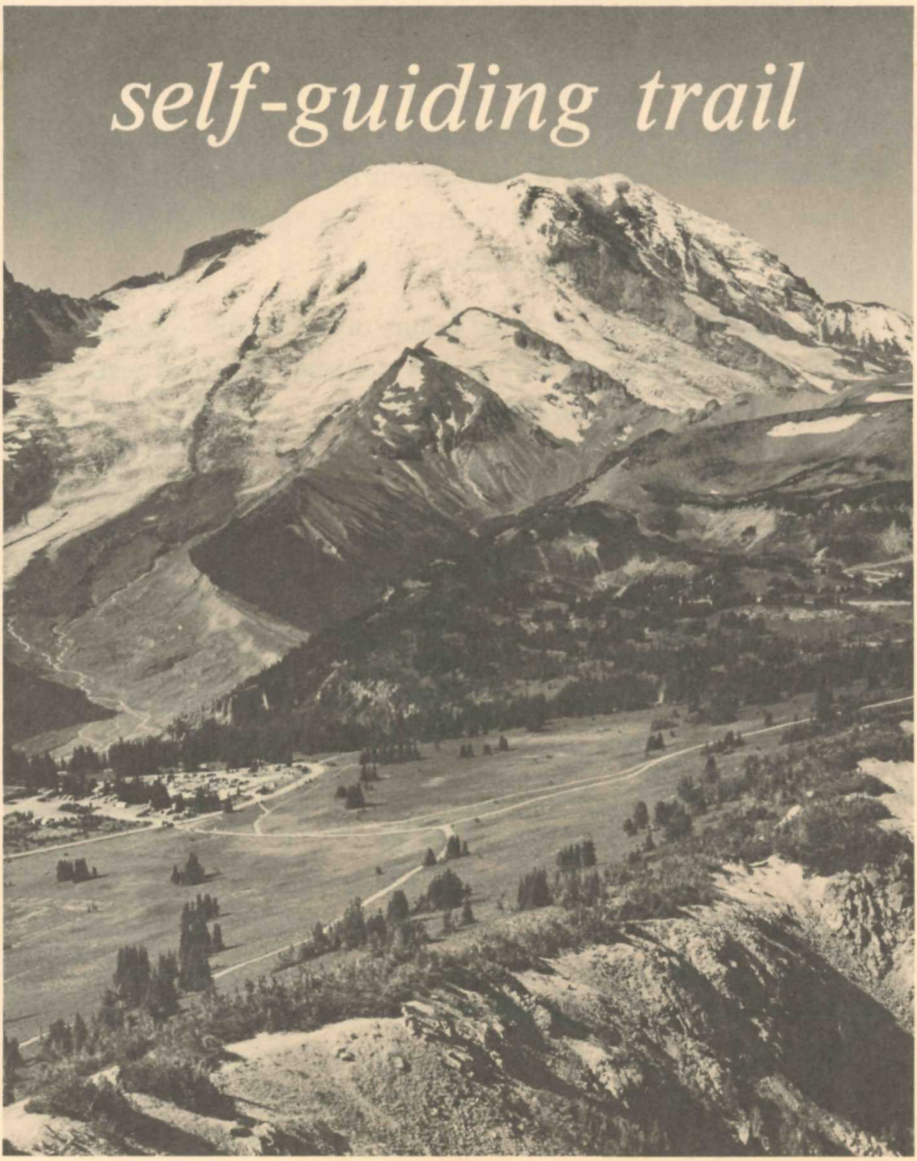
SOURDOUGH RIDGE



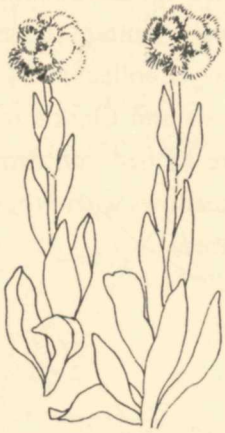
MOUNT RAINIER NATIONAL PARK

This short walk of about one hour will take you through the Sunrise subalpine meadows and along Sourdough Ridge, where you may see Mount Adams, Mount Baker, Glacier Peak and magnificent views of Mount Rainier. This guide will help you understand some of the wonders, going on around you all the time, that produce this lush carpet of subalpine flowers for which Mount Rainier is so famous.

Take your time and drink in the beauty of the subalpine meadows. To use the guide, stop at the numbered post and read the paragraphs with the same number.

GRAY JAY

1 The story behind today's subalpine meadows begins with the volcanic formation of Mount Rainier. The bench where you are standing was formed by lava flows early in the mountain's development. As you walk the trail, notice the brown popcorn-like pumice and fist-size chunks of light gray rock beside the trail. The volcano erupted these fragments onto the mountain's slopes about 2000 years ago. The soil has mostly developed from these volcanic deposits. Because it is loose and well-drained, it holds little moisture from snowmelt and summer rain.



PUSSYTOES

2 Look at the mound of earth on your left. The vegetation grows more densely here than in surrounding soil. The mound may be the result of frost heaving, the freezing and thawing of the soil, but the slight elevation produces denser plant growth.

The distribution of snow also affects the distribution of plants. Some plants, such as pussytoes *(Antennaria lanata),* grow in areas where snow lasts into spring and early summer. On the right you can see a swale in which the gray-green color is caused by the abundance of pussytoes. Look for other places where the snow lasts longer!

3 The white bark pine *(Pinus albicaulis)* is often called the "Sentinel of the High Country," for it is one of the few hardy trees which grows a treeline. This tree is found on the east side of Mount Rainier where drier conditions are produced when the mountain cuts off the moisture from the heavy winter storms. Cones and seeds collected by ground squirrels and Clark's nutcrackers are cached and dropped in the meadows where they sprout new trees.

SUBALPINE FIR

4 Look below you for the white bark pine standing in the middle of the group of subalpine fir *(Abies lasiocarpa)*. Both are pioneer trees, that is, they are able to establish themselves in the meadows before other trees. The pine is better suited to these drier conditions. Snow around the trees melts earlier than in the open meadows, giving seeds around the pioneer tree a longer growing season, which adds to the islands of trees in the meadows. The firs may also reproduce by layering, which occurs when the lowest branches touch the ground and sprout roots, forming a new shoot. As the island enlarges, the oldest trees are found in the center and the youngest on the margins.

5 Subalpine meadows are one of the most fragile life zones of Mount Rainier. (Long winters and short summers do not make for the best growing conditions. Snow from last winter can often be found in the meadows during August.) Plants in lower elevations grow to a size in one year that may take alpine plants many years. The soil for these plants takes even longer to develop, and is easily washed away when disturbed.

This and other trails have been closed as they are too steep, and walking on them causes erosion of the dry loose soil, destroying the subalpine meadows you have come to enjoy. Hand seeding, transplanting, and jute are used to help restore the meadow environment. You can help by traveling only on established trails.

6 Look below at the Sunrise Lodge and the pattern in the meadows behind the building. What do you think made this, and how long ago? This was the site of 200 summer cabins between 1930 and 1945. A field or vacant lot at home would have grown over with plants to hide and repair the scar in the same time since the cabins were removed. But at this elevation plant growth is extremely slow and repair to damaged meadows is even slower.

We are not the only ones to be attracted to the Sunrise area. Klickitat and Yakima Indians are said to have camped, hunted and gathered seeds and berries in the area before the European migration to the Pacific Northwest.

7 Along the trail and in the meadow below, the flower display will change color as the season progresses. Each flower has its own time to bloom, controlled by the amount of snow, temperature, moisture and light. Some, like the avalanche lily *(Erythronium montanum)* and the glacier lily *(Erythronium grandiflorum),* bloom early, while the blue lupine *(Lupinus latifolius* var. *subalpinus),* paintbrush *(Castilleja),* and western anemone *(Anemone occidentalis),* provide a bulk of the color in midsummer.

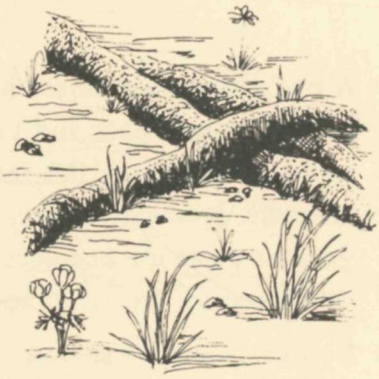
WESTERN ANEMONE SEEDHEAD

8 You have just walked through a subalpine meadow on a gentle south-facing slope. In contrast, look at the steep north-facing slope ahead. This slope is cooler and more moist because it receives less sun. South-facing slopes receive more sun and do not accumulate or keep the depth of snow as north-facing slopes. Even late into the summer, large patches of snow remain, retarding plant growth and soil development. Would you expect to find the same kinds of plants on both slopes?

To the north can be seen peaks of the North and Middle Cascades, with Mount Baker and Glacier Peak the most noticeable.

9 Above is a stand of yellow cedar *(Chamaecyparis nootkatensis).* During past ice ages, plants and animals which evolved in northern areas migrated south along the mountain crests with the advancing ice. When the climate warmed and glaciers receded, islands of northern plants and animals were left behind. It is believed that the yellow cedar survives on the ridgetops by taking moisture from the clouds that sweep the ridges.

Look along the trail for long low mounds of earth. These winding mounds were made by pocket gophers pushing earth into the snow during the winter. The dirt-filled tunnels remain after the snow melts, lasting until rain washes them away. This, together with the activities of other burrowing animals, helps to mix the organic material into the soil.



ESKER IN THE MEADOW

10 This part of the trail is called the "Elfin Forest." You are approaching treeline. Compare these trees with those in the meadow. At this high altitude, temperatures are low and snow covers the ground for six to eight months. These trees rarely have enough reserve energy to produce cones and seeds. Trees only 1½ feet tall have been recorded as old as 75 years. Imagine how old some of the larger trees must be.

11 Many believe wind actually bends trees into the gnarled shapes seen at treeline. This is a place of constant struggle, and wind does play an important role in shaping these trees. Cold, drying winds, carrying ice and sand, kill and cut away shoots from the windward side of the tree.

A tree's height will be stunted when it grows higher than the insulating snow pack and the leader is trimmed off by wind action. Growth on the leeward side of the tree goes on normally, producing the one-sided appearance. The weight of snow on a tree can and does bend and shape it. This, together with the wind, produces these gnarled trees.

How deep does the snow get along this ridge in the winter?

12 The large raised semicircle of trees and other vegetation in front and below you is growing on a moraine, formed at the front of a small glacier which flowed northward into Huckleberry Creek about 11,000 years ago. The kind and quantity of vegetation is influenced by how well the soil is developed. Higher on the ridges, there is less soil development and less plant development.

13 The subalpine meadow exists in a transition between the retreating glaciers and the advancing forest. The meadows will only last as long as suitable conditions exist for their survival. Changes in environmental factors, such as temperature, moisture, mud slides, erosion or fire, will affect the development and maintenance of the meadows.

MARMOT

This trail has given you the opportunity to see the effects of the environment on the development and survival of subalpine meadows. All life, including ours, is affected by these factors, no matter where we go. Look for them as you travel.

Further Reading

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These and other publications are available at visitor centers in the Park through the Pacific Northwest National Parks Association, a nonprofit organization to help study and interpret the parks of the Pacific Northwest. For more information, catalog or membership, write Mount Rainier Branch, Pacific Northwest National Parks Association, Longmire, Washington 98397.

We hope that you have enjoyed your trip. You will find other self-guiding trails in the Park at Longmire, Paradise, Ohanapecosh, Kautz Creek and Carbon River.

Your comments on the booklet and trail would be appreciated. Kindly leave them with a Park Naturalist at the visitor center or write:

Superintendent
Mount Rainier National Park
Longmire, Washington 98397

SOURDOUGH RIDGE:
SUBALPINE MEADOW ECOLOGY

by

Marcia J. Hamann

Edited by

Loren E. Lane

Drawings by

E. M. Mills

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