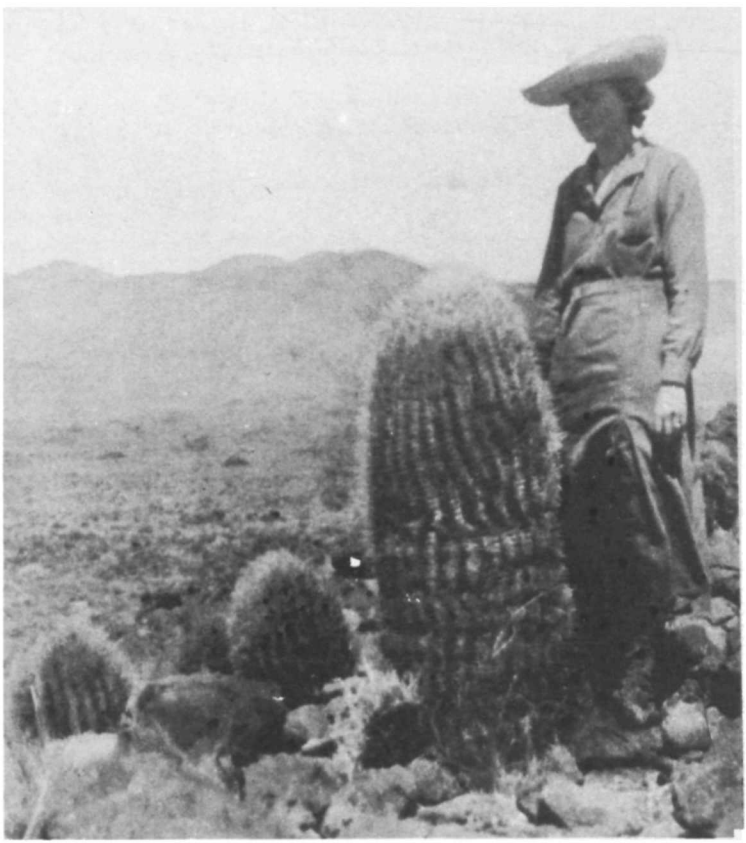
GRAND CANYON NATURE NOTES



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GRAND CANYON NATURE NOTES

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History Association

This publication is issued monthly for the purpose of recording observations and of making known the results of research and scientific investigation in the Grand Canyon region in the fields of natural history, history and related subjects. It is published by the Natural History Association for the Grand Canyon National Park. Membership in this association is $1.00 per year and includes a subscription to Nature Notes. Additional copies of Nature Notes may be obtained at 10¢ each by addressing The Grand Canyon Natural History Association, Grand Canyon, Arizona.

M. R. Tillotson,
Superintendent.

Edwin D. McKee,
Park Naturalist.

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Illustrations by Florence Satterwhite.

FLORA OF GRAND CANYON NATIONAL MONUMENT

By Park Naturalist, Edwin D. McKee *

he flora of the Grand Canyon National Monument represents several distinct plant associations, each of which is different and in contrast to that, with Saltbush predominating, along the approach road across the great alkaline plains to the northeast. The main groups of plants in the Monument are controlled principally by factors of soil and climate and for the most part are rather distinct in their constituents although gradational along their borders. They are listed by the writer as (1) the high mountain type, (2) the valley wall type, (3) the open valley type, (4) the inner canyon rim type, and (5) the lava bed type. In the first two of these, representing the high altitudes, plants are almost if not entirely the same as those found in corresponding life zones in Grand Canyon National Park to the east. In the lower two, many of the plants are of species unknown in eastern Grand Canyon, while the open valley type is intermediate in its status.

HIGH MOUNTAIN TYPE, REPRESENTED ON MT. TRUMBULL AND NEIGHBORING VOLCANIC PEAKS, ALTITUDE 6,250 - 7,500 FEET:

This type corresponds to the upper part of the upper Sonoran and to the Transition Zones as found on the Kaibab and Coconino Plateaus to the east and essentially all of its plant species are found in those areas. A few typically Canadian Zone species are found in sheltered places on the mountains.

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* Material obtained on a reconnaissance trip for the purpose of making general observations, studies and collections of the biological and geological features of the region made during the period of April 8 to 14, 1934.

List of conspicuous plants in lower part.
(c) - very common:

(c) Pinyon Pine - Pinus edulis
(c) Sagebrush - Artemesia tridentata
Gambel's Oak - Quercus gambelli
Live Oak - Quercus wilcoxii
Manzanita - Arctostaphylus pungens
Scarlet Bugler - Pentstemon torreyi
Mountain Mahogany - Cercocarpus sp.
Cliff Rose - Cowania stansburiana
Gooseberry - Grossularia sp.
Hollygrape - Berberis fremontii
Ponderosa Pine - Pinus ponderosa


Manzanita

List of conspicuous plants above spring, near top of Mt. Trumbull. (c) - very common:

Elderberry - Sambucus sp.
(c) Gambel's Oak - Quercus gambelli
(c) Ponderosa Pine - Pinus ponderosa
Quaking Aspen - Populus tremuloides aurea
Meadow Rue - Thalictrum sp.
New Mexico Locust - Rubinia neomexicana
Apache Plume - Fallugia paradoxida
Big Blue Pentstemon - Pentstemon cyanthophorus
Wild Buckwheat - Eriogonum sp.
(c) Stonecrop - Sedum stenopetalum


Stonecrop

VALLEY WALL TYPE, REPRESENTED ON BOTH SIDES OF TOROWEAP VALLEY, BROKEN WALLS OF SEDIMENTARY ROCKS, ALTITUDE 5,000 - 6,250 FEET:

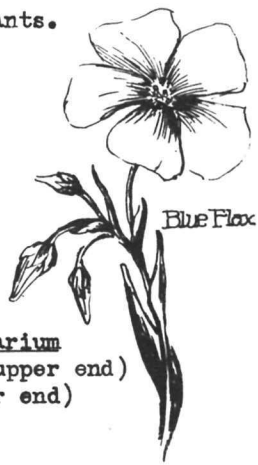
This type corresponds closely to the upper Sonoran Zone as found on the Coconino and Kaibab Plateaus to the east, with essentially all of its species also found in those areas. A few typically Lower Sonoran species are also found in this association on the more open slopes. Both because of a lack of time and because the flora was so similar to that of the National Park area, a rather incomplete list was made of this type.

Partial list of conspicuous plants:
Rabbitbrush - Chrysothamnus sp.
Snakeweed - Guterrexia sp.
Cliff Rose - Cowania stansburiana
Mormon Tea - Ephedra viridis
Barrel Cactus - Ferocactus lecontei
Sagebrush - Artemesia tridentata
Cucumber Cactus - Echinocereus sp.
Leadbush - Lopagyrea argentea
Pinyon Pine - Pinus edulis
Utah Juniper - Juniperus utahensis

OPEN VALLEY TYPE, REPRESENTED IN TOROWEAP VALLEY - A WIDE FLAT PLAIN FILLED WITH ALLUVIUM, ALTITUDE 4,250 - 5,000 FEET:

Since this valley includes most of the area to be developed as an antelope range, its flora is of considerable interest. At the present time it is very badly overgrazed and includes a surprisingly small number of species. Indeed there are only four or five different plants that can really be considered common in this area.

Partial list of conspicuous plants.
(c) - very common:
(c) Sagebrush - Artemesia tridentata
(c) Cholla - Opuntia sp.
(c) Broad-leaf Yucca - Yucca baccata
Narrow-leaf Yucca - Yucca baileyi
Saltbush - Atriplex canescens
Snakeweed - Guterrezia sp.
Pincushion Cactus - Mammalaria sp.
Hollygrape - Berberis fremontii
(c) Mormon Tea - Ephedra sp.
Blue Flax - Linum sp.
Red-stemmed Filaree - Erodium cicutarium
Evening Primrose - Oenothera sp. (upper end)
Thistle Poppy - Argemone sp. (upper end)



INNER CANYON RIM TYPE, REPRESENTED AT JUNCTION OF TOROWEAP VALLEY AND GRAND CANYON EXCEPT ON LAVA FLOWS. RED SANDSTONE AND SHALE OF THE SUPAI FORMATION. ALTITUDE 3,250 - 5,000 FEET:

This type is characterized bya peculiar mixture of fairly well developed Upper Sonoran species together with a great number of those typical of the Lower Sonoran Zone. Many of the latter are of species not represented farther east in Grand Canyon, even at lower altitudes, and others have attained a remarkably large growth.

The apparent excessively favorable conditions for the development of Lower Sonoran types in this area seem incongruous when it is considered that fairly large Pinyons, Junipers and Sagebrush occur mixed with these. From this it would seem evident that the temperature is not the principal controlling factor in this area. Probably a more favorable supply of moisture explains this phenomenon, however, no concrete evidence was obtained to substantiate this suggestion.

Specific examples of plants illustrating the unusual conditions represented in this area are the Ocatillo and Creosote Bush, plants that have not been recorded from farther east in Grand Canyon, and the shrub Thamnosma which in one place has actually developed into the proportions of a tree, 15 feet high and with a basal trunk diameter of 14 inches, looking strangely similar to a huge broom pointing skyward. The exceptionally great size of the Broad-leaf Yuccas and the rigidity of their leaves are also noteworthy local developments.

Partial list of conspicuous plants.
(c) - very common:

(c) Live Oak - Quercus wilcoxii
Pinyon Pine - Pinus edulis
Utah Juniper - Juniperus utahensis
(c) Mountain Mahogany - Cercocarpus sp.
(c) Turpentine Broom - Thamnosma montana
Rabbitbrush - Chrysothamnus sp.
Century Plant - Agave utahensis

Pinyon Cone

Yellow Mustard
(c) Indian Paintbrush - Castilleja sp.
(c) Broad-leaf Yucca - Yucca baccata
Narrow-leaf Yucca - Yucca baileyi
Beargrass - Xerophyllum tenax
Cucumber Cactus - Echinocereus sp.
Gray Prickly Pear - Opuntia chloritica
Big Prickly Pear - Opuntia sp.
Paper Flower - Psiliostrophe sparsiflora
Sagebrush - Artemesia tridentata
Squawberry - Rhus trilobata
Creosote Bush - Covillia tridentata
Ocatillo - Fouquieria spendens
Blue Flax - Linum sp.
Rabbitbrush - Chrysothamnus sp.
Desert Mallow - Sphaeralcea sp.
Wild Four O'Clock - Quamoclidion multiflorum
Phlox - Phlox caespitosum
Pincushion Cactus - Mammalaria sp.
Apache Plume - Fallugia paradoxida
Singleleaf Ash - Fraxinus anomala
Rock Rose - Petrophytum caespitosum
Scarlet Bugler - Pentstemon bridgesi
Evening Primrose - Oenotheria sp.
Devil's Claw - Martynia louisiana
(Some others which appeared to be different from any found in eastern Grand Canyon but which have not yet been identified, were collected.)

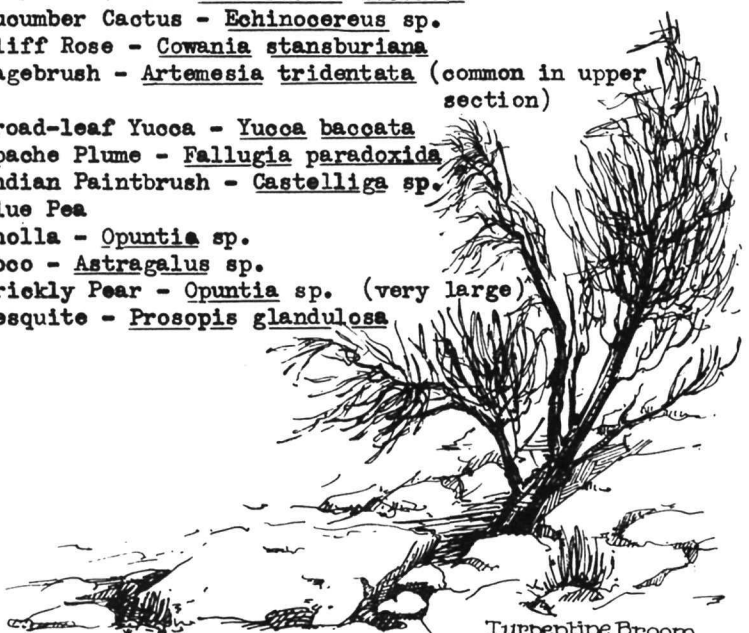
LOWER LAVA BED TYPE, REPRESENTED BY BASALT FLOWS FROM VULCAN'S THRONE AT LOWER END OF VALLEY INTO INNER CANYON, ALTITUDE 3,250 - 5,000 FEET:

This area, although representing about the same altitude as the preceding, is characterized by a very distinct plant association. Like the preceding, however, it contains many species not found in eastern Grand Canyon and many Lower Sonoran types which have attained exceptional size. Most noteworthy in the latter group are the Barrel Cactuses which grow to a height of four feet and the Chollas which appear in

clumps, 25 to 30 feet in diameter and as high as a man. Since among the plants not known to the writer were several of the most common species, the following list loses most of its value until determinations make it possible to supplement the names of these.

Partial list of conspicuous plants.
(c) - very common:

(c) Snakeweed - Guterrezia sp. (most numerous plant in upper section.)
(c) A feathery plant not yet determined.
(c) A plant with bulbous leaves not yet determined.
(Most numerous in lower section.)
Yellow Daisy - 3 species
Mormon Tea - Ephedra sp.
Barrel Cactus - Ferrocactus lecontei
Cucumber Cactus - Echinocereus sp.
Cliff Rose - Cowania stansburiana
(c) Sagebrush - Artemesia tridentata (common in upper section)
(c) Broad-leaf Yucca - Yucca baccata
Apache Plume - Fallugia paradoxida
(c) Indian Paintbrush - Castelliga sp.
Blue Pea
Cholla - Opuntia sp.
Loco - Astragalus sp.
Prickly Pear - Opuntia sp. (very large)
Mesquite - Prosopis glandulosa



Turpentine Broom
Height - 15 feet

WHEN ENEMIES MEET

An interesting fight between a San Francisco Mountain Wood Rat and an Arizona Gopher Snake was witnessed by the author on July 28 of this year.

The rat, a rather large specimen, was introduced into a cage containing the snake. For a few moments both eyed each other without any movement whatsoever. Then the rat started on a tour of inspection, his route taking him close to the coiled reptile. With a loud hiss, the snake struck and missed. With an audible gritting of teeth, the rat retaliated by slashing his adversary on the head and neck. Instantly the snake recoiled into a corner where he rubbed his wound against the side of the cage. Then he slowly drew himself into a compact mass, his eyes malignantly regarding his enemy who had retired to the far side.

The action which followed was swift and deadly. In a second the cage was transformed into a battlefield upon which rolled a squealing, writhing mass of scales and fur. The outcome was not long in doubt as tightly drawn coils began relentlessly crushing the life from the rat. Ten minutes later all was silence again. The rat lay stretched out upon the floor of the cage--dead. His conqueror was coiled up in a corner nearby, still angry but triumphant.

Although large enough to swallow the rat, the snake absolutely refused to utilize his victim for food.

- R. Grater -

AN ARCHAEOLOGICAL MINDED JAY

It is common knowledge that Jays are notoriously inquisitive but when one shows a marked interest in Archaeological subjects---that is news!

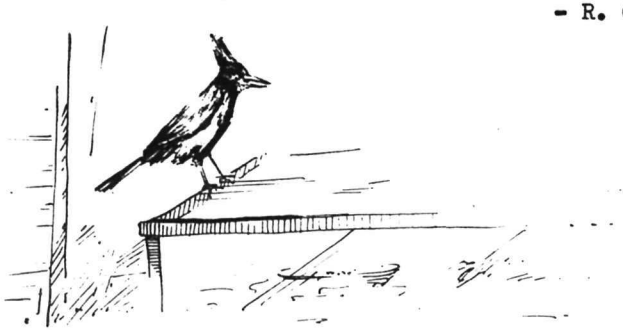
On July 14, a Long-crested Jay alighted on a tree just outside of Wayside Museum of Archaeology. Since the building was seemingly unoccupied, he ventured inside where he stopped on a glass case near the door to look the situation over before going any farther. For a few moments he suspiciously eyed a motionless but highly interested human being at the far end of the room. Then, seeing nothing to alarm him, he flew over to another case where he gravely eyed the pottery for a moment or so. From there his wanderings led him to other cases, where his loud harsh cries seemed to denote great interest in their contents.

Suddenly he stopped and gazed fixedly down into the case beneath him. Right under him was a small glass plate upon which were several grains of corn! Immediately all else was forgotten in a mad effort to get to the tempting meal within the case. In vain he clawed and pecked at the transparent barrier separating him from the inviting tidbits, but to no avail! Suddenly losing his timper, he began loudly screeching, his crest jerking violently with every note uttered.

All this was too much for the delighted spectator at the other end of the room, and he laughed out loud.

Quick as a flash, the Jay made a wild dash for the door and flew directly into a very resistant glass case with terrific force! Picking himself up off of the floor, he looked around, dazed for a moment, and then flew hurriedly outside, yelling at the top of his lungs! Lost forever was his interest in the Archaeological world!

- R. Grater -



HISTORY NOTE

A "cliff-dwelling" which has obviously been made by man of post-Columbian times at the isolated junction of the main and Little Colorado Rivers was reported a few years ago by Mr. Emery Kolb of Grand Canyon. While making geological studies in the area this past year, the writer was able to relocate this interesting site and to make the accompanying photographs of it. Built beneath the cliff of Tapeats sandstone southeast of the confluence of the rivers, this structure was both well concealed and well protected from the elements. Who built it and when are the questions that cannot be answered but the small iron plow shown in the picture testifies to the probable intentions of some pioneer to plow the Little Colorado River delta. Only those who are acquainted with the extreme solitude and isolation of the locality and the difficulties of access to it can truly appreciate the hermit-like qualities of any man who sought existence in such a place.

- E. D. McKee -

NOTE ON PALEONTOLOGY

Throughout the Grand Canyon is found a limestone layer of three to four foot thickness which everywhere contains in great abundance the shells of a small sea animal and which is both covered and underlaid by beds of red and yellow sandstone, probably of continental origin. It is in the middle of the uppermost formation which is known as the Kaibab.

The remarkable uniformity of the limestone referred to as seen at Fossil Mountain, Hilltop and Seligman to the west and along the Hermit, Bright Angel and Kaibab trails to the east, is striking. Even more astounding, however, is the great abundance of the small clam-like shells (Pelecypods of the genus Schizodus) throughout this layer. With over a hundred individuals included in a block of one cubic foot, it is apparent that in the thirty or more miles over which their remains are scattered, they must occur by the millions or even billions. In the rocks both above and below this limestone ledge, however, this species is not to be found, thus indicating not only its prolific nature and the favorable conditions under which it apparently lived, but also the great time which must have elapsed during the forming of that thin layer of limestone and the consequent complete wiping out of that host of animals.

In an earlier article in Nature Notes (1) the writer pointed out that although most of the fossil shells in the Kaibab formation have been petrified - replaced by the mineral quartz in various forms - occasionally species retaining their original shell material are discovered. He pointed out also, that two specimens of the genus Chonetes, had been found retaining what probably was their original color - a beautiful pale pink. Recently one of the shells of the genus Schizodus described above was found also retaining what appeared to be its original color - in this case, a pale blue. Since

(1) McKee, E. D., Fossil Mountain, Grand Canyon Nature Notes, Vol. 5, No. 2, p. 18, December 1930.

this likewise represents an animal that has long been extinct the color observation seems deserving of record and aids in giving a touch of reality to the ancient Permian sea and its fauna.

- E. D. McKee -

ETHNOLOGICAL NOTE

The Havasupai Indians are undoubtedly among the best basket makers in northern Arizona so the material which they use in this work is of considerable interest. According to Spier (1) the black fibre is obtained from the Devil's Claw, Martynia sp., and the white from Cat's Claw, Acacia greggii, and less commonly from cottonwood and willow.

In discussing the making of baskets recently, the writer was told by Dottie Watahomigie that she often used "willow" and that this made a whiter basket than did the cottonwood. Later when Dottie brought in specimens of the "willow", however, it was seen that they were the straight stems of Rhus trilobata (?), a plant much used by Indians of the west coast and commonly known as Squaw Bush. In the Grand Canyon area this plant, possibly more than one species, is found both on the Tonto Platform and on the South Rim.

- B. H. McKee -

RECENT PUBLICATION

For the benefit of botanists interested in the lower plants of the region, the editor wishes to call attention to the paper - "The Phytoplankton of Some Arizona Pools and Lakes" by Wm. R. Taylor and H. S. Colton, published in the American Journal of Botany, XV. Although printed in December 1928, it has just recently come to the attention of this office. It includes a statement of species of plankton according to locality, including references to the Kaibab Plateau and Painted Desert, and it presents an interesting discussion of ecological conditions.

(1) Spier, Leslie - Havasupai Ethnography - American Museum of National History, Vol. XXIX, Part III, pp. 128, 134, 1928.