UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, *Secretary*

OFFICE OF NATIONAL PARKS, BUILDINGS, AND RESERVATIONS
Arno B. Cammerer, *Director*

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DESERT VIEW DRIVE

IN

GRAND CANYON NATIONAL PARK

The Grand Canyon, Nature's mighty motion picture in color, is one of the world's greatest spectacles. To the right is Desert View

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GUIDE LEAFLET No. 1

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SAVE THIS BOOKLET
READ IT AGAIN AFTER YOUR TRIP

DESERT VIEW DRIVE

The Start. El Tovar, Bright Angel Hotels:

Bright Angel Fault.
Granite Dikes.
Indian Gardens.
Trinity Creek—Dry Stream Bed.
Upper Canyon Strata.

First Stop. Yavapai Point:

An orientation station portraying the geological history of the region. See the most famous view of the Grand Canyon, and learn its geologic history. Telescopes and charts are available for public use.

Second Stop. Yaki Point:

Ancient seashells on the rim of Grand Canyon.
Cremation Fault.
Ancient Rock Island.

Third Stop. Grand View:

The Sinking Ship.
Grand View Copper Mine.
Ponderosa Pine Forest.

Fourth Stop. Moran Point:

Brilliantly colored formations deep in Canyon.
Ancient Indian Fort.

Fifth Stop. Wayside Museum of Archeology:

Archeological exhibits.
The Tusayan Ruin.

Sixth Stop. Lipan Point:

San Francisco Mountains.
Painted Desert Formations.

Seventh Stop. Desert View (Navajo Point):

Cedar Mountain.
Marble Canyon.
The Little Colorado Canyon.
The Tanner Trail.
Ancient Lava Flows.

DESERT VIEW DRIVE

This leaflet contains a brief description of each major feature seen from the various places visited on the Desert View Drive along the east rim. Read it carefully. It will give you a fuller understanding and appreciation of the wonderful Grand Canyon region, and greatly enhance your enjoyment of the trip.

START—ON THE RIM AT EL TOVAR

Bright Angel Fault. The steep hill about a quarter of a mile west of El Tovar Hotel was formed when a great break occurred in the rocks which now form the Canyon walls. The rocks on the west side of the break were lifted 180 feet above the corresponding ones to the east. This can be seen by observing the relative positions of similar strata on opposite sides. The break or fault extends across the Grand Canyon and is at least 20 miles long. When this occurred is not known. Suffice that it shows movement.

The valleys along the Bright Angel Fault owe their location to rupturing and consequent weakening of the rocks. Erosive action of water was more effective in this fractured zone than in the unbroken rocks on either side. Once the cutting started, drainage from neighboring areas poured into the channel and hastened the process.

Granite Dikes. The dark rocks at the bottom of the Canyon are noticeably different from those which form the horizontal layers in the Canyon walls above. Their irregular vertical structure is partly the result of shattering by great earth movements in a remote period of the past. These are among the oldest rocks known on the earth, and represent the base of ancient mountains which were worn down to an approximately even surface by stream erosion.

Light-colored streaks and bands in the dark rocks of the Inner Gorge are intrusions of granite. They formed when molten masses were forced up into cracks and cooled very slowly far beneath the surface of the earth.

Indian Gardens. In the valley below El Tovar is a green patch of trees and shrubs known as Indian Gardens, where a small spring flows from the base of the cliffs. The luxuriant vegetation made possible by

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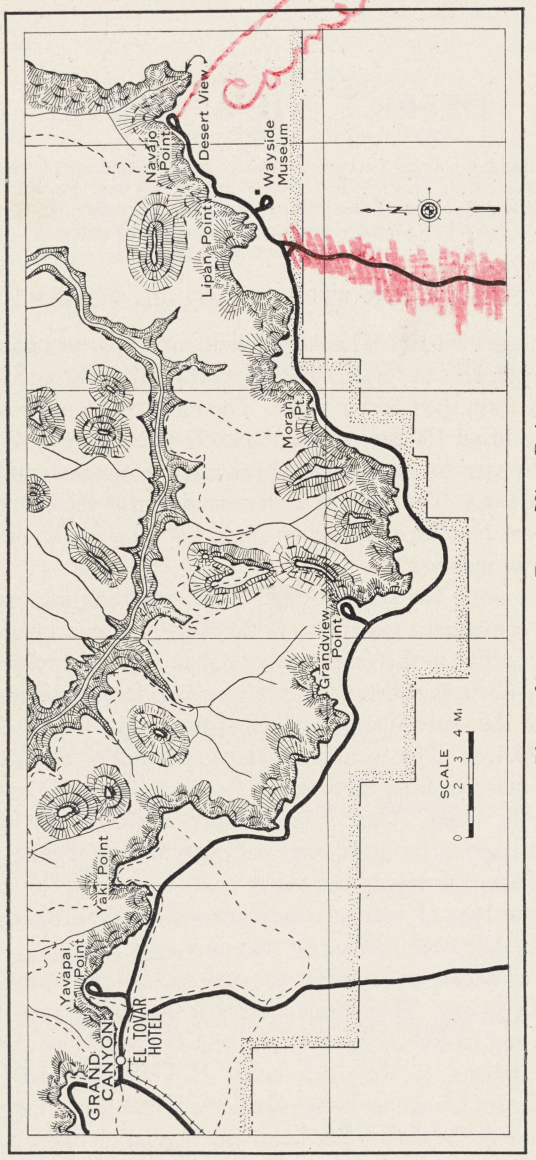
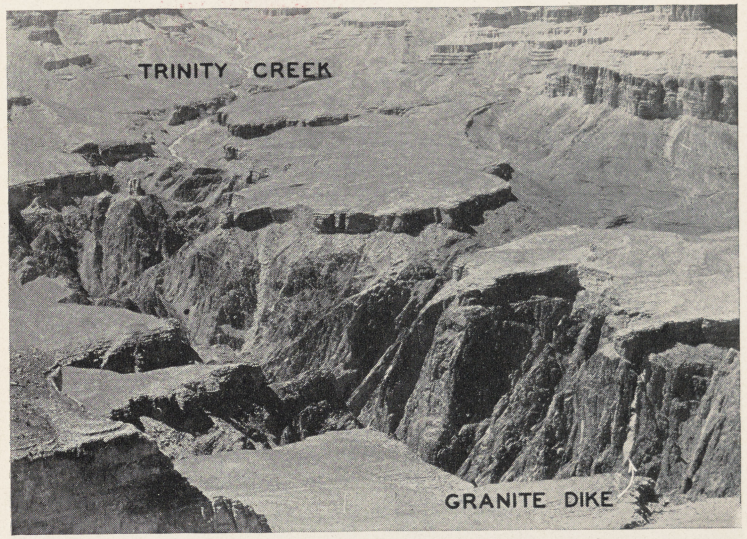


Places of interest on Desert View Drive.

the stream contrasts strongly with the surrounding arid area. As the name indicates, this spot was formerly used by the Indians as a home and garden plot.

Trinity Creek, a Dry Stream Bed. Across the Colorado River to the northwest of El Tovar is a stream bed known as Trinity Creek. Commonly it is completely dry. Its wide valley illustrates the cutting power of running water in this region of little vegetation. Desert



The wide valley of Trinity Creek illustrates the cutting power of running water in a region of sparse vegetation. The dark rocks at the bottom of the canyon are among the oldest known rocks on earth.

plants grow far apart, leaving the slopes partially bare, and the concentrated energy of a single torrential rain often does more destruction than a season's rainfall on densely covered slopes of a humid region.

Upper Canyon Strata. Each of the great layers of rock exposed in the upper canyon walls has a distinct and interesting history. They were all formed as vast accumulations of sediments—sand, mud, and lime. Several times this region was beneath the sea, and during these periods plant and animal remains gradually built up layers which formed limestones. At other times sands on beaches were heaped up

by winds into dunes which now appear as sandstone cliffs. At still other times mud was deposited here by ancient rivers. This is now hardened to make what are known as shale formations.

The history of the region has been one of continual change. In moving up and down, the surface has alternated between high altitudes, where the streams flowed swiftly producing great erosion, and low altitudes, where the slow streams deposited sediments to make new formations.

FIRST STOP—YAVAPAI POINT

Yavapai Observation Station. This station is maintained by the National Park Service to show a few of the canyon features generally

The Yavapai Observation Station is equipped with telescopes and field glasses.

recognized as of greatest interest. A ranger naturalist is always in attendance, and literature relative to the views may be obtained from him. Parapet views point out especially important features by means of fixed telescopes and field glasses. Specimens brought from the places to which your attention is directed show the actual nature of the materials. Exhibits of photographs and specimens in the room to the rear of the porch illustrate the localities seen in parapet views.

The 15 parapet views and exhibits show—

1. The forces involved in making the canyon and its walls.
2. The history of building the outer part of the earth's crust.
3. The record of life through the ages.
4. The forming of Grand Canyon as affecting life of today.

SECOND STOP—YAKI POINT

Ancient Sea Shells on Canyon Rim. Sea shells and corals are abundant in the limestone which forms the upper layer of the Grand Canyon walls and may be seen in the rocks at Yaki Point. As similar animals are found living only in the sea, it is evident that this layer was once an ocean bottom. The corals indicate that the sea was clear and warm.

Today Yaki Point is 7,250 feet above sea level, yet the rock of which it is formed was deposited on the floor of an ancient sea. This relationship is accounted for by uplift of the land. The earth's crust is almost constantly moving up or down, although so slowly that in our short lifetime we may not recognize the movement.

Cremation Fault. In Cremation Canyon, below Yaki Point, the cliffs on the west side are seen to be considerably higher than those of the east wall. Careful examination shows that the horizontal layers forming its walls are not continuous at this point and that this tributary canyon follows a line of breaking.

The line along which this movement has taken place is known as the Cremation Fault. Actual measurement shows a vertical slip or dislocation of 230 feet for a distance of over a mile to the northwest. This is one of many breaks or faults that, like the Bright Angel Fault, have determined the straight courses of side canyons in the Grand Canyon.

Ancient Rock Island. Deep in the canyon across from Yaki Point one may see an ancient hill of hard black rocks buried in a series of sandy brown layers. These are among the oldest rocks on the North American Continent. The dark rocks in the Inner Gorge have in most places a flat surface that was formed many millions of years ago by the wearing action of streams. The brown layers resting upon these are composed of sand and pebbles accumulated on this old surface at a time

when the region was a beach. Sediments brought down by rivers or washed in by the sea gradually built up this thick deposit.

While this process of burial of the older rocks was under way, small hills of the dark rock stood above the general level of the beach. They remained as islands in the midst of the accumulating deposits until the sediments finally buried them.

THIRD STOP—GRAND VIEW

The Sinking Ship. The "Sinking Ship" is a small butte just east of Grand View, in which the rock layers or strata are tilted at a steep angle. Careful examination shows that these rocks are in horizontal

The Sinking Ship is an interesting illustration of bending movement in the earth's crust after these rocks were formed.

position where they continue westward under Grand View; and that in the opposite direction, or eastward from this point, they also become horizontal but are lying at much lower level. This is an interesting illustration of bending movement in the earth's crust after these rocks were formed.

Grand View Copper Mine. The old trail from Grand View leads to an interesting deposit of brilliant green and blue carbonates of copper

in the Redwall limestone below. The evidence of early mining operations can still be seen in ore dumps and tunnels. Difficulties experienced in carrying the ore out of the canyon were too great to justify development of the deposit.

Ponderosa Pine. The tall ponderosa pines along the approach and near Grand View Point add much to the charm of that place. These large trees are particularly noticeable because areas all about them are either covered by the small piñon pines and junipers, or remain as open sagebrush country. The presence of ponderosa pines near Grand View appears due to the fact that this is the highest point on the South Rim. Traveling eastward from El Tovar Hotel to Grand View one ascends 600 feet. Altitudinal change in temperature is probably one of the causes of difference in forest cover.

The tall pines, the presence of which is unusual in this region, add interest and charm.

FOURTH STOP—MORAN POINT

Brilliantly Colored Formations Deep in Canyon. Forming the bed of the Colorado River and the wide slopes on either side below Moran Point is a series of brilliant red rocks which lie in a tilted position. They were deposited as horizontal beds of mud and sand some hundreds of millions of years ago.

The present steep slope of these strata is the result of great movement in the earth's surface which took place before the many overlying layers of rocks were formed. Evidence of this movement is given by contrast with the horizontal layers above, which have been lifted without bending.

Ancient Indian Fort. Masonry found on the small butte just beyond Moran Point is believed to represent an ancient fort. This structure was built by early Pueblo Indians. Several hundred of these dwelling sites, dating from a period a few centuries before the coming of Columbus, have been discovered along the rim and in the canyon. Many arrowheads, fragments of pottery, and other evidences of an advanced state of culture have been found near the ruins.

FIFTH STOP—WAYSIDE MUSEUM

Wayside Museum of Archeology. Exhibits deal with the development of early man, and also with the stages of human history represented by house types and pottery in the American Southwest. Other exhibits demonstrate various types of pueblo artifacts and ornaments including materials found in the Grand Canyon and along its rims. Finally, the museum serves as a key to the partially excavated Tusayan ruin near by.

It is advisable to examine the exhibits in the order indicated since then a connected story of human history and development will be obtained. The ranger naturalist in charge is glad to assist in the explanation of features in the museum and also in the ruins outside.

The Tusayan Ruin. This ruin, typical of many pueblo sites in the Grand Canyon region, was partially excavated in 1930. It represents a type of communal dwelling of two stories, built by pueblo people about 1200 A.D. On the ground plan, it forms three sides of a square

with a plaza in the center. It contains four living rooms, two kivas or ceremonial chambers, and numerous storage rooms. The west side has purposely been left unexcavated in order that visitors may know how the dwelling appeared when discovered. Numerous artifacts of various types have been found in the rooms of this ancient ruin, and they may now be seen in the Wayside Museum.

SIXTH STOP—LIPAN POINT

San Francisco Mountains. Fifty miles to the southeast the San Francisco Mountains rise more than 5,000 feet above the level plateau and 12,611 feet above sea level. The dark conical peaks are in strong contrast to the flat, colorful features so characteristic of the Canyon region.

The San Francisco Mountains are ancient volcanoes about the bases of which lava flows extend for many miles. The Grand Canyon itself is remarkably free from volcanic material, yet here, close by, is one of the largest volcanic areas in the United States.

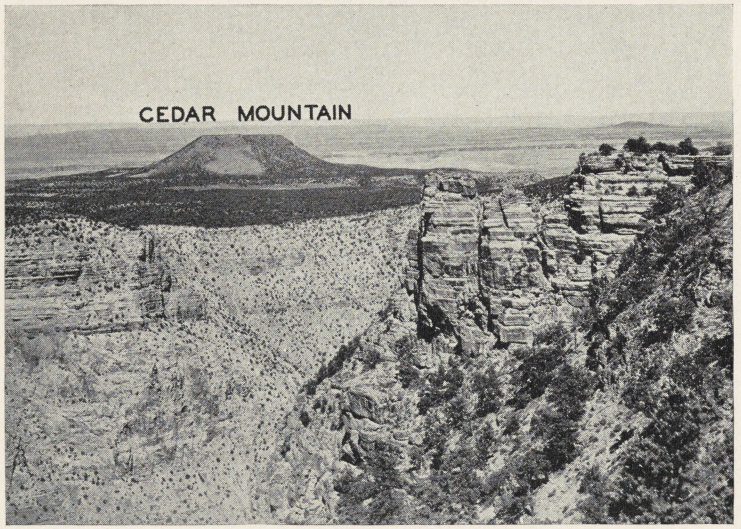
The Painted Desert with its fantastic rocks is a splendid picture of color. The rocks were formed during the age of dinosaurs.

Though extremely old beside the works of man, these molten masses are relatively recent compared with the ancient plateau through which they have come.

Painted Desert Formations. The Painted Desert, with its highly colored, fantastic rocks, extends far to the east. It is a splendid picture of color, and also the record of an interesting chapter in earth history. The rocks of the Painted Desert were formed during the age of dinosaurs. They are accumulations of pebbles, sand, mud, and lime. Logs of petrified wood, tracks of dinosaurs, and beautifully preserved fishes have been found in them. The fossil remains give some conception of the kinds of life and the climate in existence when these ancient rocks were being formed, a contrast with the life and climate of the present. The rocks of the Painted Desert lie on the surface of the youngest formations represented in Grand Canyon and belong to later geological ages.

SEVENTH STOP—DESERT VIEW (NAVAJO POINT)

Cedar Mountain. To the east of Desert View Point is a small flat-topped mesa, known as Cedar Mountain. This mesa is of especial

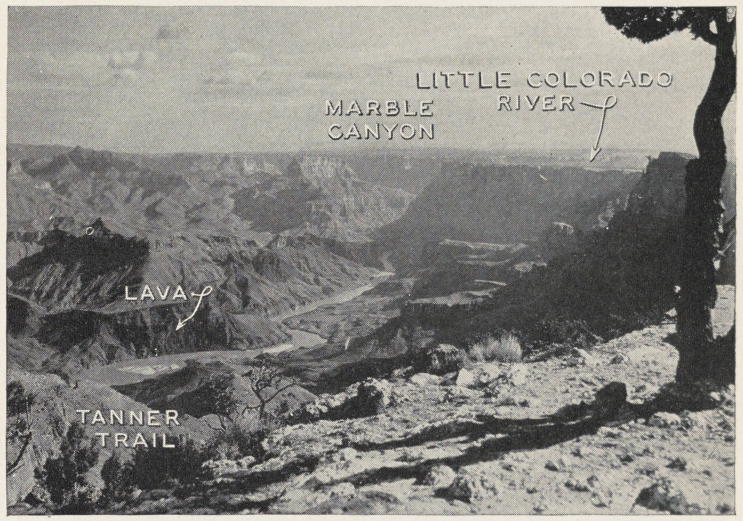


The rocks of Cedar Mountain contain petrified wood and other fossils similar to those found at Petrified Forest National Monument.

interest in geological history, since the red sandstones and pebble rocks of which it is formed represent a remnant of wide-spread layers that once covered this entire region. Other remnants of these formations are found near Zion Canyon to the north, in the Painted Desert farther east, and on the plateau to the south.

The rocks of Cedar Mountain contain petrified wood and other fossils similar to those from the Petrified Forest at Adamana.

Marble Canyon. Due north of Desert View is the lower end of Marble Gorge. Here the Colorado River leaves the narrow, sheer-walled channel above to enter the much broader Grand Canyon.



Marble Canyon is the narrow gorge through which the Colorado River flows north of Grand Canyon.

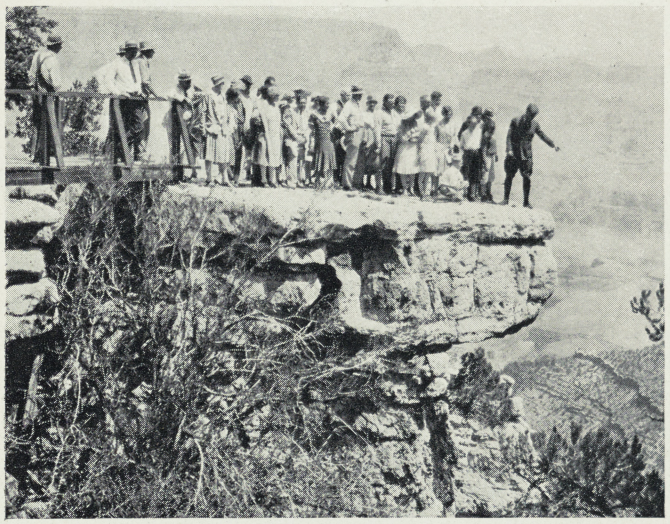
The contrast in form and appearance of these two canyons is marked, and the change from one to the other is abrupt. In Marble Canyon the formations have been less shattered by earth movement than those of the main canyon. Here the river has less gradient, flows over the upper more resistant beds, and consequently has cut a narrow gorge in contrast to the Grand Canyon which is eight or more miles in width. Widening of the Grand Canyon is due to the weakened condition of the beds because of fracturing and undermining of the lower softer beds.

Little Colorado Canyon. The Little Colorado flows west across the Painted Desert and joins the Colorado River immediately north of Desert View. Although this stream has succeeded in cutting deeply into the rocks through which it passes and has entrenched itself between high cliffs, its bed is dry sand and gravel during a considerable part of the year. During the rainy seasons of spring and late summer it is a raging torrent, with waters colored a brilliant red by mud derived from formations through which it passes.

The Tanner Trail. Starting into the Canyon east of Desert View Point and passing over the promontory in front of it, is the old Tanner Trail leading to the river. During the past century this trail was used extensively by prospectors and adventurers in exploring the region. It followed a natural passageway into the Canyon made by a break or vertical slipping of the strata and by the presence of soft shales which form slopes near the Canyon bottom. Copper mining has been carried on at the lower end of the trail, but most of the pioneers who descended here crossed the river in its open stretches to search the dry desolate country beyond.

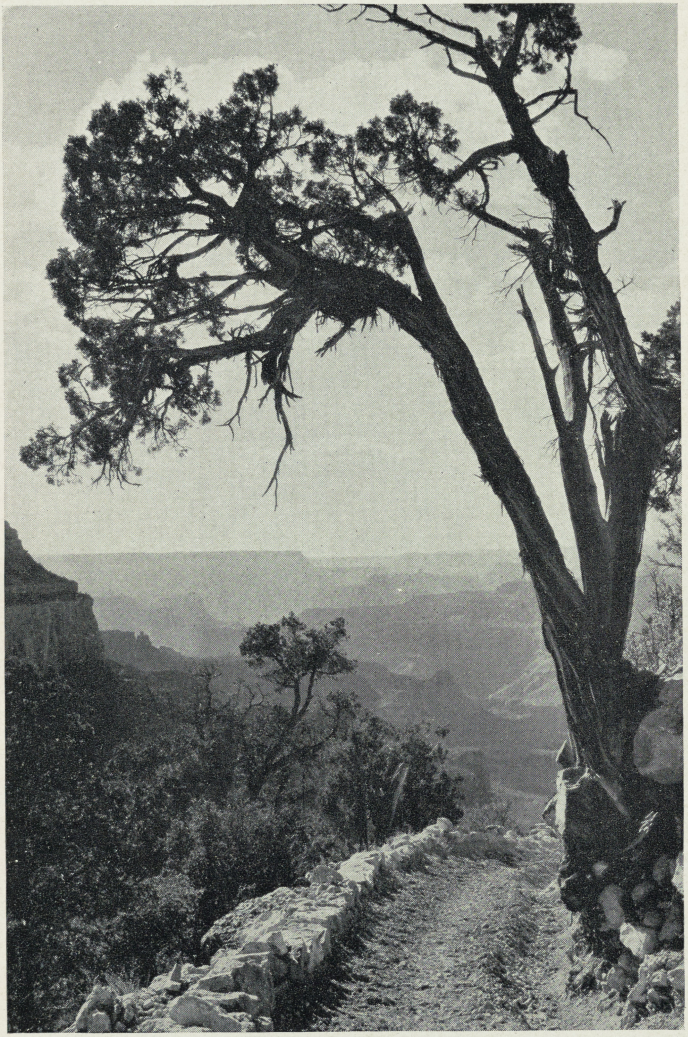
Ancient Lava Flows. Dark cliffs bordering the Colorado River below Desert View are composed of lavas which flowed out on the surface of this region long before the cutting of Grand Canyon began. Though essentially of the same composition as the much more recent volcanic rocks found on the plateau surface to the south, these lavas were formed in the second of the great divisions of time represented by the rocks of this region.

The muds and sands on which the molten material was poured probably formed an ancient shore line. No definite traces of animal life and only very primitive forms of plants have as yet been found in the rocks of that age. It is significant that, even in this remote period, the great processes of nature, including volcanic activity, were much the same as today.



A park naturalist explains how the great gorge was cut.

Footprints preserved in the rocks of the canyon walls. These tracks were made by amphibians and reptiles that lived in the region many thousands of years ago.



The Kaibab Trail below Yaki Point.

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