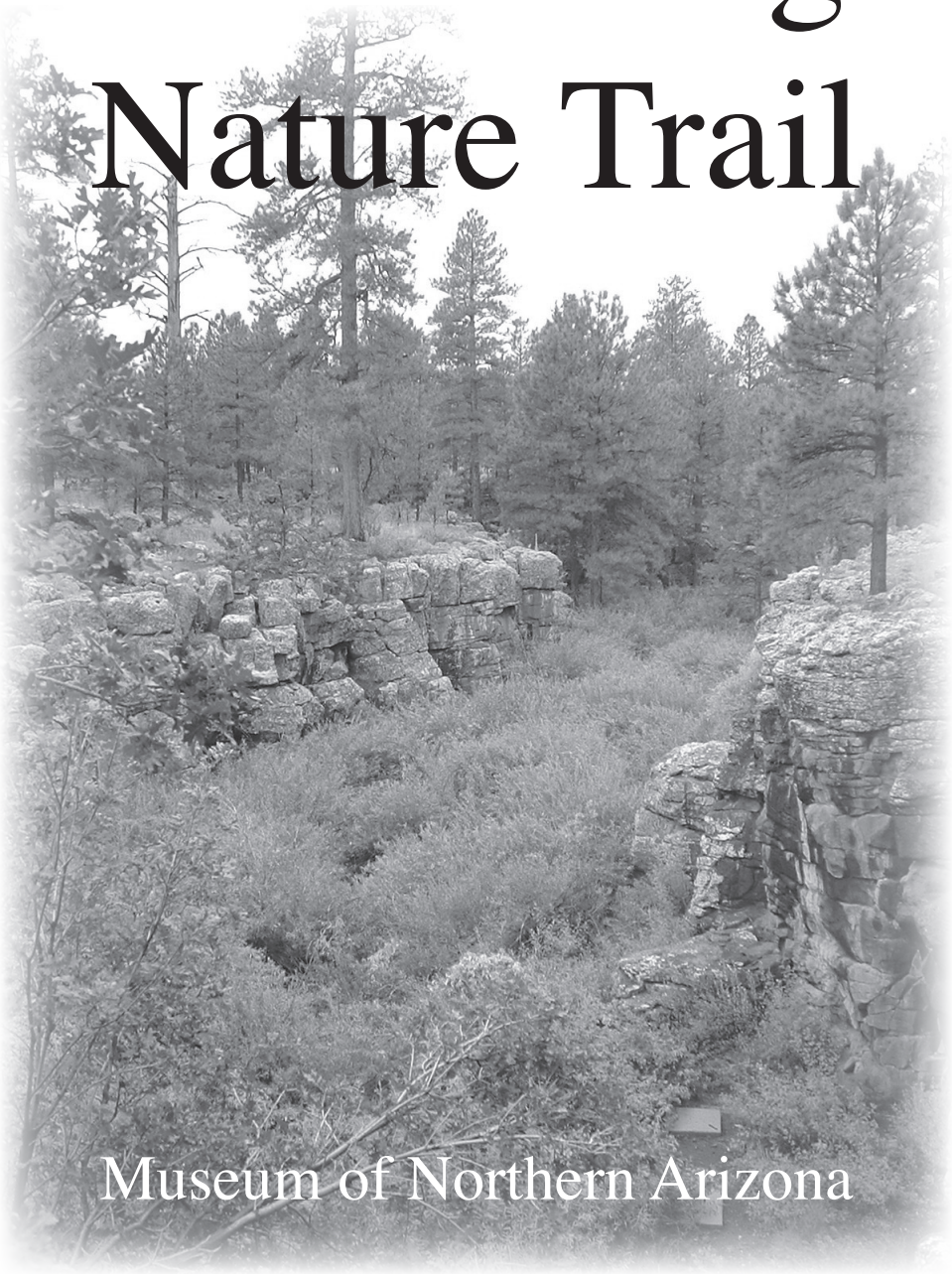
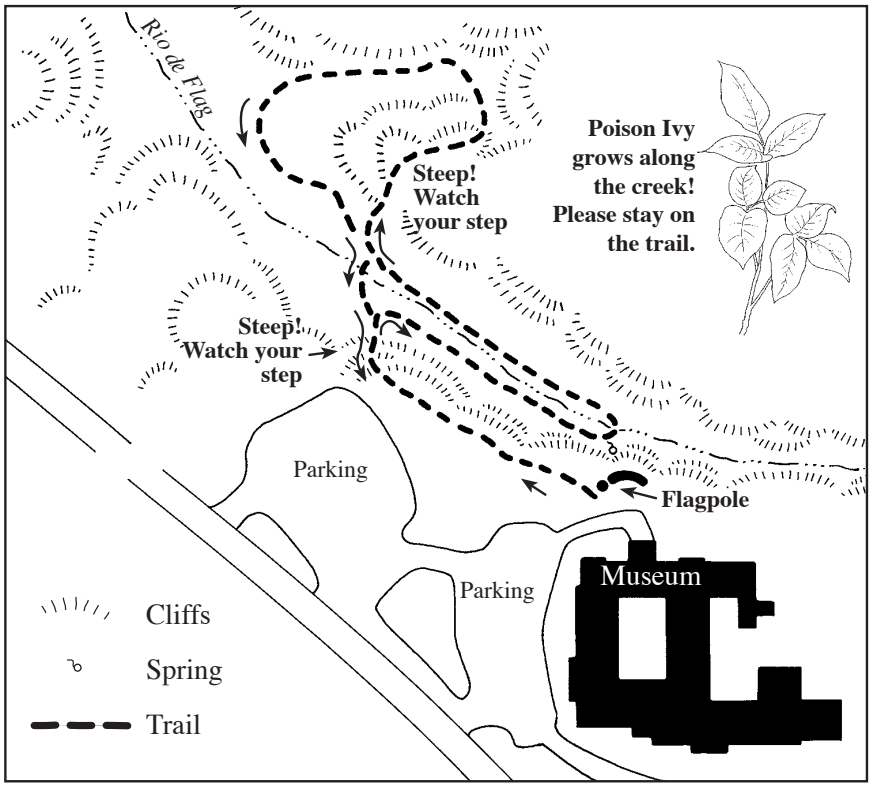
MUSEUM *of* NORTHERN ARIZONA

Rio de Flag Nature Trail



Museum of Northern Arizona



Rio de Flag Nature Trail Map

(With apologies to cartographic purists, north is at the bottom of this map.)

Conception by Barb Phillips
Text by Roger Clark
Line drawings by Jodi Griffith
Production by Steve Hirst for the Museum of Northern Arizona

Museum of Northern Arizona
Rio de Flag Nature Trail Guide

Welcome to the Museum of Northern Arizona's Nature Trail. It travels along a shallow canyon carved by the Rio de Flag through the lava flow that covered much of the Flagstaff area six million years ago. The lava is primarily olivine basalt, the primary constituent of the earth's hot mantle. A map of the half-mile trail appears on the facing page.

The trail begins at the flagpole in front of the Museum, follows the canyon rim to the east, then descends along rock steps to the floor of the canyon, where it follows the creek westward. About halfway, you may return to the start via a short loop or continue along an additional loop that ascends the far wall of the canyon, then descends into another, smaller drainage. The trail winds along this small, usually dry creek before returning to the original trail. Refer to the glossary at the end of this guide for definitions of words in bold print.

Use This Trail at Your Own Risk

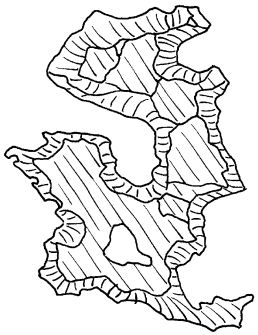
The trail at the top is rocky; watch your step. Please stay on the trail at all times. Poison ivy is common along the north side of the canyon near the spring. Rock climbing is not permitted. Plant collecting is also prohibited. The medicinal and culinary uses of plants in this trail guide have not been tested by museum personnel, and MNA takes no responsibility for the use of plants. All medicinal and culinary use of plants should be done only under the direction of a qualified herbalist.

CANYON OVERLOOK AT FLAGPOLE

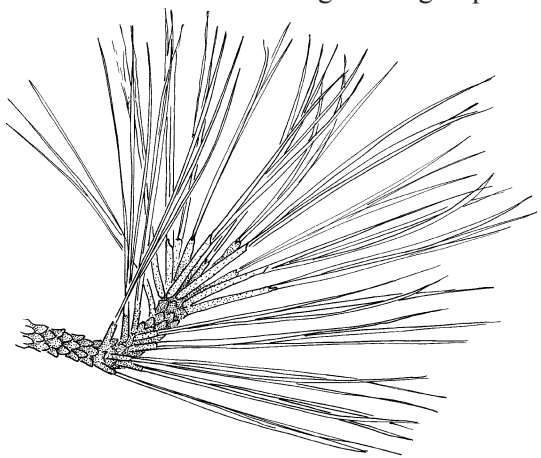
The Rio de Flag canyon and the area surrounding it supports a rich community. Many plants make the pine forest, the open meadows, and the canyon floor their homes. A variety of animals take advantage of the water and abundant plant life of the small canyon as well. Natural communities such as this one provided humans with food, medicine, and tools.

The trail begins near the flagpole at the Museum entrance.

Ponderosa Pine (*Pinus ponderosa*)
The trail winds through several different communities on its course around and through the canyon. Each is typified partly by the vegetation that grows there. The area surrounding the Museum is the ponderosa pine community. The plants you will see as you walk along the canyon rim are typical of this pine forest. Such forests are common in the middle elevations of the western mountains, usually between 6,000 and 9,000 feet. Ponderosa pines often live for 300 to 500 years and grow 150 feet tall. Notice that the bark of the younger trees is black, while the bark of the older trees is orange-red. Several older ponderosas grow on the opposite side of the canyon. The needles of these trees are three and one-half to four inches long and grow in groups of three. Wood from the large trunk of the ponderosa makes a common building material. Needles, inner bark, and sap are all **expectorants**. Pine needles make a pleasant tea that is a mild **diuretic**. The inner bark is also a favored food of the squirrels of the area and is even palatable to humans in times of emergency.



Ponderosa bark flake



Ponderosa needles

pinnate	having leaflets, leaf lobes, or veins arranged on opposite sides of the main leaf vein, often resembling a feather; compare to palmate
poultice	a soft mass, usually heated and spread on a cloth, that is applied to sores, inflamed areas, or lesions to supply moist warmth, relieve pain, or act as a counter-irritant or antiseptic
riparian	refers to the community on the banks of a watercourse or lake; also refers to a species that lives in that life zone, as in, "The arroyo willow is a riparian tree."
salve	a healing ointment
simple leaf	a leaf with a single blade; compare to compound leaf
symbiotic	an intimate relationship between two dissimilar organisms

dioecious male and female flowers grow on separate plants; compare to monoecious

diuretic a substance that tends to increase the flow of urine, either by increasing the permeability of kidney cells or increasing blood flow

emollient a skin dressing or soothing ointment

evergreen a plant which has green leaves throughout the year; compare to deciduous

expectorant a substance that stimulates the outflow of mucus from the lungs or bronchioles

hemostat a substance which stops bleeding, internally or externally

monoecious male and female flowers grow on the same plant; compare to dioecious

palmate having leaflets, leaf lobes, or veins radiating from a common point; compare to pinnate

perennial a plant that lives for an indefinite number of years; compare to annual and biennial

photosynthesis production of carbohydrates from water and carbon dioxide in chlorophyll-containing tissues of plants exposed to light

You approach the rim of the canyon as the trail passes an area of large, flat rocks.

Weather Pits And Lichens

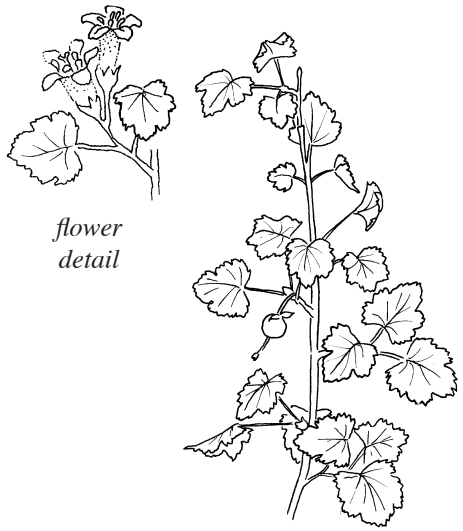
Although the depressions and the lichens on these rocks may appear unrelated, they actually have similar and important functions in this community. Wind and water erosion of soft spots in the rock initially formed the weather pits. An important source of water for wildlife, they hold rain for short periods of time after storms. Pine needles, leaves, and other fallen debris are also caught in the pits. As they decompose, they form a rich soil in which plants can grow. Similarly, lichens create pockets of soil on rocks by secreting an acid that erodes the rock.

Lichens are actually combinations of fungi and algae living together in a mutually beneficial **symbiotic** relationship. The fungi protect and provide moisture for the algae, and the algae provide food for the fungi through **photosynthesis**.

Understory vegetation in ponderosa forests tends to be rather sparse, especially when compared with vegetation in areas with higher rainfall. You will see, however, two common shrubs, one widespread grass, and many other plant species as you continue along the trail.

Wax Currant (*Ribes cereum*)

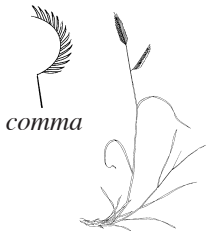
The leaves of this shrub are an example of **compound leaves** with three leaflets per leaf. A white, waxy substance covers each leaflet and gives the plant its name. Small, trumpet-shaped, pinkish-white flowers bloom in May and June. They are followed by small, opaque, red berries. The berries have a slightly sweet flavor and can be eaten straight or made into jelly or wine. In addition, the straight, woody stems of wax current have been used to make arrow shafts.



flower detail

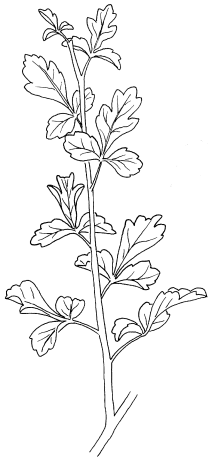
Wax currant

Grama Grass *(Bouteloua gracilis)*
Blue grama grass is easily recognized by its distinctive seed heads. In mid-summer these appear cocked at an angle from the main stem and have been described as "combs" or "eyelashes." These dry out in the fall, assuming a "comma" shape. Blue grama is an important forage plant of southwestern rangelands.



Blue grama

Threeleaf sumac (*Rhus trilobata*)
Similar in appearance to the wax currant except for its dark green leaves and sticky, hairy berries, this sumac is one of the more well-known plants of the Southwest. The berries, which appear after the plant blooms in May and June, bring the bush its fame. They have a sharp, acidic flavor similar to that of lemons and, when steeped in cold water, make a tasty "lemonade." Adventurous eaters can chew the raw berries; the more conservative can grind the berries and make them into a cake. The plant is also important medicinally. A **salve** of the leaves helps soothe irritated mucous membranes, including mouth sores of nursing babies. The strong, supple twigs have been used to make a variety of things, including basketry, arrow shafts, and bows. A black dye can also be made from the leaves.


Threeleaf sumac

Large Fallen Tree
The large fallen tree, to the right of the trail as it begins its descent, fell during a wind gust from a thunderstorm in August of 1996. Intense summer thunderstorms with an abundance of lightning are a common occurrence in the Arizona mountains. While it still stood on the canyon rim, lighting struck this tree in one such storm. The lightning apparently struck near the top and followed the wood's grain to the ground, as the spiral scar shows. Standing dead trees are referred to as snags. They provide important habitats for birds, mammals, and insects. More than 60 species of mammals and birds in this area depend on snags for habitat. Snags can remain standing for two or three decades after the tree dies. Now that it has fallen to the ground, the slow process of the tree's decomposition is returning nutrients to the soil.

Glossary of Terms

annual — a plant that completes its life cycle in one year or one growing season; compare to perennial and biennial

antibiotic — a substance which has the capacity to inhibit the growth of or kill microorganisms such as bacteria

antiseptic — a substance that will prevent or retard the growth of microorganisms

astringent — a substance that constricts tissues, used to stop bleeding and secretions

biennial — a plant that generally forms a basal rosette in the first year of growth and a flowering stalk the second year and usually dies after the second year; compare to annual and perennial

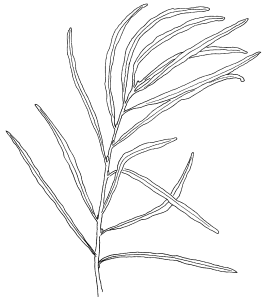
colic — acute abdominal pain caused by obstruction, spasm, or twisting

compound leaf — a leaf in which the blade is divided, forming two or more distinct leaflets on a common axis; compare to simple leaf

deciduous — a plant that loses its leaves at the end of the growing season; compare to evergreen

The trail brings you back to the fallen tree, where you take the right fork to return to the Museum. After crossing the creek, see if you can distinguish a second variety of willow growing in the canyon bottom.

Sandbar Willow (*Salix exigua*)
The leaves of sandbar willow are narrower and grayer than those of the more common arroyo willow. The uses of this willow are identical to those of the arroyo willow.



Sandbar willow

Continue west along the creek until you reach the base of the steps that brought you down into the canyon. Return to the top of the canyon.

For an interesting side trip, detour right toward the wooden bridge visible through the trees. Here you may view the runoff and artificial pool fed by San Francisco Spring across the road. This prolific spring became a stop on the Beale stage road and led Thomas McMillan in 1866 to build the log homestead still standing across the road and now sheathed in clapboard.

Linoleum block print of the McMillan Homestead
by Barton Wright, circa 1960

Just before starting down the rock steps into the canyon you will pass through a thicket of the area's dominant deciduous tree.

Gambel Oak (*Quercus gambelii*)
Gambel oak is the most common oak in northern Arizona's forests. It usually grows in dense, shrubby thickets, although these oaks can sometimes reach 50 feet in height. The leaves, with rounded lobes separated by deep notches, fall in autumn, unlike other oaks in the Southwest. Gambel oak is a veritable supermarket and drugstore. The acorns can be eaten raw, roasted, or ground and made into bread or gruel. The oak is also one of the most basic medicines in this community. An **astringent** wash made from the bark or leaves of this tree makes an excellent first aid treatment for wounds, burns, and abrasions. A chewed up leaf applied to insect bites reduces swelling and irritation. Tannin, essential for tanning leather, is contained in the bark. Finally, this tree provides an important source of wood to make utensils such as digging sticks and bows and arrows.

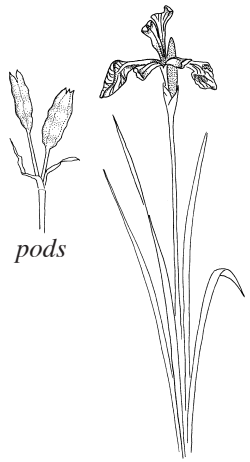
Gambel oak leaves and acorn

Turn right at the base of the rock steps.

The trail has brought you down and out of the ponderosa pine forest community. Now, it follows the canyon westward, along the border between the **riparian** community on the left-hand side of the trail and the community of plants on the south-facing canyon wall. Riparian communities include plants and animals found commonly along waterways. In the northern hemisphere, south-facing slopes of mountains and canyons tend to be warmer and drier than north-facing slopes because the sun generally shines from a southerly angle.

As you proceed up the canyon look for these two colorful flowering plants:

Rocky Mountain Iris (*Iris missouriensis*)
The Rocky Mountain iris is common to moist mountain areas between 6,000 and 9,500 feet in elevation. This is a slightly smaller version of a garden iris, with clusters of tall, lance-like blades, sturdy flower stalks, and pale blue flowers in May and June. The flowers mature into seed pods that dry and remain on the dried stalks. The pods make a sound like a rattlesnake when shaken by the wind or brushed by walkers. The dried root stock of the iris is a potent laxative. A green dye is also made from the iris.



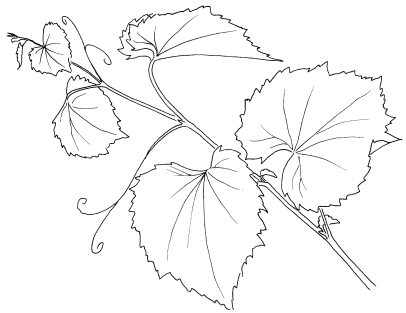
Rocky Mountain iris


Goldenrod

Goldenrod (*Solidago sp*.)
Nestled among the iris and other greenery of this area are the singular thin stalks of goldenrod with their regularly spaced, elongated oval leaves. Goldenrod reaches six to eighteen inches in height. These shy plants make themselves known in late summer with brilliant mustard yellow clusters of flowers atop their stalks. The flowers yield a dye.

As you approach the first large boulder on the slope above you on your right, notice the mass of tangled vines.

Canyon Grape (*Vitis arizonica*)
The woody vines growing on almost every available surface on this hillside are difficult to miss. Clusters of small, tart, purple-black fruits hang from the vines in the autumn. The grapes are edible and make good jelly and wine. This **deciduous** plant loses its large, bright green, heart-shaped leaves in the autumn.

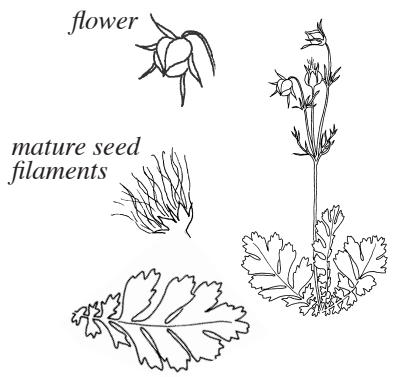

Canyon grape

Evidence of Abert Squirrels
The Abert squirrel (*Sciurus aberti*) is a resident of the pine forests of this area. Unlike most squirrels, the Abert seldom stores food for the winter. This squirrel's regular diet consists of ponderosa pine seeds, male pine cones, buds, eggs, carrion, and fungi. When these are not available, the Abert squirrel turns to the inner bark of young pine twigs. The squirrel cuts off the end clusters of needles, then severs a portion of the branch. The outer bark is removed, the edible inner part is eaten, and the twig is dropped to the ground. The stripped pine twigs on the ground around nearby ponderosa pines provide evidence of this habit.

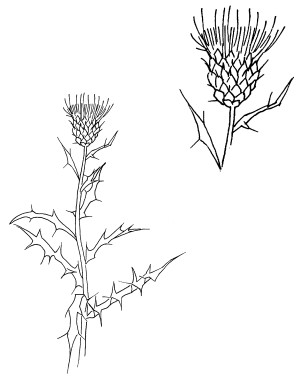

Abert squirrel

PONDEROSA PINE MEADOW

Many of the wildflowers that grow in other places on the trail grow in this opening in the forest, including western yarrow, Rocky Mountain iris, wild rose, wooly cinquefoil, manyflower puccoon, meadow rue, purple cranesbill, beardtongue, and spreading fleabane. Here you will also encounter old man's whiskers (*Geum triflorum*), and Wheeler thistle (*Cirsium wheeleri*). The five- to fifteen-inch flower stalks and reddish-yellow flowers of old man's whiskers grow out of rosettes of feathery leaves in spring and early summer. The singular, straight stalks of thistle are difficult to miss with their dangerous-looking spiky leaves and purple flowers. The flowers of thistle are used to make a dye.



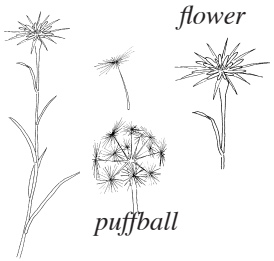
Old man's whiskers


Wheeler thistle

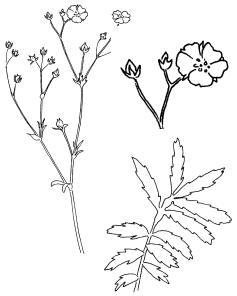
CREEK BED

Puccoon detail

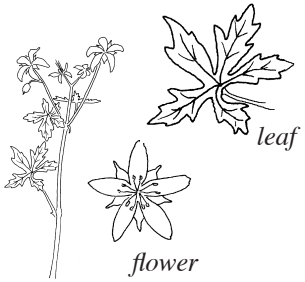
Runoff from the mesa above flows through the creek bed during winter and the summer monsoon. The water supports a proliferation of flowering plants in the meadow around the creek. Manyflower puccoon (*Lithospermum multiflorum*) grows here with one- to two-foot-high stems, linear leaves, and yellow, tubular flowers. Green spikes behind the pale yellow flowers and grayish-green stems distinguish goatsbeard (*Tragopogon dubius*) from the look-alike flowers of the dandelion. Goatsbeard flowers mature into puff-balls, formed by the white, parachute-like attachments on each seed. Silver-green, hairy leaves and yellow, buttercup-like flowers identify wooly cinquefoil (*Potentilla hippiana var. duffusa*). Cinquefoil soothes and helps heal both internal and external inflammations. Purple cranesbill (*Geranium caespitosum),* with its sharply lobed leaves and purple flowers, also adorns this meadow. This wild geranium has many medicinal uses including first aid treatment for minor wounds to help blood clotting and, like cinquefoil, to soothe and heal internal and external inflammations. Delicate scarlet trumpets on narrow-leafed stems mark golden-beard penstemon (*Penstemon barbatus*), a favorite of hummingbirds and used by Native Americans for ceremonial and medicinal purposes.



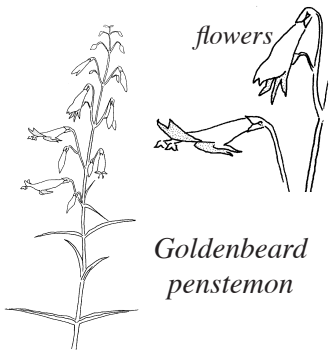
Goatsbeard



Wooly cinquefoil



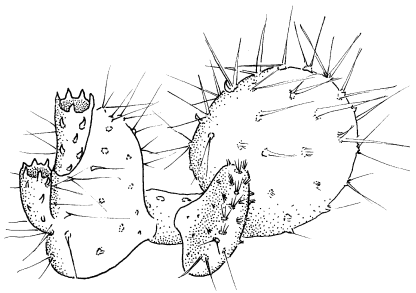
Purple cranesbill



Goldenbeard penstemon

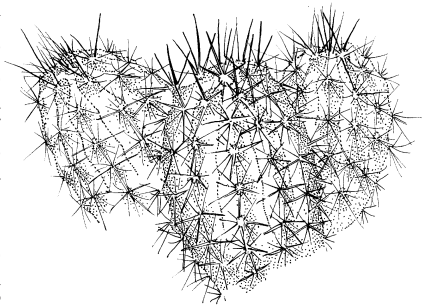
Just past the second large boulder on your right, pause to look for two varieties of cactus.

Plains Prickly Pear Cactus (*Opuntia macrorhiza*)
There are two specimens nearby, slightly up slope. The fleshy, dull-green, spine-covered pads are actually the stems of the plants rather than its leaves. Waxy yellow, orange, or red flowers bloom in June, and mature into fleshy red fruits. The fruit is delicious, but tiny hair-like spines called *glochids* make it dangerous to eat. The glochids can be removed by careful peeling or by quick roasting over an open flame. Candy, jelly, wine, and a rose-colored dye can be made from the fruit, which can also be dried for use as a sweetener. Peeled pads of this plant make good **poultices**.



Prickly pear

Hedgehog Cactus (*Echinocereus triglochidiatus var. melanacanthus*)
This plant is growing in the rock crevices eight to ten feet above the canyon floor, above and to the left of the prickly pear cactus. The stems of the hedgehog are clustered, with some clusters having as many as 50 stems. Each stem on this plant is three to six inches tall and has about nine longitudinal ridges. During a rainstorm the cactus absorbs a large quantity of water very quickly. The ridges allow the cactus to expand to make room for the water. This cactus also blooms in June with deep orange-red flowers that mature into one of the best tasting fruits of the cactus family. Its fruit can be prepared in the same way as prickly pear fruit to make candy, jelly, or wine. The stems of this cactus can also be eaten by either baking them like squash or pickling them.



Hedgehog cactus

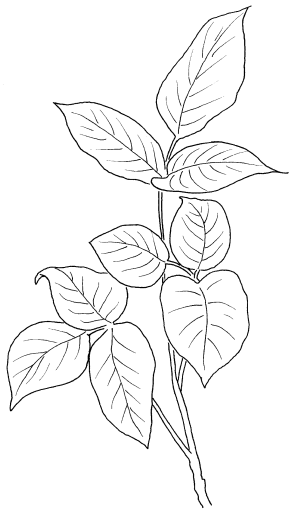
Arizona has more than a dozen species of willow. The tangled thickets in the center of the canyon floor are members of the willow family.

Arroyo Willow (*Salix lasiolepis*)
Willows are very common in riparian areas, growing in dense stands from six to thirty feet tall. Small roots of the willow form extensive underground systems and are important in preventing erosion along watercourses. Willows are **dioecious** and bloom in early spring. Willow bark contains both salicin and populin, relatives of aspirin, and is used as a pain reliever and anti-inflammatory agent. It is also a strong **antiseptic** and a good wash for wounds and skin irritations. The supple and abundant trunks and twigs of willow are used in basketry and to tie and sew things together. Timbers bound with willow twigs have been found in prehistoric cliff dwellings, as have small figurines made out of split willow twigs.

Arroyo wllow

Continue along the trail, passing between two closely-spaced rocks at waist level. Along this next section of the trail, watch for a plant that everyone should learn to recognize and for two unusual-looking plants with an ancient pedigree.

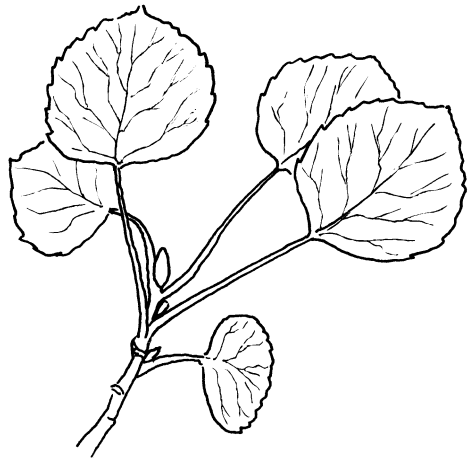
Poison Ivy (*Toxicodendron rydbergii*)
CAUTION! All parts of this plant, alive or dead, contain a toxic oil that causes watery blisters and severe skin rashes on many people. The compound leaves of poison ivy have three leaflets and turn red in autumn. The stems may grow up to two feet tall—and even more when they grow as a vine around rocks or other plants. Inconspicuous flowers bloom in early spring and are followed by small white berries that may persist through the winter. Some animals eat the berries with no ill effects, but the berries are harmful to humans. Poison ivy is often hidden among other plants, so use caution.



Poison ivy

Continue your walk into the side canyon.

Quaking Aspen (*Populus tremuloides*)
This small stand of aspens, with their smooth, white bark and heart-shaped leaves, is representative of the mixed conifer community that usually occurs just above the ponderosa pine community. Aspen trees grow in groups of clones with a shared root system. New trees grow from the roots of the clone. Although individual aspens may live for only 100 to 200 years, the clone to which they belong might be hundreds or even thousands of years old. These aspens may all be part of one organism. Individual clones may be distinguished in a larger stand of aspen when, in the autumn, the leaves of all trees in a clone will begin to turn colors at the same time. Like willow, the bark of aspen contains salicin and populin, relatives of aspirin, and is used as a pain reliever and anti-inflammatory agent. When steeped in oil and mixed with beeswax, the leaf buds of aspen make a soothing **salve**. The inner bark is edible, though usually only eaten in times of emergency. Aspen is a fire-adapted species; new growth quickly sprouts from the roots in burned areas. Due to wildfire suppression, habitat suitable for aspen has sharply declined. Other members of this community, such as the ponderosa pine, are also affected by wildfire suppression. Ponderosa pines depend on fires to clear away ground cover and debris so that their seedlings have enough room to grow. The thick bark of the older trees protects them from the quick, hot fires that were once typical of this area.

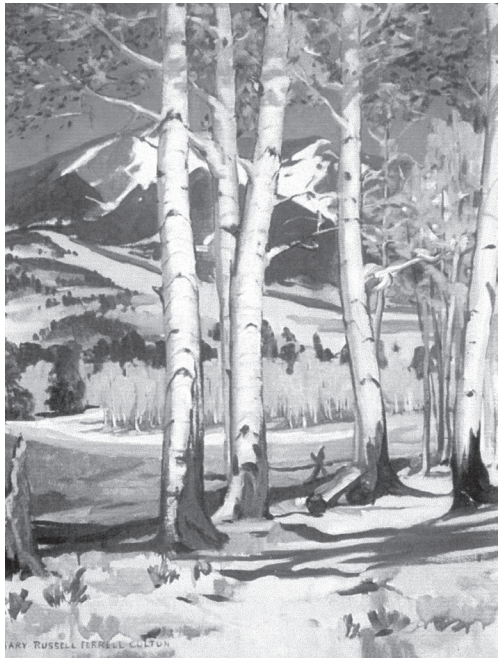


Quaking aspen

The trail now descends the side canyon. The creek will be on the right at first, but you will soon cross to the other side, where you will continue to the junction with the Rio de Flag.

VIEW OF SAN FRANCISCO PEAKS

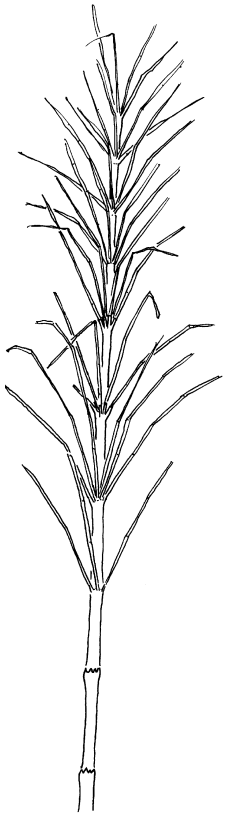
Mount Humphreys, at 12,633 feet in elevation, is the highest point in Arizona. Its summit stands above tree line and supports only low-growing plants of the alpine tundra community. More properly the San Francisco Mountain, the Peaks were formed by a series of volcanic eruptions that began 1,800,000 years ago and ended 400,000 years ago. Scientists remain uncertain what happened to the upper part of this volcano, originally at least 15,000 feet high. It may have collapsed, eroded, or possibly exploded in a violent eruption. Erosion by streams and Ice Age glaciers has further dissected the slopes. The geology gallery in the Museum has more information about the mountain.



Hart Prairie *by Mary-Russell Ferrell Colton*

The Havasupai, the Hopi, and the Navajo all consider the mountain sacred. To the Havasupai, it is *Wi Hlaa'*, the moon mountain—the center of the world and their link to the Universe. To the Hopi, it is *Nuvatukya'ovi*, the snowy peak—the home of rain forces and of the life-giving *katsina* spirits. To the Navajo, it is *Dook'o'oslíid*, the gleaming summit—the abalone-shell mountain of the west, fastened to the sky with sunbeams and topped with a golden cloud.

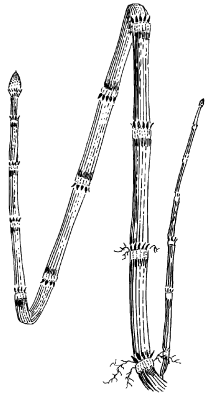
Field Horsetail *(Equisetum arvense)*
Gigantic, ancient ancestors of this plant formed extensive forests in early Mesozoic times (200 million years ago). A depiction of the ancestors of horsetail covers the wall behind the dilophosaurus in the natural history exhibit inside the Museum. The horsetail we have today is much smaller but just as majestic in its own way. This plant grows in two phases each year. In early spring a small, inconspicuous, reproductive shoot comes up. A short time later the nonreproductive stems emerge. A creeping underground stem produces shoots above and roots below, so many of the plants you see here may actually be part of one organism. Horsetail has hollow, jointed, ribbed stems with many grass-like branches at the joints. The ribs are strengthened with silica. Bound together, horsetails—or their relative, smooth scouring rushes—make a scouring pad equal to the finest grade of steel wool. They can be used to clean and polish metal or, as cabinetmakers in early Europe used it, to polish wood finishes. Horsetail and rush make one of the few forms of silica—an essential mineral—absorbable by the human body. Horsetail is also an external **hemostat**.



Field horsetail

Smooth Scouring Rush *(Equisetum laevigatum)*
This plant is similar to the field horsetail but has scale-like leaves at the joints and no branches. The two are relatives, and uses for this plant are identical to those for horsetail. Early in the spring a tapered black reproductive head tops smooth scouring rush, earning it another common name: snakegrass.

Just before the trail turns to cross the Rio de Flag, notice an especially lush area to your right, with vegetation enjoying the extra moisture from a small spring in the canyon wall.



Scouring rush (folded)

SPRING AREA

The area around the spring is yet another community. The small but constant flow of water keeps this area lush with plant life. The wildflowers are some of the most brightly colored members of this little community. The fluffy yellow-flowered rock dandelion (*Taraxacum laevigatum*), with its jagged edible leaves, blooms here in early summer. Dandelion has a stimulating and cleansing effect on both the kidneys and the liver. Bright yellow blossoms of monkeyflower (*Mimulus guttatus*) fill this area with their monkey-like faces in late summer. Also blooming in late summer is checker mallow (*Sidalcea neomexicana*). This member of the mallow family has **palmate** leaves and delicate pink cup-shaped flowers. The white flower clusters of western yarrow (*Achillea millefolium var. lanulosa*) also bloom around the spring. Said to have been discovered by Achilles during the Trojan War when he used it to cure the wounds of his soldiers, yarrow later became very popular among American soldiers for its blood-clotting properties on external wounds.

From the spring, use the footbridge to cross the creek.

Checker mallow

Monkeyflower

Yarrow

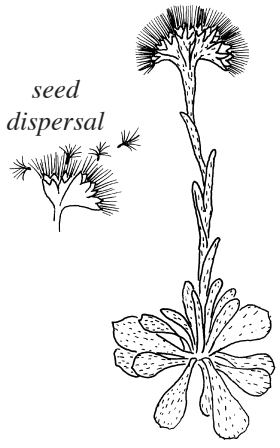
ROCKY AREA AT TOP OF THE STAIRS

The steps have brought you up out of the riparian and canyon wall communities and back into the ponderosa pine forest. Throughout the summer many wildflowers carpet the crevices between the rocks here. The flowers of spreading fleabane (*Erigeron divergens*), with their yellow centers and many-rayed white flowers, at times decorate the stairway from bottom to top. Inch-tall, gray-green-leafed rosettes of pussytoes (*Antennaria aprica*) are abundant in this area. Flower stalks grow four to six inches out of the leaf mats and are topped by fuzzy, pale pink flowers that resemble the underside of a cat paw and give the plant its common name. Pussytoes is used as a medicine for liver inflammations.

fleabane

Ultraviolet light is intense at this elevation and exposes lush, broad foliage to radiation damage. The small, grayish leaves of plants like pussytoes reduce both ultraviolet absorption and water loss—perfect for this high, dry environment.

The trail descends into a small side canyon. Before starting down, turn and enjoy a fine view of the San Francisco Peaks to the north.



pussytoes

ANIMAL HABITAT

Availability of water, abundant plant life, and protection in the form of rocks and trees make this area ideal for many species of birds and other animals. The ponderosa pines here are often host to the Abert squirrel (*Sciurus aberti)* and the Steller's jay (*Cyanocitta stelleri*). The side-blotched lizard (*Uta stansburgiana*) and the gray fox (*Urocyon cinereoargenteus)* often sit among the rocks of the canyon wall. The animals and plants of the entire canyon community are interdependent. Plants provide food and shelter for animals, while animals may pollinate flowers or spread plant seeds, which helps ensure their continuation and propagation.

Steller's jay

Fallen Tree

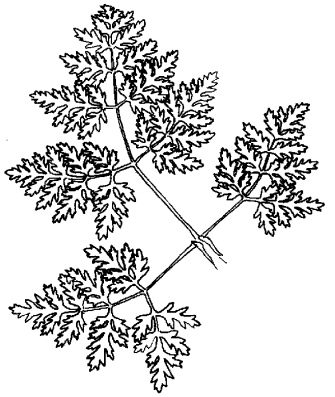
This fallen tree is another example of the interdependent relationship among the members of this natural community. As a living ponderosa pine, this tree took nutrients and water from the ground, carbon dioxide from the air, and energy from the sun to make its own food through **photosynthesis**. Fungi and bacteria are now decomposing the tree, and in the process, giving the nutrients and energy that it stored during its life back to the community. Decomposed wood provides a rich growing medium for a variety of plants and habitat for insects and other small animals.

At the fork in the trail just before the fallen log, you may return to the beginning by crossing the creek to your left or you may continue on the trail up the stairs to the right.

Poison Hemlock (*Conium maculatum*)

CAUTION! POISONOUS! All parts of this plant, both dead and alive, are highly toxic. The stems of hemlock can grow up to six feet tall and have several branches that support carrot-like leaves and an umbrella of small, white flowers in late summer. Seeds mature in the flowering head and remain on the dried stalk when the plant dies. All parts of this plant contain poisonous piperidine alkaloids that completely incapacitate and kill its victims in 45 minutes, beginning with the muscles and ending with the brain. For a short time American doctors used small doses of hemlock as a sedative, but the practice was quickly halted. This is a relative of the plant that the ancient Greek philosopher Socrates was sentenced to ingest in 399 B.C.

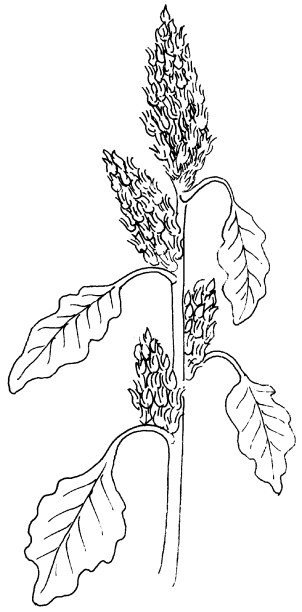
Hemlock flower cluster



Hemlock leaves

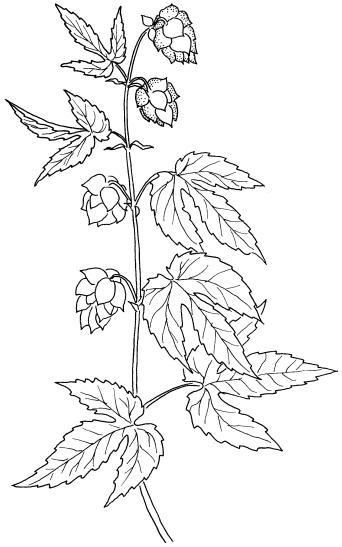
Amaranth (*Amaranthus palmeri*)

The thick stalk of this plant and the dense spikes of flowers it supports are its identifying features. A very adaptable plant, amaranth—also called pigweed—may be a few inches or six feet in height, depending upon environmental factors such as the availability of water. Amaranth grows best in alkaline and low-nitrogen soil—conditions unsuitable for many other plants. This, in combination with its very edible greens and high protein seeds, has sparked interest in amaranth as a cultivated food. The seeds, as well as breakfast cereal made from amaranth, can be purchased in health food stores. Also useful medicinally, this plant soothes the stomach, is used as a **poultice**, and, when steeped in milk with other herbs, helps babies who suffer from **colic**.



Amaranth

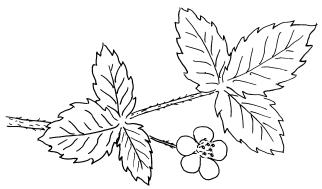
Common Hop (*Humulus lupulus var. neomexicanus*)
Forming a dense mat on the canyon floor among the willows and growing over dried hemlock stalks, is the common hop vine. The **palmate** leaves of the hop have five sharp lobes with deep notches like the palm of a hand. The pale green, papery fruits of this plant appear in late summer and ripen into a deep amber in the autumn. The wild hop is a relative of the cultivated hop used in brewing malt beverages. Hops are used to impart a bitter flavor and, because they contain **antibiotics**, to retard spoilage. Of its many medicinal uses, the most popular historically is as a sedative. Both King George III and Abraham Lincoln slept on pillows filled with wild hops to help them sleep.



Common hop

Just after the trail turns to the left, note the brightly colored canyon walls on your right.

Desert Varnish And Multicolored Lichen
A mural of blacks and oranges adorns the canyon wall. The black color is called desert varnish and is formed by mineral oxides deposited by water over long periods of time. During storms, water flows into the canyon from the canyon rim via these rocks. Desert varnish is a typical surface for petroglyphs—markings of the Native peoples who lived in this area over the last ten thousand years. Petroglyphs were chipped out of the varnish to leave a light-on-black design. The orange color is lichen, a different species from the lichen on the canyon's north rim, described earlier.

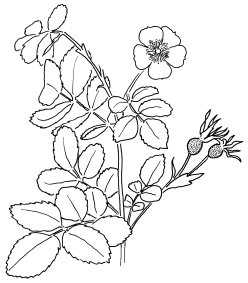


Wood strawberry

At the base of the wall, notice the dark green, toothed triple leaflets of wood strawberry (*Fragaria bracteata*) hugging the ground. Humans and other animals savor the fruit of this member of the rose family.

The trail will now follow the canyon back down, with the riparian area on the left and the cooler, moister north-facing canyon wall on the right. See if you can identify these three plants along the trail:

Arizona Wild Rose (*Rosa arizonica*)
The wild rose is one of the typical plants of the north-facing canyon wall. It resembles garden variety roses, but stems of the wild rose are thinner, leaves are smaller, and flowers have only five pink or white petals. After blooming in June and July, each flower ripens into a rose hip, a marble-sized fruit that begins with a green color and matures after the first frost of autumn into a brilliant red. Flowers and hips are used medicinally to cure diarrhea and as a soothing eye wash that reduces redness and irritation. Rose hips are edible either straight or made into jelly. The hips are an important source of Vitamin C; three hips contain as much as one orange.



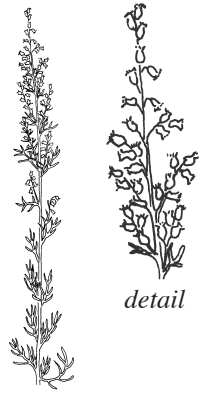
Wild rose

Meadow rue flower enlarged

Meadow Rue (*Thalictrum fendleri*)
The delicate leaves of this plant almost appear to be floating, as the petioles that support the blade are so thin. Leaves of this plant are **compound**; three of the oval leaflets together make one leaf. Small green, inconspicuous flowers bloom in May and June. The flowers are edible.

Meadow rue

Wormwood (*Artemisia carrothii*)
Silvery stems and leaves of wormwood grow along the lower end of this slope among the iris. Wormwood is a member of the sunflower family and, when crushed or rubbed between the fingers, releases a wonderful sage odor. The small, ball-like flowers of this plant grow on unleafed branches amongst the other leafed branches. Wormwood can reach two feet in height. As with all sages, wormwood is valued for its aromatic properties. It can also be used to season food. Medicinally, wormwood is used to stimulate sweat in dry fevers, to aid digestion, and as its name suggests, to prevent or fight pinworm or roundworm infections.



detail

Wormwood