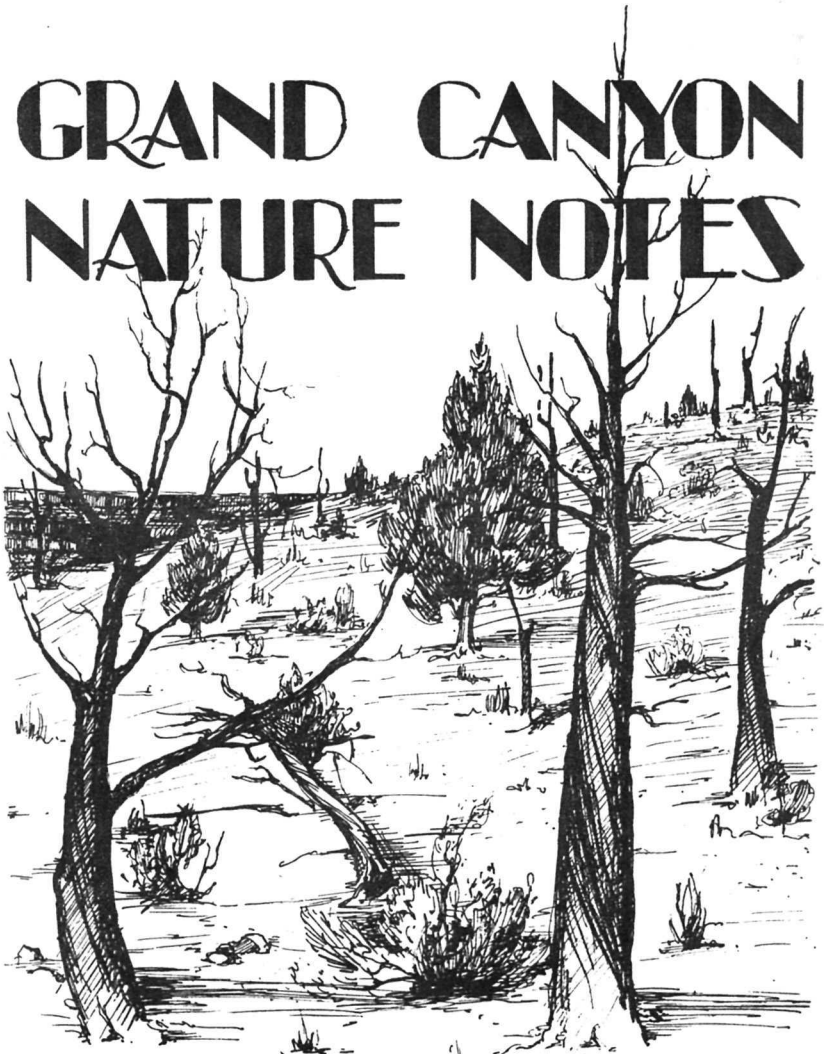
GRAND CANYON NATURE NOTES



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GRAND CANYON NATURE NOTES

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M. R. Tillotson,
Superintendent.

Edwin D. McKee,
Park Naturalist

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Illustrations by Florence Satterwhite.

NOTES ON PINYON-JUNIPER REFORESTATION

By A. R. Croft, Ranger Naturalist.

SOME very interesting aspects of natural reforestation after burns in pinyon-juniper forests may be observed in the Grand Canyon National Park, near Grand Canyon village.

Upon visiting burns in great lumber producing forests one is impressed, first, with the direct losses such as the destruction of potential lumber, property damage, and loss of life, and second, the indirect losses, not measurable in monetary terms, such as damage to soil, watershed, grazing, game cover, and recreation.

It is of course true that both of these classes of loss by fire appear to some extent in forests of the pinyon-juniper type such as occur at Grand Canyon, but on these burned areas the author has been impressed most by the apparent great length of time required to re-establish a normal forest. This length of time has been approximated by a study of the plant cover on two burns of known age, and by age determinations of the normal forest of the region.

The youngest burn in the South Rim region, a crown fire, occurred in 1929. Its location,which may be called Area One, was a short distance south of Yaki Point, just off the main highway. In an article in the October number of "Grand Canyon Nature Notes" the author pointed out that the plants in this area could be placed in two groups. The first consisted of those which had grown in a suppressed condition on the forest floor, the roots of which had not been killed by fire. Group two consisted of plants which had migrated to the site since the burn. As might be expected, not a single seedling of the trees constituting the former climax forest could be found, even though adjacent trees had apparently matured seed every year since the burn.

Let us now consider another burn of known age, one about thirty years old, located between Grand Canyon village and Yaki Point, which is designated as Area Two. Thirty years after the climax forest was destroyed the principal plants on the site are as follows:

Cliff Rose
Cowania stansburiana

Black Sagebrush
Artemisia tridentata

Fern Bush
Chamaebatiaria millefolium

Gambell's Oak
Quercus gambellii

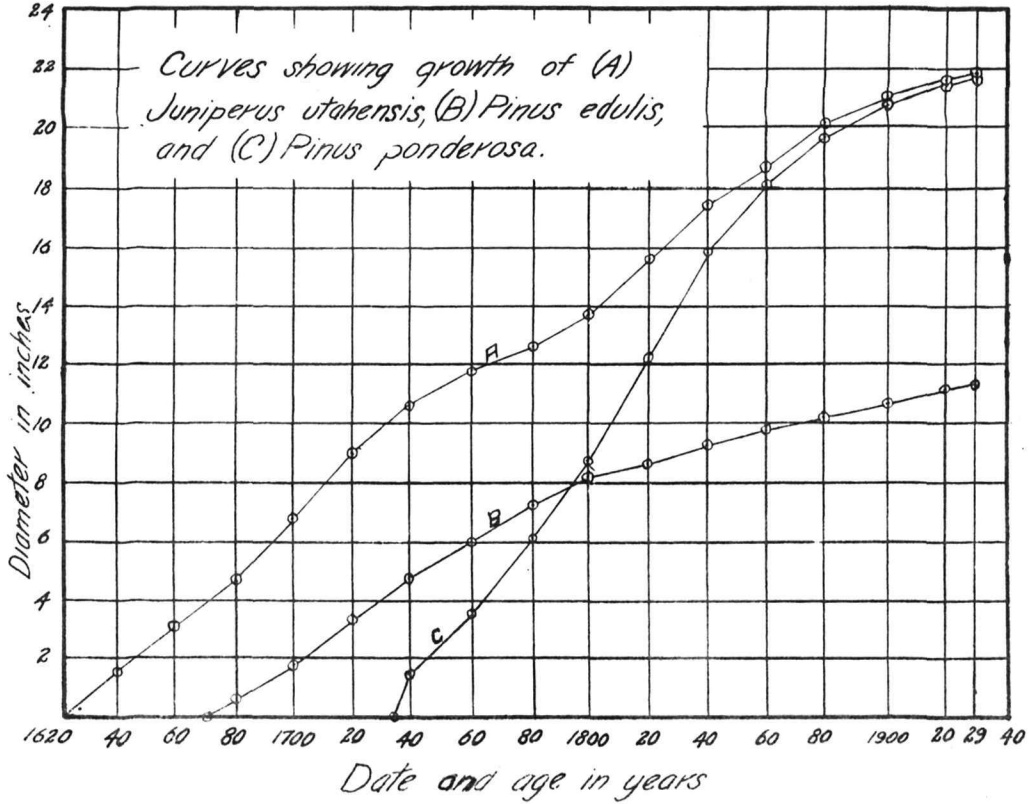
Snakeweed
Gutierrezia microcephala

Rabbitbrush
Chrysothamnus stenophyllus

There are also a few scattered pinyons and junipers on this area which may be classified as follows: (1) Mature trees which escaped death at the time of the fire, (2) A few young trees, which as seedlings at the time of the fire, escaped its ravages, and (3) A very few young seedlings which have become established since the burn. This last group is practically negligible.

In the absence of older burns of known age in the vicinity, by which this interesting evolution of the pinyon-juniper forest could be traced, it was necessary to jump a great intervening gap, between Area Two stand and maturity, and determine the age of an average normal stand. Such a determination gave the appfoximate lapsed time between the beginning of a reproduction on Area Two and the mature forest. For this purpose advantage was taken of a condition on Area One. A salvage cutting for fuel was being made so it was comparatively simple to determine the age of a normal mature forest by counting the rings on the newly sawed stumps.

The results of the counts are shown in the accompanying figure. It must be remembered, however, that these curves show only the history of the individual trees, not the history of the forest. The trees represented in the curves constitute only one of many groups which have occupied this same site.


Curves showing growth of (A) Juniperus utahensis, (B) Pinus edulis, and (C) Pinus ponderosa.
Diameter in inches
Date and age in years
A
B
C
24
22
20
18
16
14
12
10
8
6
4
2
1620
40
60
80
1700
20
40
60
80
1800
20
40
60
80
1900
20
29
40

Reference to the curves shows that the junipers considered, started growth in 1620, about the time the Pilgrims landed at Plymouth. In 1929, when they were killed by fire, they had been alive about three hundred years and were still growing well. Three pinyon trees, which grew nearby, commenced growth about fifty years later and were approximately two hundred and sixty years old at death. The yellow pines commenced growth about one hundred years after the junipers and were their neighbors in the forest for approximately two hundred years.

If we may apply these calculations in a rough way to growth on burns in this region after reproduction starts, where conditions are about the same, it is possible to arrive at the approximate time necessary for nature to reforest a burned area on harsh sites such as exist on the South Rim of the Grand Canyon.

Recapitulating, we find one area with no reproduction three years after burning, another area with reproduction practically negligible thirty years after burning. Here we may safely assume that fifty to seventy-five years may be necessary to secure a fairly well stocked area. Studying a mature forest, we find its age to be about three hundred years.

If we review the limited data at hand, it is safe to assume that about three hundred and fifty years may be required for nature to repair the damage done by fire in a few hours in a climax forest of the pinyon-juniper type, such as occurs on the South Rim of Grand Canyon. In view of this apparent fact, and in view of the fact that over eighty percent of the forest fires in the United States are man caused should we not re-dedicate ourselves to the task of spreading the gospel with renewed vigor, which is so well stated by the common motto:

"BE CAREFUL WITH FIRE"

HOW PIPE CREEK RECIEVED ITS NAME*

Ranger Naturalist Hugh H. Waesche.

IT seems strange that the name "Pipe" should be given to any body of water, yet examples of this are found in Arizona. They are Pipe Spring and Pipe Creek. Pipe Spring, now a National Monument, is famous for its connection with early Mormon history. It is located in northwestern Arizona near the Utah line. Pipe Creek is a tributary of the Colorado River in the Grand Canyon and is seen daily, yet seldom given any particular attention, by park visitors. Indeed, there is nothing unusual about this small canyon-bound stream. It is the origin of its name which adds the touch of human interest.

Many of the names given to features of the Grand Canyon and surrounding country are legacies left by some early explorer, trapper, or prospector. These men either named the objects concerned directly, or the name became attached through some anecdote. Pipe Creek is no exception.

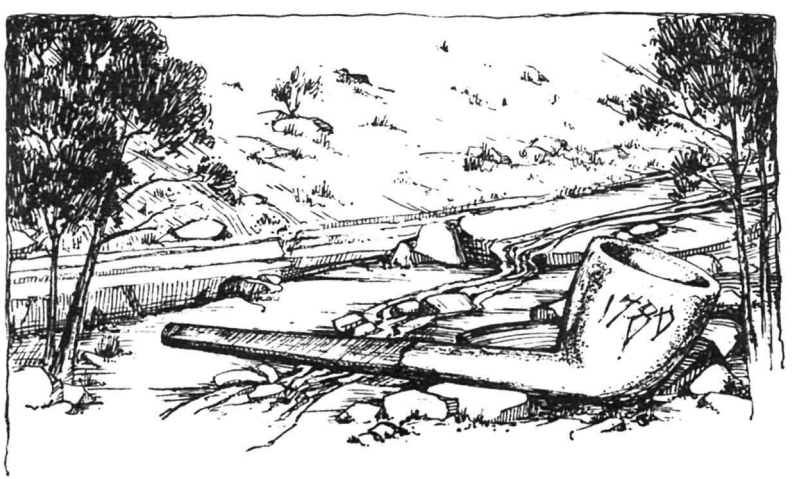
Some of the early pioneers in Grand Canyon country were certain that such a wonderful natural phenomenon as the Canyon must contain vast riches in valuable ores, so much prospecting for gold, copper, lead and zinc was a natural result. The large number of prospect holes to be found at several localities along the Canyon walls is mute evidence of their activities. These men often traveled along the Tonto Platform which was the only practical way to follow the course of the Colorado without resorting to the plateaus along the rims. Good showings of copper were discovered in the Red Wall limestone near Grandview. Considerable prospecting was done at a locality near what is now known as the "Corkscrew" on Bright Angel Trail.

One day in 1894, four of these hardy prospectors came along the Tonto Trail from Grandview, headed for the "Corkscrew" locality. The names of all these men have since become very familiar in the vicinity of Grand Canyon. They were R. H. Cameron, his brother Niles, James McClure and Pete

Berry. R. H. Cameron, for some reason, went on ahead of the other members of the party. When he reached the point where the stream now known as "Pipe Creek" is located, he discovered an old Meerschaum pipe lying on the ground. He picked up the pipe and scratched on it a date of about one hundred years previous, then placed it on a willow twig in such a way that the members of the party following could not miss it as they came by. His little joke worked perfectly since the three others discovered the pipe when they came along. One can well imagine the speculation as to how the pipe got there and what the fate of the original owner might have been. It seemed evident that there had been some traveler along that very route many years before. Cameron enjoyed the joke by himself for a while, but it was too good to keep so the story finally leaked out. It was this little incident which was responsible for the name, Pipe Creek, which the stream continues to bear.

Pipe Creek flows into the Colorado from the south side of the Grand Canyon, nearly opposite Bright Angel Creek. It may be seen from the Yavapai Observation Station as the canyon directly below and to the right - the next tributary canyon east of the one containing Garden Creek.

*Information obtained from Mr. Emery Kolb, Grand Canyon.



JUNCO VISITS BOTH RIMS

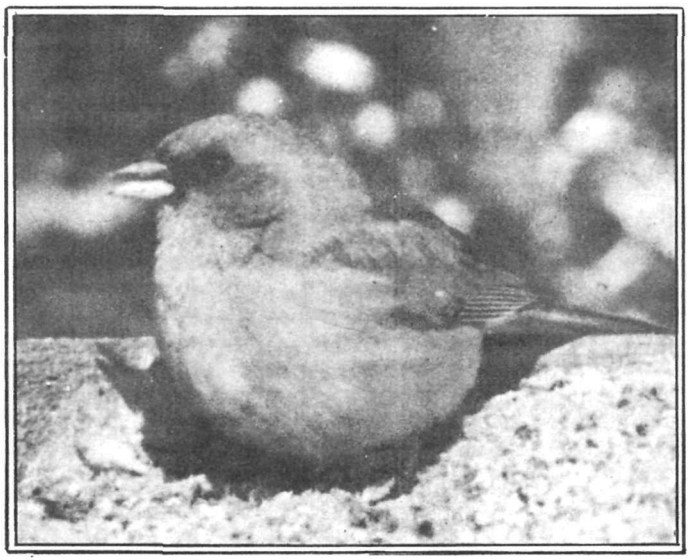


Photo by E.D. McKee

ON December 16, 1932, a Red Backed Junco was officially given the number of H-72850 at the Grand Canyon Bird Banding Station C, which is located at the McHenry residence on the South Rim. Four months later, April 20, 1933, Junco H-72850 appeared on the opposite rim of Grand Canyon, where it obligingly went into a trap operated by Ranger Hamilton at Sub-station E, on Bright Angel Point. This is important as the first definite cross-canyon bird record, and is suggestive of the many interesting data which may be expected as a result of continued banding in the Park.

E. D. McKee.

LANDSLIDES AND THEIR PART IN WIDENING THE GRAND CANYON

By Edwin D. McKee, Park Naturalist.

THE Grand Canyon of Arizona has an average width of approximately ten miles within the Grand Canyon National Park, according to measurements obtained by scaling off the distance on a topographic map. The maximum width from rim to rim is found near the Canyon's eastern end where a distance of about eighteen miles exists.

To explain this great width the geologist unhesitatingly refers us to erosion -- a term which covers that multitude of agencies which everywhere throughout the world are at work destroying the mountains and elevated regions. He tells us that the walls of Grand Canyon simply represent the valley of the Colorado River and he may even go so far as to insist that this canyon is not wide but narrow -- that is, when compared with the valleys of most of our other large rivers.

Nearly all of the normal agencies of erosion are involved in the process of widening Grand Canyon. Among these should be mentioned rain, snow, wind, temperature changes, frost, plant action and gravity. Although this knowledge is common to all students of the Canyon, apparently very few of them have given any serious consideration to the relative importance or to the percentage of the entire undertaking which is done by each of these agencies.

That wind action plays a comparatively small part in eroding the Grand Canyon has been shown in an earlier article of "Nature Notes"[1]. This is indicated both by the lack of physiographic evidence and by data on existing meteorological conditions.

The writer is likewise inclined to believe that plant action produces only a negligible amount of Grand Canyon

1. "Wind Erosion in the Grand Canyon" Edwin D. McKee. Grand Canyon Nature Notes, Vol. 3 No. 9, 1929.

erosion despite the fact that some excellent examples of trees acting as wedges and levers, and of small plants forcing apart and decaying rocks are to be found along the rims and to a less extent down in the Canyon. The general semi-aridity of the region naturally limits the amount of the vegetation so decay effected by it is reduced proportionately. On the other hand, the amount of wind is not excessive so even where trees are numerous their prying action is probably not above normal.

It is the comparative lack of a real vegetative covering however, which, in the opinion of the writer, has made running water by far the most important agent of erosion - this, and the nature of the precipitation. It has been aptly said that "the concentrated energy of a single torrential rain (within the Grand Canyon) often does more destruction than a season's rainfall on the densely covered slopes of a humid region". Not only the frequent cloud bursts of the summer rainy season, but also the rapid melting of the heavy winter snows on the Canyon rims produce great destruction to the walls below.

An important corollary of running water as an erosive agent is seen in the work of gravity as exemplified by landslides. Although undoubtedly assisted and affected by numerous other forces, the start of most recent slides within the Grand Canyon can be traced either to the direct or to the indirect action of water. To be sure, the usual results of water work are found at the base of every major cliff in the form of talus slopes, but examples of definite slides from this cause are also numerous.

Landslides have been classified by Ries[2] under four types. Briefly stated these are (1) creeping slides of unconsolidated materials, (2) swiftly moving slides of unconsolidated materials, (3) rock slips and (4) rock falls. The effects of the first two types are to be seen seldom if at all in the Grand Canyon because of the general absence of unconsolidated materials other than talus. The third type is likewise of little significance here, both because of the semi-arid climate and because of the general horizontal attitude of the

2. Ries, H., and Watson, T. L., Elements of Engineering Geology, page 247.

strata. Splendid examples of the fourth type, however, are to be found on every hand.

Mr. Emory Kolb who has lived on the rim of Grand Canyon for many years states[3] that within the past twenty years no less than seven major rock falls have occurred immediately in front and within sight of his house. Numerous others he has heard roar and rumble during otherwise quiet nights. Above Indian Gardens great piles of debris and rocks -- some as large as houses -- testify to the size of two landslides which occurred during the period of 1910-11. The smallest of these, to the east of the Gardens, occurred during dry weather and involved the entire face of the Redwall cliff. It was both heard and seen by Mr. Kolb. The larger slide started up in the middle Supai sandstone cliff during a storm and came down through the Bright Angel fault area in the Redwall, completely wiping out the trail at Jacob's Ladder.

During a violent storm in December, 1919 a great promontory projecting out into the Canyon just west of Kolb's studio slid forward and then dropped as a mass. The material finally came to rest far down in the Supai formation. Judging from the descriptions of the preliminary outward slipping in this case, it seems likely that the wetting of the red shales and muds which occur at the base of the major cliff involved (Kaibab limestone) was the cause. If this is true, the landslide should properly be termed a "rock slip" rather than a "rock fall".

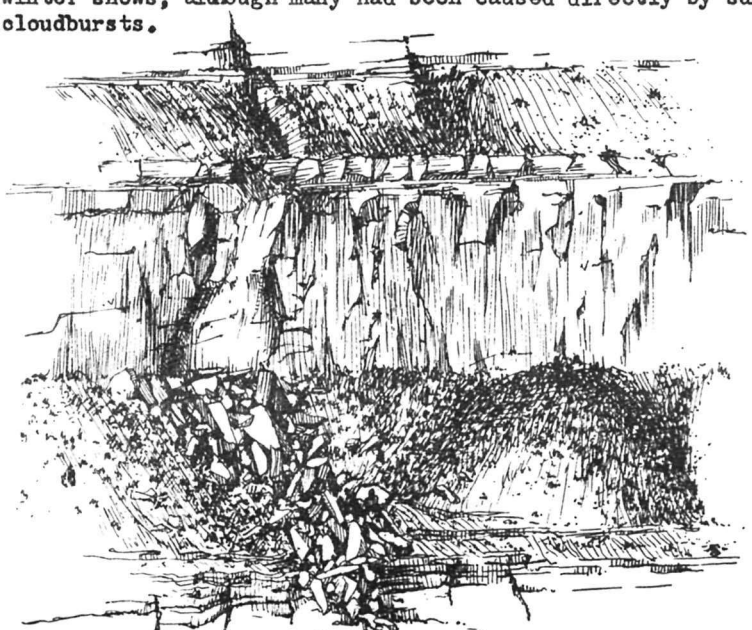
The courses of three large slides which occurred about ten years ago may be seen in the Supai formation below Grandeur point. At the south end of the Battleship is the debris of a large one which took place at night during the summer of 1931. Again, Ranger Lauzon states that while working on the Bright Angel trail during the winter of 1921 he witnessed slides of various sizes, nearly every day during the thaw of a warm spell in midwinter.

Probably the largest and most spectacular rock fall of recent years to occur in this particular area was one which took place below the North Rim at a locality opposite and

3. Kolb, Emery. Personal communication, 1933.

plainly visible from Grand Canyon Village. Although about nine miles away airline, people on the South Rim could hear the great roar, and see the dust as it rose high in the air. This occurred on a wet summer day and was a remarkable sight.

Innumerable other cases of recent landslides in the Grand Canyon might be mentioned, but enough instances have been cited to show the importance of gravity in Canyon widening. So far as can be determined, these falling rocks are usually sections of great cliffs from beneath which soft shales have been undermined. In the nearly horizontal strata of the Canyon walls, vertical joints seem to have much influence on slides. In about twenty records examined, it was also found that most of the movements occurred during thaws following winter snows, although many had been caused directly by summer cloudbursts.



ERRATUM: In Vol. 8, No. 1, page 130 of Grand Canyon Nature Notes, line four under Havasupai basketry should read "and blanket weaving" instead of "and basket weaving".