

# Nature Notes of Grand Canyon



Vol. 4  
No. 4

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Dec. 31-1929

U. S. DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE  
GRAND CANYON NATIONAL PARK

Vol. 4  
GRAND CANYON NATURE NOTES

No. 4  
December 31, 1929

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This Bulletin is issued monthly for the purpose of giving information to those interested in the natural history and scientific features of the Grand Canyon National Park. Additional copies of these Bulletins may be obtained free of charge by those who can make use of them, by addressing the Superintendent, Grand Canyon National Park, Grand Canyon Arizona.

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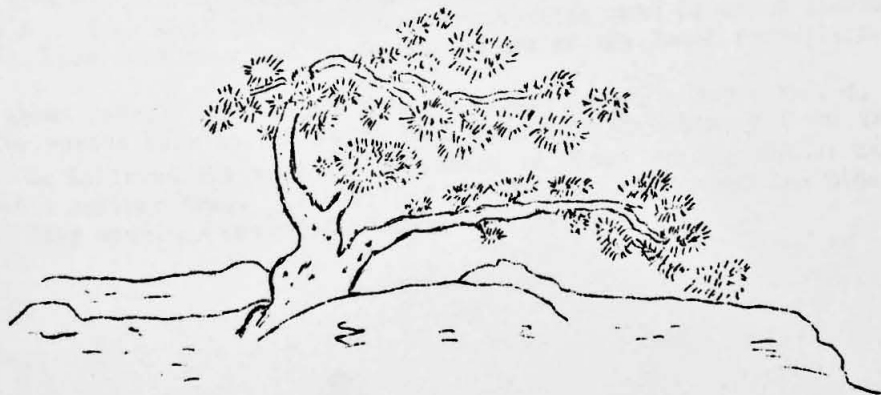
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M. R. Tillotson, Superintendent - Edwin D. McKee, Park Naturalist

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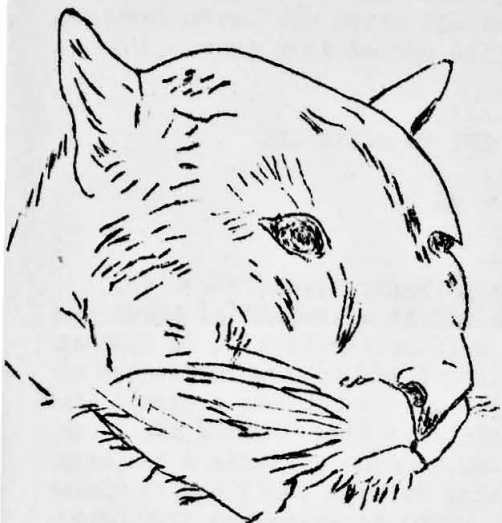
Table of Contents

The Cougar of the South Rim	Ranger H.R. Lauzon
The Flora of the Hermit Shale in Grand Canyon	Dr. David White, US Geological Survey
Unconventional Pines	Ranger-naturalist S.B. Jones
Rug-weaving, Navajo Style	Ranger-naturalist E.W. Count
Grand Canyon Lichens	Park Naturalist



## COUGARS ON THE SOUTH RIM OF GRAND CANYON

By - Ranger H.R. Leuzon



Cougar.

The Cougar was formerly a very widely distributed mammal - ranging over practically all of North America as far north as the present Canadian boundary. In various localities throughout the country representatives of the genus are known as the Puma, Mountain Lion, Panther, or Painter. Today it is extinct in a large part of its original range.

The Mountain Lion or Cougar of the North Rim of Grand Canyon and of the Kaibab Forest (*Felis oregonensis hippolestes*) has long attracted national interest not only because of its former great abundance and consequent depredations on grazing and other animals, but also because it is the largest North American species of cat. It is not generally known, however, that cougars inhabit the South Rim country, yet there have been several killed in that section within

recent years.

Something over ten years ago Mr. J.E. Shirley was on his way to the forest to hunt deer. While travelling along a stock trail, a short distance from Grand Canyon village, a Cougar started to cross the trail in front of him. Mr. Shirley "pulled-down" on the big cat and now has its hide in his office. This Cougar measured 9 feet 11 inches from tip to tip.

At a more recent date, Jack Tocker killed two Cougars near the head of Long Jim Canyon. These were tracked and treed by well-trained dogs.

In early February 1928, Cougar tracks were seen in the snow at a point near Rowe Well which is about three miles west of Grand Canyon village. These were reported by Sherman Moore of the local Postoffice.

About February 20 of the same year Alva Jones, a Supai Indian, was hunting horses near Apache Point when he picked up a Cougar track in the snow. He followed the track on horseback to where the big animal had climbed a Juniper tree. Alva killed the Cougar and brought the hide into town. This specimen measured about 9 feet in length.

From the fact that there were no more Cougar tracks seen in this locality last winter, it is believed that this animal ranged from Rowe Well to the Apache Point country. Undoubtedly, however, there are others scattered about the South Rim country of Grand Canyon and these play a not unimportant part in the wild life story of the region.

## THE FLORA OF THE HERMIT SHALE IN GRAND CANYON

By - Dr. David White

The upper part, including nearly 300 feet, of the great series of red beds found in the walls of the Grand Canyon, is known as the Hermit shale. The base of this formation lies on the sandstone forming the "Esplanade," the topmost member of the Supai formation, also red, and the lowest of its beds occupy a shallow stream erosion network cut in the top of the "Esplanade." The Hermit shale consists of scattered thin sandstones and sandy shale, of a slightly warm brick red. The sediments are fresh-water laid, mainly rather fine, more or less distinctly angular sand grains, thinly coated with red oxide of iron. The shales are stream ripple-bedded and wavy. Occasional thin beds of sand evidently were rapidly deposited. Erect plants rose through and above them. Argillaceous or mud layers are largely confined to very thin slimy silt deposits that settled to form films or thin coverings on the sandy bottoms and sloping shores of quiescent pools after the run off of water.

The lower part, at least, of the formation was laid down by streams, first gradually filling the old drainage system and later building up a flood-plain over the "Esplanade" sandstone. The streams were more or less intermittent, with dry intervals in which the water in some of the shallow channels was largely or wholly evaporated. Steepness of the banks of the old waterways suggests arroyo systems cutting a great flood-plain of red sand.

Fragments of plants are found, generally rare, in the sandstones in the stream-rippled sandy shale, and in the slime layers, which sometimes also show in great distinctness footprints made by several kinds of primitive reptiles and amphibians while the slimy surfaces freshly exposed by the withdrawal of the water were still moist.

Lack of carbonaceous deposits or residues gives further evidence of intermittency of water and to conditions favorable for oxidation. The films are highly ferruginous.

The Hermit plants embrace a number of European conifers and fernlike seed-bearing plants (pteridosperms) found in Europe or closely related to European species, but about half of the flora has not been known before. A number of the forms are Uralo-Asiatic in character. The plant association is remarkable for the apparent absence of all Calamarian types and of the cosmopolitan genera Neuropteris, Alethopteris and Pecopteris, due to unfavorable environmental conditions such, especially, as long, dry seasons

and restriction of rainfall, which are indicated also by the characters of the plants themselves as well as by the redness of the sediments. The climate may not have been much more humid than that now prevailing in northern New Mexico.

The American Paleozoic flora nearest related to the Hermit flora is that of the Wellington formation in Kansas, and the flora is probably nearly of Wellington age - i.e., Lower Permian, but not earliest Permian. It proves the Coconino sandstone which overlies the Hermit shale also to be Permian. Further, in view of the probably very short erosional break between the Hermit and the upper Supai, it becomes probable that the greater part of the latter also may be of Permian age.

### UNCONVENTIONAL PINES

By - Ranger-naturalist S.B. Jones

There are three points along the Rim trail on the north side of Grand Canyon between the Lodge and the camp ground. These are Inspiration Point, Respiration Point and Perspiration Point. The latter is the writer's designation for the rustic bench at the end of the climb out of the first gully, on the way to the camp from the Lodge. Resting there, under the pines, the writer was explaining to a nature guide party that yellow pine needles always occur in threes. Just then a lady picked up a bundle of four needles. Searching about we found bundles of two as well as four, all indubitable yellow pine needles. In both aberrant cases the bundle was perfect, that is, formed a complete circle.



*Two needles in bundle.*



*Normal bundle  
of three needles.*



*Four needles in bundle.*

Subsequently the writer has found such irregularities on other yellow pines. Variation is to be expected in the organic world, but the writer is puzzled to know just why pines have split needles anyway. It has occurred to him that the white pines, which of all pines, grow in the coolest and moistest climates, have the most highly divided needles (five in a bundle), while the pinon (two needles) and the one-needle pines grow in the hottest and driest places. It is possible that the five-fold division of the needle is simply a device to increase transpiration surface, or, conversely, that the once-cleft needle of the pinon and the solid needle of the "single-leaf" are devices to decrease transpiration?



## RUG-WEAVING, N. NAJJO STYLE

By - Ranger-naturalist E.W. Count

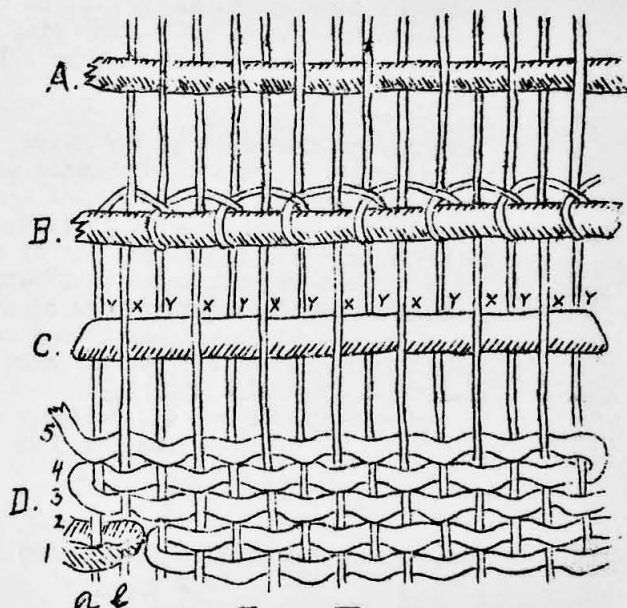
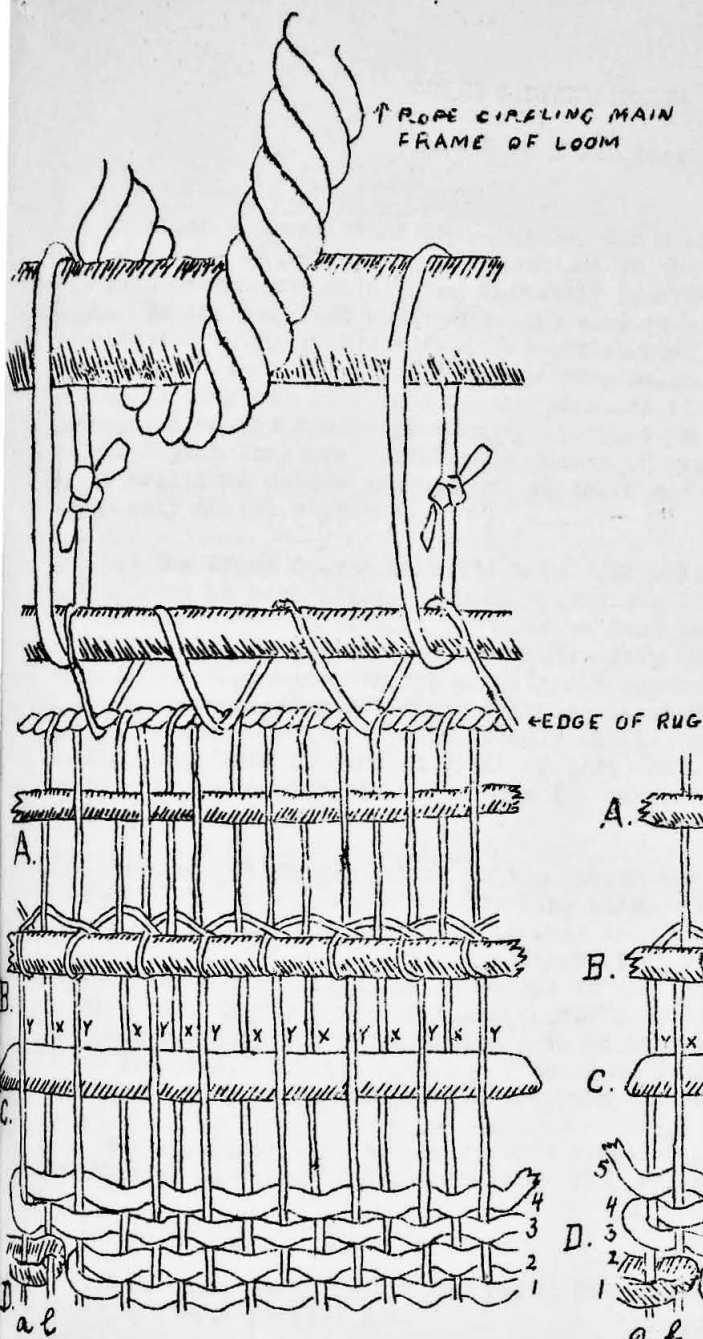
Day after day the Navajo squaw sits with a stick thrust through a wooden disk, and beside her masses of coarse wool, red, brown, black, or white. The red is dyed; the other colors are natural. Gradually, by resting one end of her apologetic spindle upon the floor, and twirling wool and spindle, she "spins" yards and yards of a thick worsted. Then, day after day, she winds back and forth from left hand to left foot as she sits plumped down upon the ground, until she has bulky skeins of weft. Her husband helps her rig the simple loom, with its warp strung tightly from a cross-beam to another beam on the floor. Now two long switches, thrust into the warp, (see cut, A and B), pull alternate strings of the warp slightly forward, leaving the others to the rear. Switch B, if pulled forward, will bring the rear set of warp-strings forward and towards the weaver, so that the wool will alternate every time a new layer is built. The flat stick (see cut C) is extracted and reinserted before each new layer is started, thus holding the warp-strings in position.

Beginning at the bottom, the weaver passes strands of weft in among the warp, between the two sets of strings, and battens them down with a flat piece of wood, toothed at one end. Then, by pulling switch B towards her, she reverses the "set" of the warp-strings, and secures them, as before, with the flat stick (compare figures I and II). So she runs through another row, and builds her design.

The rug develops upward, as with all of the loom weaving in the Southwest. There is no shuttle, and the process is slow, despite the weaver's deftness. When the rug has grown up beyond comfortable reach, the cross-beam is lowered overhead, the lower end of the rug unfastened and folded away, and some higher point in the rug secured in its place to the lower end of the loom.

The Navajo squaw would not think of making a perfect rug; she fearfully believes that anyone so doing would go blind.





D. is a weft thread of another color. Note how, by lapping both colors around warp-threads (a) and (c), the coherence of the texture is assured.

## GRAND CANYON LICHENS

By - Park Naturalist

Lichens - those primitive, little plants of many colors which we see so abundantly on the trunks of trees and on the sheer walls of cliffs where not even mosses can exist, are extremely interesting and important in many ways. To the botanist their interest centers usually on the fact that they represent a union of two very different plants. In brief, they are a combination of algae and fungi - an interdependence termed symbiosis. To the geologist they are important as the pioneers of the plant kingdom in rock decomposition and disintegration - important phases of erosion. Finally, to the layman they are a continual source of wonder because of their frequent brilliant colors and because of their uncanny ability to cling to apparently smooth surfaces.

At the Grand Canyon with its bare rock walls within and its open forested areas on both sides, lichens very naturally form an important part of the flora. In the desert sections we find them as outposts where no other forms of plant life are apparent. Even the most arid places possess them in great numbers, though usually not representative of many species. Moisture is necessary for their life and development, but the amount required by many species is surprisingly small. Again in the open forests we find them both in certain kinds of soil and on the trees. Here the species vary according to the chemical nature of the former or the type of bark of the latter.

Lichens attach themselves to the substratum by root-like appendages (rhizoids) which usually have very fine tips. These serve principally for anchorage but also are important in that they exude substances which corrode the rock surface. A totally different flora develops on calcareous rocks from that on silicious rocks due to the acid quality of the first as contrasted with the basic of the second. Many other factors such as climate and humidity undoubtedly also have an important part in determining their location. In listing some of the common lichens of Grand Canyon, therefore, they have been grouped according to localities and substratum.

The identification of the species listed below was kindly done by Mr. Charles C. Plitt of the University of Maryland.

### I. Lower Canyon Area

1. Fine Sandy Soil (3000 ft. Kaibab Trail) - *Lecidea* (*Psora*) *crenata* (Thyl.) Nyl.

### II. South Rim Area

2. Basal Kaibab Limestone (Hermit Trail) - *Gyrophora hirsuta* (Ach.) Fr.
3. Clay Soil (6500 ft. Hermit Trail) - *Lecidea* (*Psora*) sp.
4. Branches of trees (Yavapai Point) - *Usnea florida* (L.) Hoffm.
5. Surface Kaibab Limestone (Cocopa Point) *Parmelia mollinscula* Ach.
6. Fine Sandy Soil (Cocopa Point) - *Acarospora* sp.



### III. Kaibab Forest Area

7. Branches of trees (Bright Angel Point) - *Romalina calcaris*  
nearest v. *subampliata*  
Nyl.
8. Surface Limestone (Bright Angel Point) - *Parmelia conspersa* (?)
9. Ground lichens, on moss (near Demotte Park) - *Cladonia pyxidata* (L)  
Fr. var. *chlorophaea*  
Flk.
10. Branches of trees (near Demotte Park) - *Usnea hirta* (L) Hoffm.

### IV. Summit San Francisco Mts.

11. Volcanic cinders. (Lassen Pk.) - *Gyrophora hirsuta* (Ach)  
Fr.
12. " " " " - *Parmelia conspersa* v.  
*stenophylla* Ach.
13. " " " " - *Lecanora rubina* (vill)  
Ach.
14. " " " " - *Caloplaca elegans* (Link)  
Th. Fr.

*Sketches by Miss Pauline Mead.*



*Usnea florida*  
On tree  
South Rim

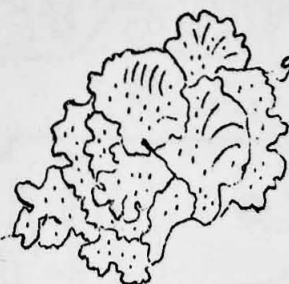


*Parmelia conspersa*  
On Limestone  
North Rim



*Lecanora crenata*  
On fine sandy soil  
Bottom of Canyon

# LICHENS.



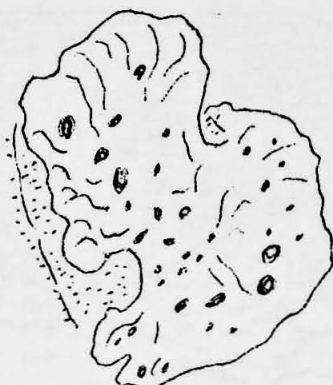
grey spotted  
with black

*Gyrophora hirsuta*  
On limestone  
South Rim



greenish grey

*Ramalina calicaris*  
Branches of Trees  
North Rim



grey spotted  
with black

*Gyrophora hirsuta*  
On Volcanic cinders  
Summit of San Francisco Mts.



bright orange.

*Caloplaca elgens*  
On Volcanic cinders  
Summit of San Francisco Mts.