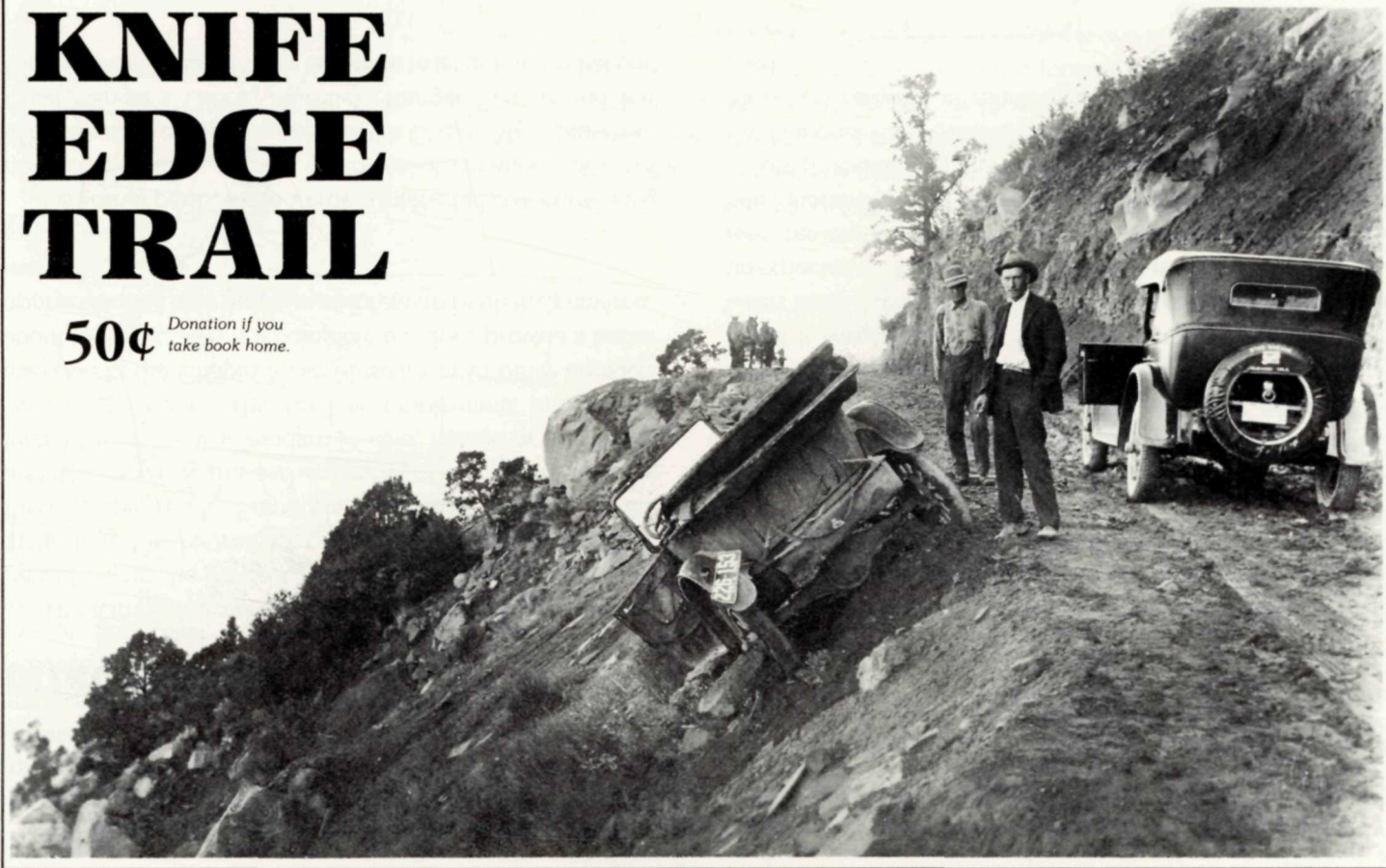


KNIFE EDGE TRAIL

50¢ *Donation if you
take book home.*



The Knife Edge Trail is a 2 mile round trip walk along the north rim of Mesa Verde National Park. It takes about 1 1/2 to 2 hours to walk the trail using this booklet. Please do not pick flowers, deface rock, litter, or in any other way damage the beauty of this trail.

Credits: Text - Linda Martin; Illustrations - Pat Oppelt

INTRODUCTION

The natural vegetation of Mesa Verde formed an integral part of life for the Anasazi, the prehistoric people who lived in the area. On this trail you can see many of the plants which these people used. Some plant uses are indicated by the artifacts found in the archeological sites. Others can be inferred from the way modern Pueblo, Navajo or Ute Indian people use them. This booklet supplements information available in the Chapin Mesa Museum or in other booklets about the park. It is not complete but does provide a better appreciation of how the Anasazi interacted with their environment.

Like other parks, Mesa Verde is interested in documenting noteworthy wildlife, plant or geological observations. A series of observation cards is available at the Chapin Mesa Museum, Chief Ranger's Office, Morefield Ranger Station and Far View Visitor Center. Please take time to let us know what you

see of special interest. Your observations are used to help document many types of natural resources. They give us a fuller picture of the Mesa Verde ecosystem.

Historically, part of the Knife Edge Trail follows a section of the Knife Edge Road built in 1914 as the main access into the park. Along the trail you may see patches of asphalt that remain from this road. Old-timers still proudly talk about what a feat it was to build, or "hang", a road on this steep bluff. Users recall it with a bit of dread because of its narrowness, the unexpected rock slides and its slippery ruts. Park administrators remember travelers having to call the Mesa Verde headquarters [at that time located in Mancos] to get clearance before proceeding up the one-way road into the park. In 1957 the National Park Service built a tunnel between Prater and Morefield canyons eliminating the need for this precarious road.



1
Gambel oak

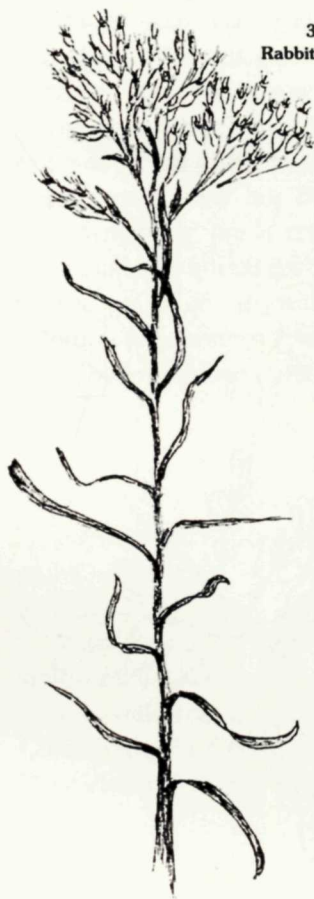
1. **Gambel oak**, *Quercus gambelii*, is a scrub oak common in Morefield Campground and other moist sites in the park. It forms low thickets where deer frequently hide during the day. It is generally fifteen to twenty feet tall, but it may reach thirty feet where historic fires have not occurred. A few grow to eighteen inches in diameter. The half inch long acorns are edible and were an important food source for the Anasazi. Animals such as bears and squirrels search for them today. The Anasazi used Gambel oak wood for tools, especially digging sticks and stone axe handles.

2. **Pinyon pine**, *Pinus edulis*, is one of the two most common trees in Mesa Verde. Along with Utah juniper, it forms the mesa top and canyon slope woodland which gives the park its name; "Mesa Verde" is Spanish for "green table." Notice the short needles growing in pairs. The cones produce large, oily seeds eaten by the Anasazi as well as people today. Pinyon nuts are rich in protein and contain about 5000 calories per pound.



2
Pinyon pine

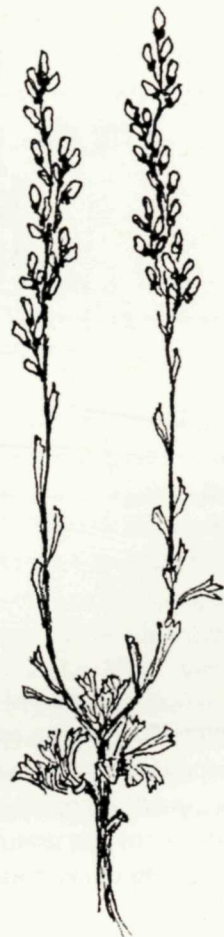
seed



3
Rabbitbrush

3. **Rabbitbrush**, Chrysothamnus nauseosus, is the gray-green shrub growing three to five feet tall, which produces bright yellow flowers in the late summer. The Anasazi made basket foundations from the smooth, flexible rabbitbrush twigs. Navajos make a yellow dye from the flowers. Deer and rabbits commonly browse on the foliage and seeds.

4. **Black sagebrush**, Artemisia nova, is a short sagebrush usually found at locations between 7700 and 8400 feet in elevation. Here it grows in olive-green colored clumps from one to two feet tall. A bitter tea is made from its leaves. For modern Navajos it is a classic stomach tonic or used to induce sweating.



4
Black sagebrush



5
Big sagebrush

5. **Big sagebrush**, Artemisia tridentata, is sometimes twice as tall as black sagebrush and has a silvery green color. It often emits a pleasant, pungent odor, especially after a rain or in the early morning. Like black sagebrush, its leaf tips have three teeth. In the fall big sagebrush bears inconspicuous, green flowers on long spikes. The presence of this plant indicates a nutritious soil in a dry environment.

6. **Gray horsebrush**, Tetradymia canescens, is the small, gray-green shrub with woolly hairs on the leaves. It produces small, yellow flowers in late summer when it is difficult to distinguish from the showy rabbitbrush blooming along the roadside. Horsebrush is reported to have been used by native people as a cleanser for the digestive tract.



6
Gray horsebrush



7
Spurred lupine

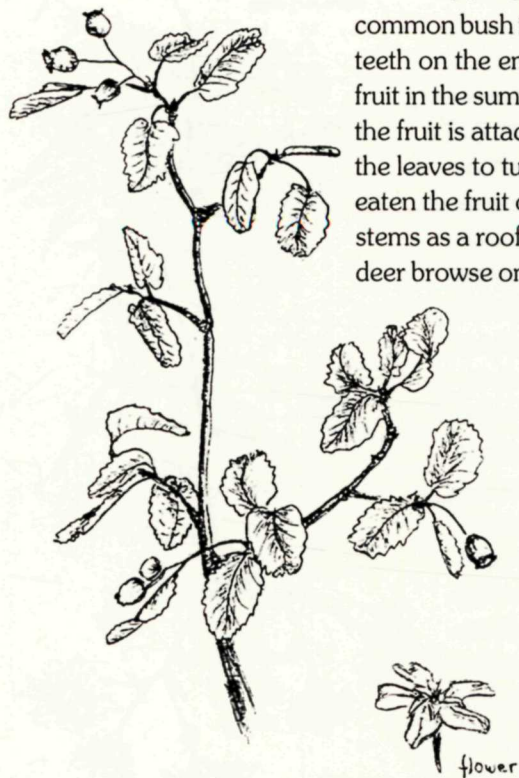
7. Spurred lupine, Lupinus caudatus, also called bluebonnet, sends up spikes of bright blue flowers which nod pleasantly nearly all summer. Lupine leaves are palmate, resembling open hands with the fingers extended. Although these members of the pea family have large, bean-like seeds, they are toxic. There are no records of lupine use by native people in the New World.

8. Wild tarragon, Artemisia dracunculus, grows in olive-green clusters about two feet tall. It has small, narrow leaves all along the stems, with spikes of inconspicuous flowers appearing in late summer. This plant flourishes in canyon head meadows. The Anasazi may have used tarragon for seasoning. Another common name, wormwood, refers to its use in expelling roundworms and pinworms when prepared as a tea.

As you approached this point, you may have noticed how the wind whips through the draw. However, once you start walking along the rim, the wind subsides. Wind currents are strong in canyon heads throughout Mesa Verde.



8
Wild tarragon



9
Serviceberry

9. Serviceberry, Amelanchier utahensis, is the most common bush in the park. Its leaves are somewhat rounded with small teeth on the end. The white, spring flowers become a tiny, applelike fruit in the summer. Although dry and mealy, the fruit is edible. Often the fruit is attacked by an orange rust fungus which sometimes causes the leaves to turn red-brown in mid-summer. The Anasazi must have eaten the fruit of this common bush. They regularly used serviceberry stems as a roofing material between the beam and mud layers. Today deer browse on the leaves in summertime and the twigs in wintertime.

10. Mountain mahogany, Cercocarpus montanus, is usually associated with serviceberry and other mountain shrubs of Mesa Verde. It differs from serviceberry in that it has fan-shaped leaves with prominent veins and teeth. The small, yellow and red flowers form a plumed fruit looking like little feathers by mid-summer. When the maturing fruit dries in the shape of a corkscrew, summer rains cause it to drill itself into the ground. Mountain mahogany is a hard wood used by the Anasazi for tools and in the construction of doorways and roofs.



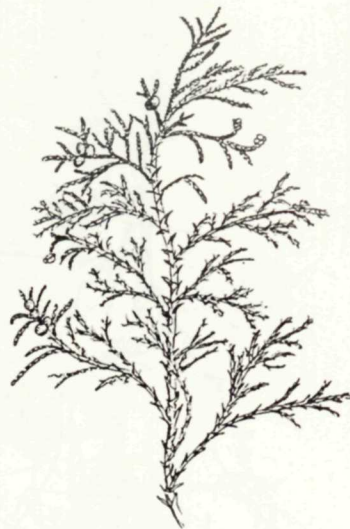
10
Mountain mahogany



11
Blue leaf aster

11. Blue leaf aster, *Aster glaucodes*, is one of the most common plants along the North Rim of Mesa Verde. It spreads over the shale slopes by rhizomes, or underground stems, as well as by seeds. Patches of this aster appear blue-green because of a waxy coating on the leaves. The blossoms are lavender to white. There are no known uses of this aster by prehistoric or modern native people.

12. Rocky Mountain red juniper, *Juniperus scopulorum*, is fairly unusual in Mesa Verde. The common Utah juniper of the mesa tops does not grow along this trail. Rocky Mountain red juniper has softer, blue-green foliage, a smaller berry and redder wood than its more abundant relative. It thrives in a more acidic, wetter habitat. Both types of juniper wood were important for Anasazi building materials because their oils resist decay. Since it splits easily, the wood was also used for weaving tools and small slabs. The stringy bark was used as an innersole for winter sandals, braided into burial robes and served as menstrual pads. The berries may have been eaten. A tea made from them could be used to treat kidney and other infections.



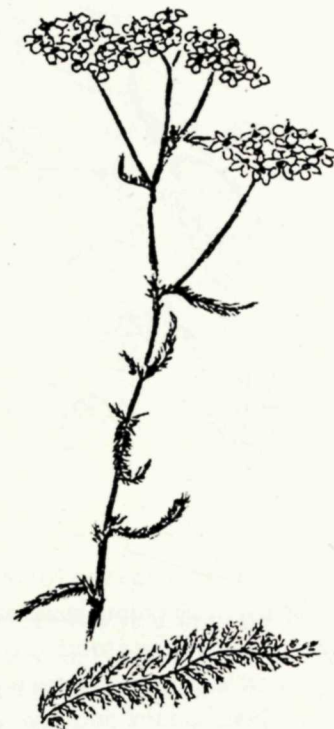
12
Rocky Mountain red juniper



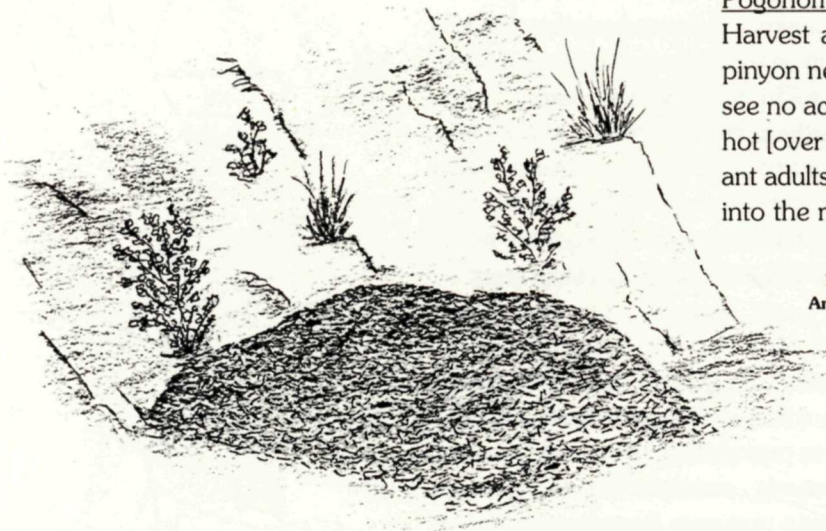
13
Elderberry bush

13. This elderberry bush, Sambucus coerulea, is interesting because it is the only bush of this species found in the park. There is even a story that the Knife Edge Road was detoured slightly to preserve this striking bush. Elderberry has 5 to 9 leaflets on a main stem with flat-topped clusters of white flowers which form blue berries. The flowers are an ancient remedy for breaking fever and treating arthritis. The fruit can be made into jam and wine. The bark can be used medicinally. Several stems have been found in cliff dwellings. They may have come from this species or from the nearby La Plata Mountains where a red-fruited species is common.

14. Yarrow, Achillea millefolium, has short, fernlike leaves and produces a head of small, white, flat-topped flowers. The leaf has a menthol fragrance when crushed. This plant, which grows worldwide, was carried into battle by Achilles and used to heal wounds. The entire plant contains an organic acid which promotes healing by helping to close up the wound. Yarrow has been used to treat diabetes. We do not know whether the Anasazi used it medicinally.



14
Yarrow



15
Anthill

15. This **anthill** was made by the red and black harvest ant, Pogonomyrmex, a common resident along the north end of the park. Harvest ants cover the large mounds with tiny juniper twigs and pinyon needles. Although there may be several entrances, you will see no activity if it is too cool [below 60 degrees Fahrenheit] or too hot [over 80 degrees Fahrenheit]. Bears level these hills to feast on ant adults and pupae. Red-shafted flickers peck conical holes deep into the mounds for an ant meal.

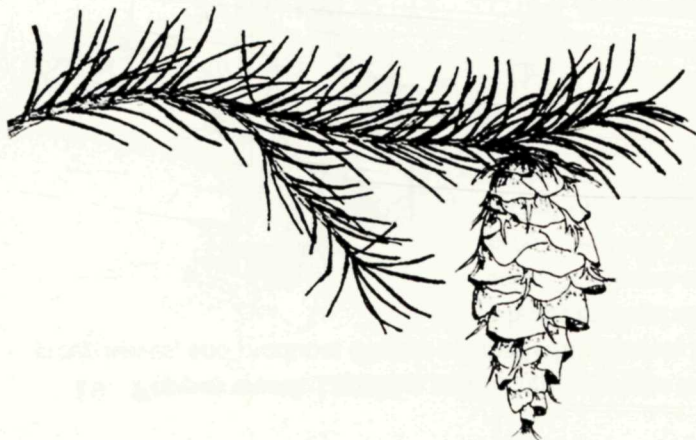
16. **Chokecherry**, Prunus virginiana, occurs here as a thicket of small shrubs. It has shiny, smooth leaves on red twigs. The fruits are like little, dark-red cherries about one-fourth inch in diameter. The Anasazi and the Utes ground the fruits, including the pits, into a mash. They made the mash into small patties which were dried for winter food. Medicinally, chokecherry fruit acted as a blood purifier. Today many people make the fruit into wine and syrup.



16
Chokecherry

17. Douglas fir, *Pseudotsuga menziesii*, is the most common large conifer in the park, thriving in groves along the north rim and in drainages near some cliff dwellings. The Wetherills, local cowboys given credit for discovering the cliff dwellings, mistook the large firs for spruce and named Spruce Tree House for this reason. Douglas firs have single, flat needles which grow so close together that they give the branches a feathery appearance. The cones contain “mouse ears” protruding from between the scales. The Anasazi used the beautiful, easily-split, durable wood for special purposes such as long beams, foot drums and tablets.

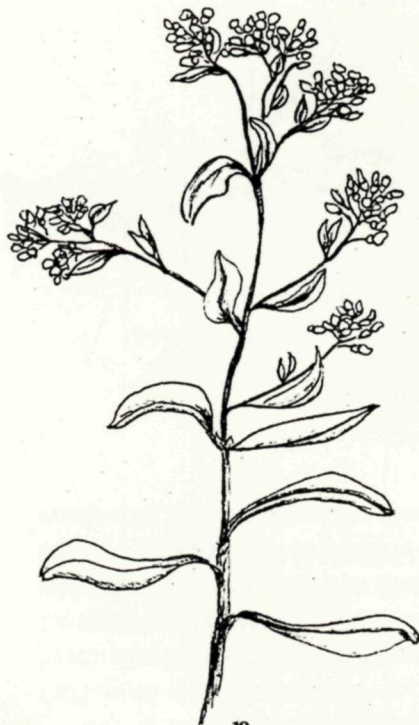
17
Douglas fir



18
golden eye

18. Although there are several plants here, **golden eye**, *Viguiera multiflora*, is the slender-stemmed one with dark-green leaves, growing about two feet tall. In late summer and autumn it produces yellow, sunflower-like flowers with a golden center. These showy flowers attract honeybees and bumblebees. Under certain conditions golden eye can be poisonous.

19. Pepper weed, *Lepidium montanum*, averages two feet in height, has lobed, dark green leaves, and produces clusters of small white flowers in late summer and autumn. It is a hardy mustard which grows in both sandy and clay soils. The leaves and seeds have a pungent mustard aroma and are used for seasoning. There is no record of any medicinal uses of pepperweed.

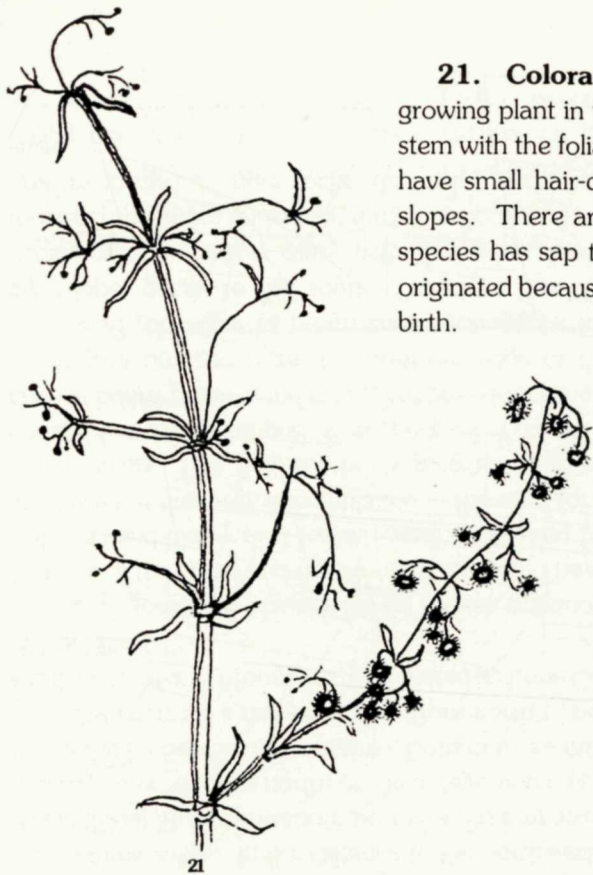


19
Pepperweed

20. Indian paintbrush, *Castilleja linariaefolia*, is the most spectacular flower along this trail. This species, which grows up to two feet tall, has orange-red flowers. These “flowers” are actually modified leaf parts containing pockets of nectar, a special lure for hummingbirds. The Ute people chew the flower heads for their sugary flavor and call them Indian candy.



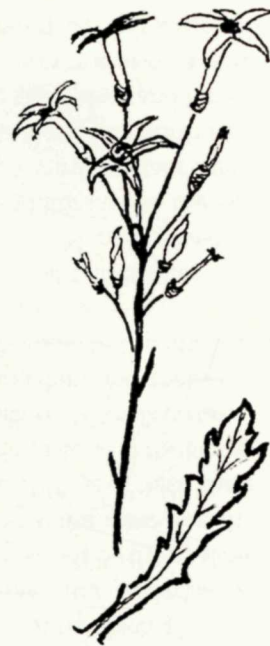
20
Indian paintbrush



21
Colorado bedstraw

21. Colorado bedstraw, Galium coloradoense, is the low growing plant in this area. By looking closely you can see a square stem with the foliage whorled around it. Later in the summer it may have small hair-covered fruits. This species thrives on dry shale slopes. There are no uses for this species of Galium, but another species has sap that makes a blood red dye. The name bedstraw originated because a Galium was used for Jesus' stable bed during his birth.

22. Hayden's gilia, Gilia haydenii, is scattered across the gray shale slope about 10 feet in front of you. This gilia was named after the well-known surveyor, Ferdinand V. Hayden, who came through the Four Corners area in 1876. The bright, magenta-pink flowers set against the gray shale hills create a striking scene. The first flowers appear in late spring, but gilia continues to bloom throughout the summer. This plant sometimes grows on nearly vertical slopes.



22
Hayden's gilia

23. Below the mesa to the north and west is the broad Montezuma valley. In the distance to the northwest are the Abajo (Blue) Mountains about 60 miles (90 km) away. At a much greater distance north, on clear days, you may be able to see the La Sal (Salt) Mountains. Both of these ranges are in Utah. Forming a ragged skyline from north to northeast are the San Miguel Mountains, dominated by Lone Cone and Wilson Peak.

The Dolores and Mancos Rivers furnish irrigation water to some of the farms and ranches in the valley. The red topsoil is a wind-blown dust (called loess) originating from the southwest. It has been accumulating in this area for the last million years. This rich soil holds moisture well and was dryland farmed by the prehistoric peoples. You can see the checkerboard pattern, indicating continued farming today.

As you proceed from this northern edge of the park southward you will cross progressively younger rocks which dip (slope) gently to the south. Therefore, the following geological information starts with the oldest formations, those at the bottom underlying the valley floor, and proceeds upward toward younger rocks, describing each successive layer.

About 100 million years ago during the Upper Cretaceous period, the entire central part of North America from the Arctic Ocean to the Gulf of Mexico and from western Utah to Iowa was covered by a shallow sea. Along the margins of this sea were swamps and lagoons which gave rise to local coal beds. The valley floor below you is underlain by Dakota Sandstone, the first sandy deposit left by the shallow sea. The low gray hills and ridges below the mesa are the remnants of the Mancos Formation, a 2000 foot thick shale layer deposited on top of the Dakota Sandstone in the slowly advancing sea during a time span of about 10 million years. The many fossils in these soft shales and thin sandstones not only date these rocks but also help us visualize the kinds of life in this sea over 90 million years ago.

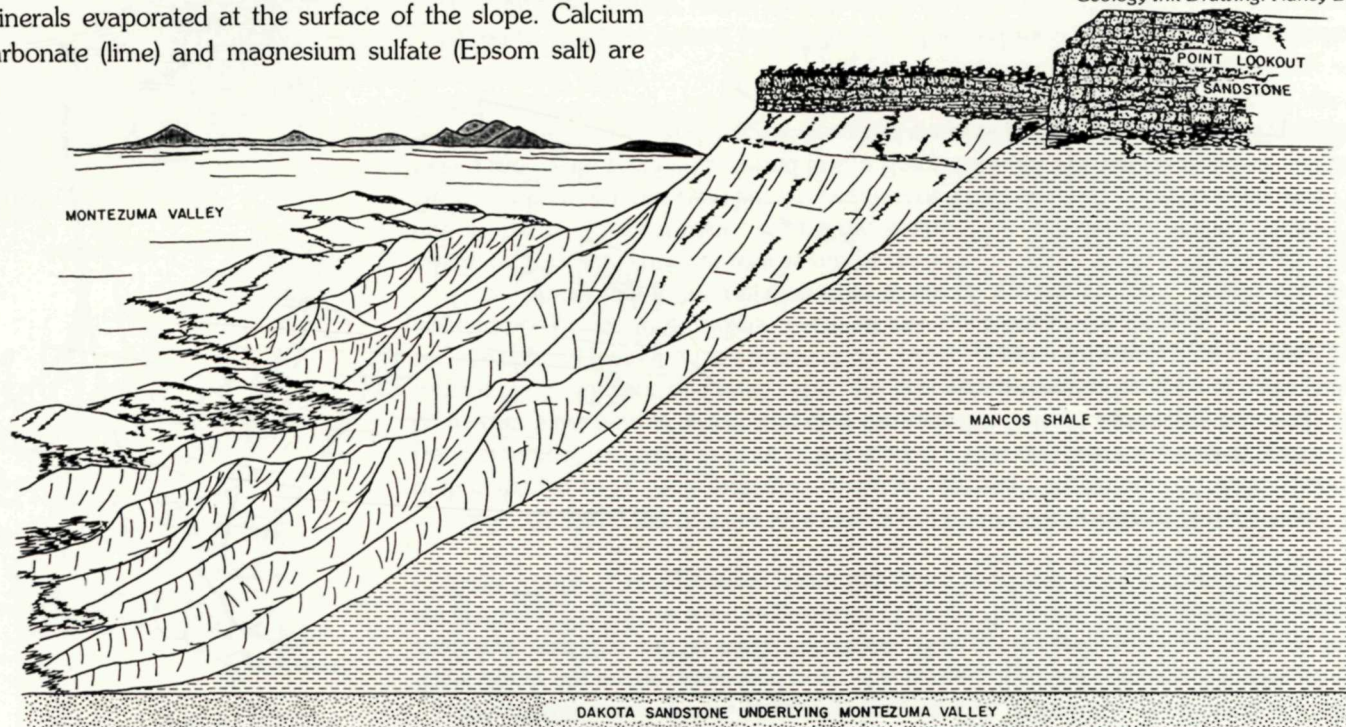
The cliffs above you are Point Lookout Sandstone. This formation was deposited on top of the Mancos shale in shallow water barrier beaches and sand bars while the sea temporarily retreated. Point Lookout, a very resistant sandstone, is visible as a band of white cliffs along the North Rim of Mesa Verde and in the cap rock of the mesas and buttes surrounding Morefield Campground. When erosion wears away this protective sandstone, the underlying soft shales of

the Mancos Formation gully rapidly. Today, as you look at Point Lookout, you may see white patches on the shale slopes. These are deposits left when water carrying various minerals evaporated at the surface of the slope. Calcium carbonate (lime) and magnesium sulfate (Epsom salt) are

commonly found in these deposits.

As you drive further into the park, you will cross younger geologic formations.

Geology Ink Drawing: Nancy B. Lamm





24
Indian rice grass

24. Indian rice grass, *Oryzopsis hymenoides*, is another plant found on disturbed shale slopes above the numbered post. It is named ricegrass because of the large, edible, shaft-free seed that can be easily harvested. Rice grass seeds are often found in Anasazi excavations. Today there are large stands of Indian rice grass on the plains south and west of Mesa Verde. During certain years this grass produces large amounts of seed.

25. All along the trail are fallen blocks of the **Point Lookout Sandstone.** Many of these blocks show the appearance of the ancient sea bottom about 81 million years ago. Look closely at the block in front of the marker. You can see the tunneled burrow made by a shrimplike animal which tunneled through the bottom sediments for food. These tunnels filled with sand and mud. They are probably preserved because of a slimy coating secreted by the animal on the inside of the tunnel. Some of these burrows have a bumpy appearance due to fecal pellets plastered into the sides of the tunnels.

Other blocks along the trail give clues to life on the sea bottom. Tracks and trails of clams, worms, and snails as well as marks made by rocks or shells bouncing along in sea bottom currents are common. Ripple marks show the directions of ancient wave activity. Bedding planes are not even but dip in different directions, reflecting changes in currents. Few good fossils have been found in the Point Lookout Formation because scavengers reworked the bottom, and intense wave and water action broke any remaining shells into small pieces.

About 100 feet ahead and 100 feet down slope from the trail is an alkaline spring. In the summer water usually dries up as fast as it comes out of the ground, leaving white alkaline salts. In winter months ice sometimes builds up a foot deep for 20 feet down the slope. Small birds and dragonflies drink from this spring.



26
Shale thistle

26. This **shale thistle**, Cirsium pulchellum, is one of the park's native species. Like all thistles, it provides nectars for hummingbirds. The blossoms are pink to white, while the leaves are whitish green. Thistle flowers and stems are sweet tasting. Some Native Americans chewed the stems for the sugar.



27
Musk thistle



27
Canadian thistle



27
Sweet clover

27. At this stop you can see several plant species which are not native to the park. One of the most obvious is **musk thistle**, Carduus nutans, the large, purple-blossomed, Asian species, which sometimes grows up to seven feet tall. Another non-native plant is **sweet clover**, Melilotus officinalis, with its clover-like leaves on four foot tall stalks. The small yellow flowers form little round seeds. Further along the trail is a third non-native plant, **Canadian thistle**, Cirsium arvense. It spreads by underground stems, forming dense patches which crowd out other plants. Although common in disturbed areas now, none of these plants were here during the Anasazi occupation. Exotic plant species such as these present many problems for national parks. Brought in historically, they have often taken over where native plants once thrived.



28
Rocky Mountain maple

to 7 leaflets. Bright pink flowers about two inches across are followed by red, oval-shaped berries called "hips." Rose hips are rich in Vitamin C, and a few seeds were found in Anasazi remains. Wild roses in Mesa Verde grow only in moist side canyons and on the North Rim such as the patch you see here.

28. Rocky Mountain maple, Acer glabrum, is a bushy tree 6 to 9 feet tall. The leaves are bright green with 3 to 5 pointed lobes. The bark is smooth and gray. If you happen to visit in the winter, you will notice how red the buds are. Clusters of winged fruits are conspicuous in the summer. Many maples have a high sugar content in the sap. Rocky Mountain maple, for example, has a sweeter sap than sugar maple.

Sometimes during fall migration you can see fifty to a hundred hummingbirds of three or four different species buzzing around this area. They are sucking nectar from the prolific stands of Indian paintbrush and thistles. Broad-tailed and black-chinned hummingbirds nest here. Rufous hummingbirds show up in July after nesting in the mountains. Calliope hummingbirds are fairly common in the autumn.

The cliffs above you contain small cavities formed by weathering. Such cavities are used by birds ranging in size from golden eagles to canyon wrens. Thirteen species of birds are known to use cliff cavities for nesting purposes. Pack rats, bats, ringtail cats, foxes, bobcats, and mountain lions also use these protected areas. What a perfect haven for all creatures concerned.

29. Dense stands of wild rose, Rosa woodsii, about three feet tall inhabit this area. Rose leaves are composed of 5



29
Wild rose

30. Snowberry, *Symphoricarpos oreophilus*, is the low-growing bush with small, thin, opposite leaves, often ending in a sharp tip. Snowberry flowers are pale pink and bell-shaped, while the fruit is snow white and tear-drop shaped. In Mesa Verde these shrubs usually grow in the shade of oak clumps. There is no ethnographic use for snowberry.



30
Snowberry

31. On the stems of oak brush in this area you may see large, **woody knobs** growing. These knobs are known as **galls**. They are especially evident during winter months when the leaves have fallen. Galls are plant growths around insect eggs serving as homes for the growing insect. Such galls are rich in tannic acid used in making leather.



31
Oak galls

32. The north rim of the Mesa Verde is visible to the west. The gray, soft shales at the base of the mesa are the Mancos Shales, overlain by the resistant, white, barren cliffs of the Point Lookout Formation, as described at marker 23. Above these cliffs is the Menefee Formation, laid down when the sea retreated a little further and this became dry land. These soft, dark rocks weather into rounded slopes. The climate was probably subtropical and quite humid. Soft, brownish-gray shales, coal, and soft sandstones were deposited in swamps and streams. These sediments contain many plant fossils including palm fronds, conifer wood, Sequoia, and many deciduous leaves. The mesa is capped by the orange-brown Cliff House Sandstone deposited near the shore in shallow water as the sea readvanced. Unfortunately, from this vantage point the Cliff House Sandstone and Menefee Formation are not easily visible. However, to the south on Chapin and Wetherill Mesas, the Cliff House Formation is the thick massive sandstone in which the alcoves sheltering the cliff dwellings are found.

Drawing by Allen Denoyer



Sleeping Ute Mountain is visible directly west of here. Seen from this angle, it has the profile of a sleeping human figure and is prominent in Ute Indian folklore. Geologically, it is the result of the intrusion of mushroom-shaped, igneous (volcanic) rock between overlying sediments about 65 million years ago when the entire region was subjected to uplift. Erosion removed the soft, overlying sediments leaving the more resistant igneous rocks composing this small mountain range.

This concludes your walk along the Knife Edge Trail. Due to unstable conditions ahead, we recommend that you return to the campground from here. Please return the booklet to the box at the trailhead or donate to take it home with you. Enjoy the rest of your visit to Mesa Verde.

