17. UTAH JUNIPER *(Juniperus osteosperma)*

Although not numerous in the Monument, this member of the Cypress Family is well adapted to arid conditions. The fruit, a reddish berry, is very sweet and relished by birds and small animals.

18. CHAMISE *(Adenostoma fasciculatum)*

Often called "Greasewood," the principle member of the Chaparral community is so resistant to decay it must burn periodically to complete its life cycle. This stand, not having burned in over 50 years, provides little feed or cover for wildlife, and sunlight cannot penetrate to germinate grasses. After fire, seed pods open ready for the first winter rains, new shoots spring from old root burls, rapidly recovering the charred landscape.

19. BUCKBRUSH *(Ceanothus cuneatus)*

Another important member of the Chaparral is Buckbrush or "Wild Lilac." Like chamise it also needs to burn periodically to provide fresh growth. In early spring the small white to violet blossoms fill the air with a lilac fragrance.

20. LICHENS

The green and orange crusts on the rocks in front of you are lichens. All lichens are actually two plants living together as one. One plant, a fungus, the body of the lichen, obtains water and nutrients. The other, an alga, is a one-celled green plant, capable of producing food for both through photosynthesis. Lichens are found in the harshest environments of the world. These members of the Xeric community are also very important in the breakdown of rock into soil.

21. CALLUS

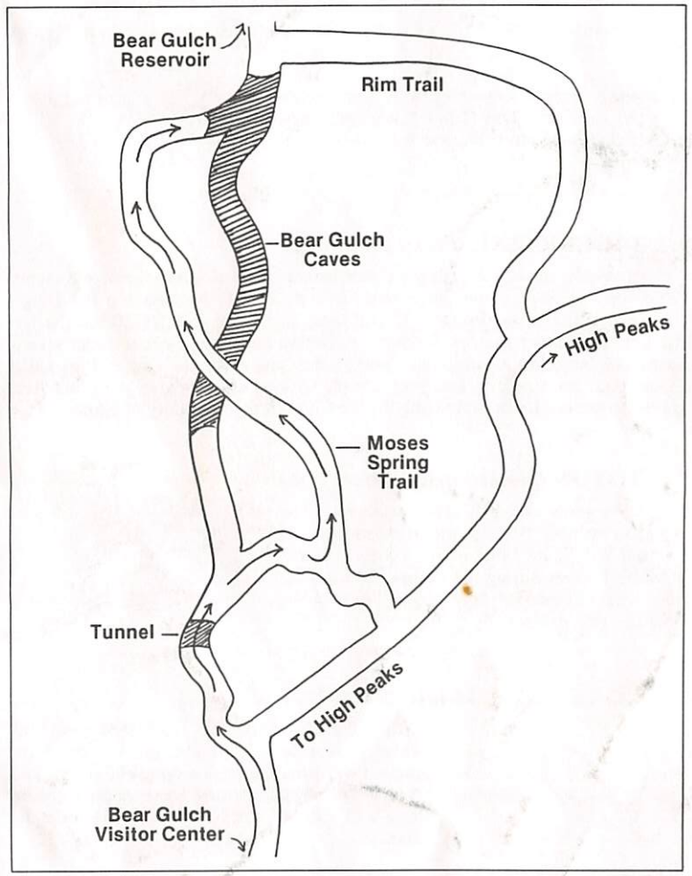
Although the plants along this trail are growing where they can best survive, they must overcome other problems. Besides lack of water, sunlight, or proper nutrients, they must survive injury from insects, animals, man, and disease. This Live Oak incurred an injury from rubbing against a rock. The injury caused the tree to form a callus, much the same as on a human, to protect the tree from further damage.

22. JUNCTION AND TRAIL ENDS

You are now at the upper end of the Bear Gulch Caves. The staircase leads to the Bear Gulch Reservoir, built by the CCC in 1936. The odor you smell is from a sulfur spring located along the staircase. The Bear Gulch Caves are talus caves, formed by large boulders faulting from the Pinnacles above and wedging into the narrow ravine. The cave trail requires a flashlight! We hope you have enjoyed this short hike and the experience of recognizing some of the plant life native to the Pinnacles National Monument.

PROLOGUE

The plants and animals along this trail have survived thousands of years without man's interference. Today Pinnacles National Monument is a protected refuge as are all National Parks. Join with us to enjoy and preserve this fragile environment.



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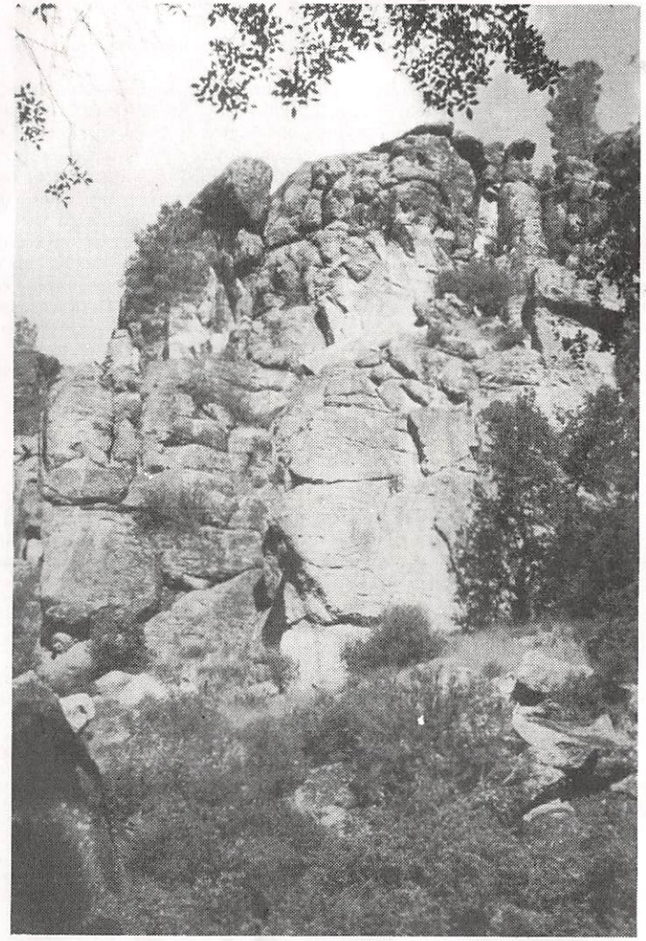
MOSES SPRING



Self-guiding Trail

PINNACLES NATIONAL MONUMENT

FREE TO BORROW — 10¢ TO TAKE HOME

INTRODUCTION

Even though the Pinnacles history reaches 23.5 million years into the past to an era of exploding volcanoes, the events following that period have produced the outstanding scenery of today. By almost imperceptible change through the centuries, a 2439 meter (8,000 feet) volcano has been weathered away. Today only a portion of the volcano remains. The soils, derived from the volcanic rocks, now support vegetation which, in turn, provides food and shelter for a great variety of wildlife.

There are three environmental zones and four plant communities found here in the monument. The uppermost zone is called the *Xeric* (ZER-ick), or bare rock zone, where there is little water, the sun is hottest in the summer, and the winds are coldest in the winter. The plant community occupying this zone is the *Xeric* community. The middle zone, the *Mesic* (MEZ-ick), covers most of the monument. We call the main plant association occupying this zone the *Chaparral* community, a term applying to a group of broad-leaved shrubs adapted to cool, rainy winters and hot, dry summers. You will be introduced to three main members of this community along the trail. A smaller plant association in this zone is the *Foothill Woodland* community, which consists of scattered oaks and pines with an abundance of grass and annuals. The lowermost zone is the *Hydric* (HY-drick), where there is an abundance of water. Water-loving plants capable of growing in the shade live here. These plants make up the *Riparian* (ri-PAIR-ee-an) community. This community is found along streams, in canyon bottoms, and other moist places.

1. MOSES SPRING TRAIL

At this point you enter the unique "Moses Spring Trail." Pause and begin to experience the beauty this .9 kilometer (half-mile) trail offers. All four plant communities represented in the Monument are found here, forming an intricate puzzle of plants in this small ravine.

2. BLUE OAK *(Quercus douglasii)*

Named for its blue-green foliage, this oak prefers the Foothill Woodland Community where soil is fertile, but dry. The gray flaking bark and extensive root system show adaptation to recurring drought. Trunks and branches of the tree are often unsound and sometimes fall for no apparent reason. The deep brown acorns, once an important food source of local Indians, are now enjoyed by deer, woodpeckers, and squirrels.

3. CALIFORNIA BUCKEYE *(Aesculus californica)*

Related to the Eastern Horsechestnut, the Buckeye grows wherever it finds moderate amounts of moisture. In late spring it bears long clusters of sweet smelling flowers. During the hottest part of summer it sheds its leaves and becomes dormant to conserve moisture, an adaptation to the dry summer climate. This defoliation exposes a crop of one or two nuts at the end of each flower stalk. The nuts are mildly toxic in their normal state. Indians, however, crushed them and leached them, producing a mush they ate. Squirrels, when hard pressed for food, will eat the nuts with no apparent ill effects.

4. MANZANITA *(Arctostaphylos chaloneorum)*

Gnarled red trunks and round green leaves identify this member of the Chaparral community. Early in spring the small trees are covered with tiny white belled flowers. Later in summer, small red berries replace the flowers. The shape and color prompted the early Spanish settlers to name it "Manzanita" meaning "Little Apple."

5. BUSH MONKEY FLOWER *(Mimulus auranticus)*

A member of the Figwort Family, Monkey Flower grows best in full sun on dry slopes. The bush has an extensive root system that works its way into deep crevices and cracks, assuring a supply of water even during the summer drought. The flowers are yellow to orange in color and bloom from March to September.

6. DIGGER PINE *(Pinus sabiniana)*

Here you can see the Digger's root reaching for moisture through 8 meters (26.2 feet) of rock. Some have roots as long as 150 feet making the Digger extremely resistant to drought. If you look above the rock you'll see the tree itself. Long slender needles, large cones containing sweet pinenuts, and several trunk-like branches meandering towards the sun, make the Digger Pine easily recognized. Because fire has been absent so long in the park, the pines have spread to areas once occupied only by the Chaparral community of plants.

7. TOYON *(Heteromeles arbutifolia)*

Commonly called "Christmas Berry." This evergreen grows best in the rich soil of the Foothill Woodland Community. It bears clusters of white flowers during the summer. At holiday time, the red berries appear just in time for Christmas decorators.

8. COAST LIVE OAK *(Quercus agrifolia)*

Unlike the Blue Oak, this tree needs abundant water to survive. It's dark green leaves are cupped with small needles around the edges. The Acorn Woodpecker finds these acorns, being long and slender, are ideal to fit the holes he makes.

9. FERN CHAMBER

Here, assisted by a spring, and the faulting action that created the alcove, lives a colony of **Chain Fern** *(Woodwardia fimbriata)*. Needing abundant water to survive, this member of the Riparian community reproduces by spores hidden on the underside of each leaf. The spores form a chain design, giving this graceful plant its name.

10. MOSES SPRING

In the 1920's Zotic Marcott and Herman Hermanson built this trail. One day they spied a wet spot, and as the story goes, Marcott said, "Moses smote the rock and water came forth... I'll smite this one!" And with a few blows of his pick he opened this spring.

11. POISON OAK *(Rhus diversiloba)*

A member of the Sumac Family, this plant is growing back from the trail against a rock. Poison Oak can appear as a low shrub, a tree, or a vine, but it will always have three leaflets resembling an oak leaf. Suprisingly, it serves as browse for animals, although man cannot touch the plant without experiencing a painful rash.

LEAFLETS THREE, LET IT BE!

12. ADAPTATION

The tree trunk you step over is that of a Coast Live Oak. As a seedling it had proper soil and moisture, but not enough light. To survive, the tree grew toward the best source of light until it reached its present location.

13. DANGER!

Here the trail crosses directly over the Bear Gulch Caves Trail. Please do not dislodge any rocks or soil. Many trained rock climbers come to this area to practice their sport. Please do not attempt to scramble on the rocks, or try an assisted climb, without previous training.

14. HOLLY-LEAF CHERRY *(Prunus illicifolia)*

Side by side grow two very different shrubs native to the Pinnacles. On your left grows the Holly-Leaf Cherry, closely related to plum, apricot, peach and almond trees. It is an evergreen that prefers the well-drained Chaparral covered slopes. The deep red "cherries" are very sweet and have extremely large pits.

15. BLUE ELDERBERRY *(Sambucus cerulea)*

The Blue Elderberry, growing to the right, is deciduous and requires abundant moisture that is provided by the spring hidden in the rocks below. The white spring flowers form flat clusters, and the dark blue berries are prized by man as well as wildlife.

16. HILLSIDE GOOSEBERRY *(Ribes californicum)*

Sometimes referred to as "Spiney Gooseberry," it will grow anywhere the soil is fertile and moderately moist. Related to the currant, its small red berries are edible.