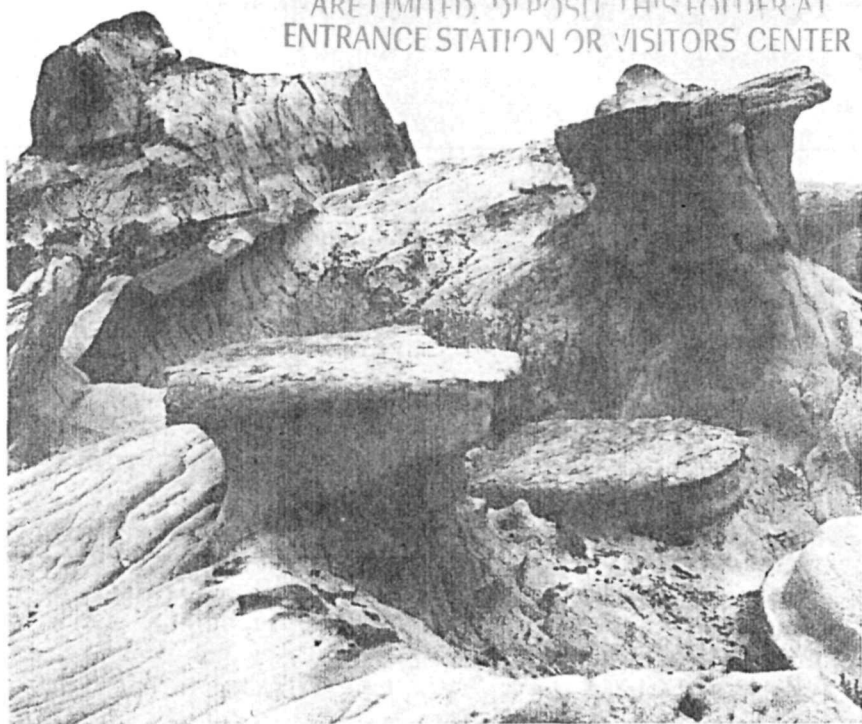


caprock - coulee

Nature Trail

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*Theodore Roosevelt
National Park*

■ if you keep this booklet



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THE THEODORE ROOSEVELT NATURE AND
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Theodore Roosevelt Nature And History Association

is a non-profit organization pledged to aid in the preservation and interpretation of the scenic, historic and scientific features of Theodore Roosevelt National Park. Membership is open to the public. Please ask for information on Association activities and dues.

Theodore Roosevelt National Park

This Park was established in 1947 to memorialize the 26th President of the United States, Theodore Roosevelt, for his enduring contributions to the conservation of our country's resources and his part in developing the northern open range cattle industry. The National Park Service has the job of preserving this Park in its natural, unspoiled condition and also of making it available for your enjoyment. Plants, animals, and the natural landscape are preserved here for all time so that you may see them as Roosevelt saw them on his first visit to this area in 1883. Please help us in this work by taking only memories and leaving only footprints.

ASK ANY RANGER questions that may occur to you as you travel through the Park. The rangers are here to help you enjoy your visit.

Caprock Coulee Nature Trail

This trail is for your use and enjoyment. Take your time as you walk along. Pause frequently to look at the scenery, to take pictures and to ponder the wonder of geology and natural history that unfold before you.

The numbered markers along the trail correspond to numbered paragraphs in this booklet. You may use the booklet free of charge, returning it to the leaflet box as you leave, or you may purchase it for 35 cents, depositing coins in the slot provided. Please help keep the Park clean and neat by depositing litter in the trash receptacles. **Please** be careful with smoking materials.

No. 1—Caprock Coulee

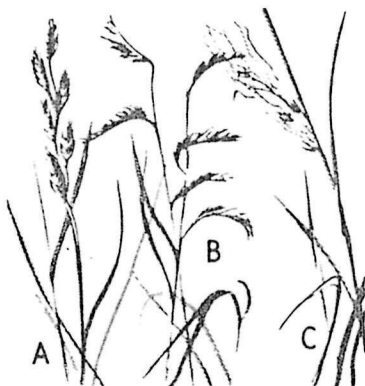
Coulees are long, steep, narrow valleys such as this one. Formed by water erosion, they are usually dry in summer. They were named by French fur traders who came to this country in the early 1800's. In the Southwest the Spanish called them ARROYOS.

No. 2—Erosion

Notice the erosion on the hillside to your right. Geologists call this RILL EROSION. Little trickles of water, coursing down the bare banks, carve the myriad of channels that you see. Eventually, as erosion progresses, these little channels will merge and coalesce to form fewer, but larger, channels. You can see this stage farther up the coulee.

No. 3—Grass

Grasses are the dominant vegetation on the more stable land areas of the Park. Stands of Western wheat grass (A), blue grama (B), and needle-and-thread grasses (C) made this region especially suitable for the grazing of bison, elk, and other wildlife and supported the the cattle of the open-range era. Look closely; can you pick out several types of grass?



No. 4—Cactus

Only a few types of cactus grow this far north. Less robust

than its southern cousins, but just as hardy, the Plains Prickly-pear is quite common in the badlands. The plant stores up water in its fleshy stems and can withstand long droughts. Its leaves have been reduced to spines as a further aid in preserving moisture, as well as to protect the plant. Watch out! Those spines are sharp and they hurt. Pricklypear blooms about July 1.

No. 5—The North Slopes

Look behind you across the road and to your right. Notice the difference in the vegetation on certain slopes. The moist, cool northern slopes support stands of juniper and other woody plants, while the drier, south-facing slopes are clothed with a more desert-like growth of cactus, saltbush, and grasses.

No. 6—Differential Erosion

To your left is a good example of the different effects of erosion on rocks of different hardness. The gray material is a mixture of sand, clay, and bentonite. The thin layers of rusty looking rock are iron-impregnated sandstone. Notice how it forms a shelf wherever it occurs. It is harder and thus erodes much more slowly than the soft clays.

No. 7—Silver Sagebrush

This woody shrub is one of several types of sagebrush found in the Park. It is common on the river flats and grows profusely along the banks of the Little Missouri. Do not confuse this shrub with the true sage which is a herb used for seasoning. It, also, is found in the Park, but belongs to the mint family and is not common here.

No. 8—Lignite

To your left is a thick black stratum of lignite. Lignite is a poor grade of coal. It is found throughout the Park. In some instances it forms layers several feet thick. If you examine lignite closely, you may see bits of plant material. Coal is formed when vegetation is preserved from decay by burial and is then subjected to great pressure. Finding it here reminds us that at one time this country was swampy, supported dense vegetation, and must have looked a good deal different from what it does today. Even though of poorer quality than other types of coal, lignite is mined in large quantities, and constitutes one of the major industries of Western North Dakota and Eastern Montana.

No. 9—Bentonite

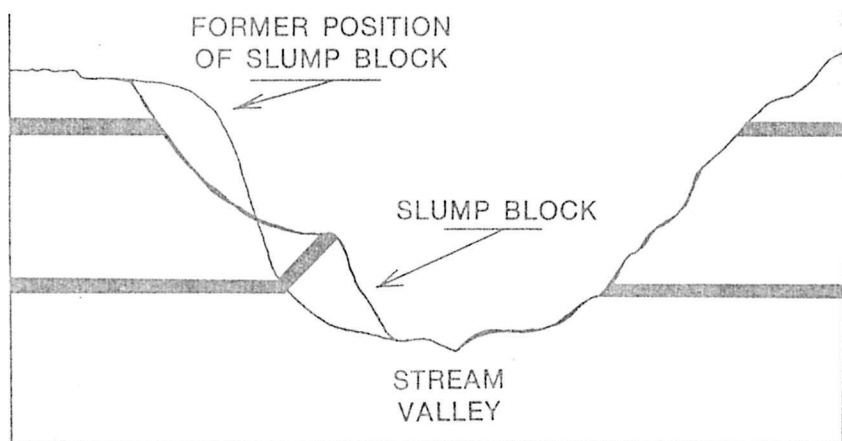
Most of the blue material across the canyon is bentonite. Pure bentonite is altered volcanic ash; it has tremendous absorbent qualities. Some bentonite can absorb up to 15 times its own volume of water. Impure bentonite, such as you see here, is prominent throughout the North Unit of the Park. It can absorb 2 to 3 times its volume of water. Because of this property, after heavy rains or when wet by melting snow, it expands and literally flows down hill.

No. 10—Tunnels and Funnels

Here the canyon wall is honeycombed with tunnels and funnels. These are caused by the more rapid erosion of softer materials. As these openings grow larger, they eventually collapse—another process in the creation of the badlands. Across the coulee are some large pieces of petrified trees. This is further proof that this area supported a more luxuriant plant growth in ages past.

No. 11—The Slump

Here we are looking directly at the slump. This is a small one; farther up the coulee we'll see a much larger slump. In contrast to a landslide where masses of earth and rock slide bodily down steep slopes, breaking up at the bottom, slump blocks retain their identity and move slowly down along a double-curved plane. (See drawing) Can you see where it came from?



No. 12—Petrified Wood

The light-colored chips and fragments you see around you are petrified wood. Trees from which this wood came grew about 55 million years ago. Buried quickly by sand, mud, and clay before decay could begin, ground water percolating through the buried trees slowly filled the cell spaces with silica (quartz). Then, much later in time, erosion exposed the trees. The fossilized logs are not well enough preserved to be identified, but they probably belong to the conifer group.

REMEMBER—IF EACH PERSON TOOK ONE PIECE OF PETRIFIED WOOD, THERE WOULD SOON BE NONE FOR OTHERS TO ENJOY. PLEASE DO NOT CARRY IT OFF.

No. 13—Juniper Grove

For the next hundred yards our route takes us through a grove of living—not fossil—trees. Ash and juniper predominate here.

Rocky Mountain junipers, or “cedars” as they are often named, are common on the cool northern slopes and moist river bottoms throughout the Park. They are among those trees in which sexes are separate on different trees. The female trees produce the berries; the male trees produce the tiny pollen-bearing cones.



Green ash is found growing in ravines and coulees throughout the Park. It is a fast growing tree and is hardy—resisting drought, heat, and cold. Indians used the wood for making bows, but today its value lies chiefly in its use as shelter belt plantings. The seeds are quite conspicuous, looking much like miniature canoe paddles.



No. 14—Lichens

The bright-colored splashes on the tree trunks are masses of minute plants called lichens (pronounced lik'ens). Curiously

enough, a lichen consists of two quite different kinds of plants—fungus and alga—which live together in a closely balanced relationship. Scientists differ on the nature of the lichen association, but it is known that the algae produce food necessary for themselves and the fungi, while the fungi are able to obtain and hold the water which is necessary to every living thing. Well over 1,000 different species of lichens are known at present, distributed all over the world. Certain lichen species are sensitive to changes in air quality and can be used to monitor such change.

No. 15—Active Slump

Here, a slump has completely blocked the coulee. It came from the canyon wall to your left. Here, also, the reason for the slump is quite apparent. Weak, slippery bentonite, saturated by water in part, at least, by the seep above you, and overloaded by the extra weight of the water, finally began to slide. While the seep water is unfit for human use, animals welcome it in this semi-arid country. If you look around, you'll probably see deer and other animal tracks in the soft mud. The conspicuous large green plant growing on the slump is rabbitbrush. This plant blooms in late August, and its yellow flowers add a bit of color to the browns and grays of the badlands.

No. 16—Wildlife Trail

Wild animals, like humans, are creatures of habit. Small sources of water, such as you just passed, make gathering places for wildlife the world over. Here, mule deer, bobcats, and coyotes are the main users of this trail. Other native mammals found in the Park include cottontail rabbits, jackrabbits, prairie dogs, badgers, weasels, and the usual number of small rodents. Remember all wildlife—even the smallest creatures—are protected in National Parks. Please do your part to help us maintain and preserve this great outdoor museum.



No. 17—Forest Litter

It is the policy of the National Park Service to preserve everything in its natural state. All living things eventually die.

But the death of these trees does not harm the community. Plants and animals depend upon such forest litter as this for seedling growth, food, shelter and nesting places. Eventually the dead trees and plant materials disintegrate and their substance then nourishes a new cycle of plant growth.

No. 18—Another Juniper

This is another of the three juniper species found in the Park. In contrast to the Rocky Mountain juniper, which is limited to the region from which it gets its name, the common juniper, here called Dwarf juniper, is widespread, being circumpolar in its extent. It rarely grows more than 3 feet in height. Its sharply pointed, awl-shaped leaves are quite different from the smooth, flush, scaly leaves of the Rocky Mountain juniper. But a closer look will show you that the mature growth of the common juniper looks exactly like the young growth of the Rocky Mountain species. Juniper berries are eaten by birds and small mammals and have long been used by man to flavor gin.

No. 19—Pedestal Rocks

On the cliffs surrounding this little basin are good examples of pedestal rocks. Being harder than the rock around them, they resist erosion. In so doing, they shelter the soft clay beneath them from the direct effects of rainfall. But the splash of rain-drips and running water eventually remove the surrounding material until mushroom-like pedestals are formed. Ultimately the supporting pillar becomes too weak to hold the caprock, and it collapses. Deprived of its protective cover, the pillar is then rapidly worn down to the level of the surrounding soft rock.

Here, too, is a good place to wander around a little, or just to sit and relax. This is the end of the self-guiding part of the trail. You may now either retrace your steps to the parking area or continue along the trail for 2½ miles to its junction with the main road, meeting your companions with the automobile there. Or, continue by trail another 1½ miles beyond the trail's junction with the main road and you will return to the parking lot from which you started.

In any event, we hope you have enjoyed the nature walk. Please return this booklet before you leave, placing it in the nearby box. You may buy it and take it home as a souvenir by dropping 35 cents in the coin box at the beginning of the trail. Thanks, and good luck.

Plants Found Along The Caprock Coulee Nature Trail

Common Name	Scientific Name
Blue Grama	Bouteloua gracilis
Green Needlegrass	Stipa viridula
Western Wheatgrass	Agropyron smithii
Plains Pricklypear	Opuntia polyacantha
Silver Sagebrush	Artemisia cana
Rabbitbrush	Chrysothamnus graveolens
Rocky Mountain Juniper	Juniperus scopulorum
Green Ash	Fraxinus pennsylvanica var. lanceolata
Common Juniper	Juniperus communis
Threadleaf Sedge	Carex filifolia
Small Soapweed	Yucca glauca
Lance-leaved	Salvia (reflexa) lanceolata
Lichen	?

Checklist of Birds

You May See Along This Trail

- American Goldfinch** — A yellow to grey body, black wings with white bars, black tail and forehead.
- Black-billed Magpie** — Large, black and white bird with a long tail.
- Black-capped Chickadee** — Black cap and throat, white cheeks, grey back, dull white underparts.
- Chipping Sparrow** — Underparts, sides of face and rump are grey. Chestnut crown, white eyebrow with thin black line through eye.
- Marsh Hawk** — Long wings, long tail, white rump.
- Mountain Bluebird** — Sky blue above, powder blue below, and a white belly.
- Robin** — Grey above, brick red below.
- Rufous-sided Towhee** — Black or brown head and upper body, with white underparts, bright orange patches on sides.
- Song Sparrow** — Heavily streaked underparts and large central spot on breast.
- Western Meadowlark** — Streaked brown above, bright yellow below, with black "V" on breast.

How the badlands formed

These rock layers were generally deposited in streams, lakes and swamps about 60 million years ago during the Paleocene epoch of the earth's history. Over a period of some 5 million years, more than 1,000 feet of sand, silt, and clay were laid down here by streams which had their origin in the Rocky Mountains. Eventually these sediments solidified and compacted into the soft rocks that comprise the badlands. Geologists call these rocks the Fort Union Group. Dense vegetation grew in some of these swamps and in time, through compaction, heat and pressure, formed beds of varying thickness of soft impure coal called lignite.

During the advance of the continental glacier, the course of the Little Missouri River was changed. Instead of emptying into Hudson Bay, as it formerly had, the Little Missouri found a new outlet to the east near Fort Berthold, which was considerably lower than its old junction with the Yellowstone River east of Williston. The rapid downcutting of the river and its tributaries accelerated erosion, causing extensive gulying and the beginning of the badlands. Erosion continues today. With every rain that falls a little bit more of the soft badlands rock is carried away. Eventually, the rough, rugged badlands topography will give way to a featureless plain only perhaps to being a new cycle of erosion.

The Lookout House

If you haven't been to the Lookout House 1½ miles up the road from the parking lot, be sure to go. Here is a good place to see the river in action and to get an idea of how sediments are carried and deposited by running water. The sand and silt carried by the high water are deposited when the water recedes. The banks of the stream are constantly changing by being eroded in one place and built up by depositing elsewhere. Even though, at times, the river is overloaded with more sediment than it can carry, it is probably still cleaning and deepening its channel.

Looking down at the river plain from the Lookout House you also get a good lesson in plant ecology. You'll notice that cottonwood trees are the first trees to grow in the newly deposited sediments along the river's edge. It is said that they "dig their own graves." The cottonwood trees stabilize the soil and provide shade. This makes the environment suitable for less hardy trees such as ash and elm. Eventually the ash and elm will crowd out the cottonwoods.

This shelter house was constructed by the Civilian Conservation Corps in 1937. It is part of our national heritage. Please help us preserve it: do not carve your name or leave litter.

Serendipity

The dictionary defines serendipity as "the gift of finding valuable or agreeable things not sought for." As you hike the Caprock Coulee Nature Trail and as you drive along the Park road, we suggest you travel slowly enough to see and enjoy the UNEXPECTED things that are not described in this booklet nor on the roadside interpretive signs. You may see a deer browsing in the tall grass or a porcupine devouring some delicious bark high up in a cottonwood tree. In the distance you may see a coyote or two out in search of food. These are the UNEXPECTED things that help make your visit more enjoyable.

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