced and it may succumb to beetle attack. This decaying tree completed its life cycle by returning nutrients to the soil.



- 19. CINDER CONES.** Notice how the north slopes of cinder cones have more vegetation than the south slopes. The north slopes are cooler and lingering winter snow gives them more moisture.

The age of cinder cones can be estimated by the amount of growth on them. Old cones such as Grassy and Sunset are well-covered with vegetation, while younger ones such as Paisley, directly ahead, have less growth.

- 20. CLIMAX COMMUNITY.** Volcanic activity devastated this area and destroyed all life. As years passed and volcanic materials weathered, a succession of plant life evolved producing the present landscape. As soil conditions continue to improve, the shrub and tree communities in front of you will ultimately lead to the final or climax community of grasses and sagebrush. If another eruption occurs here, this story will again have its beginning.

