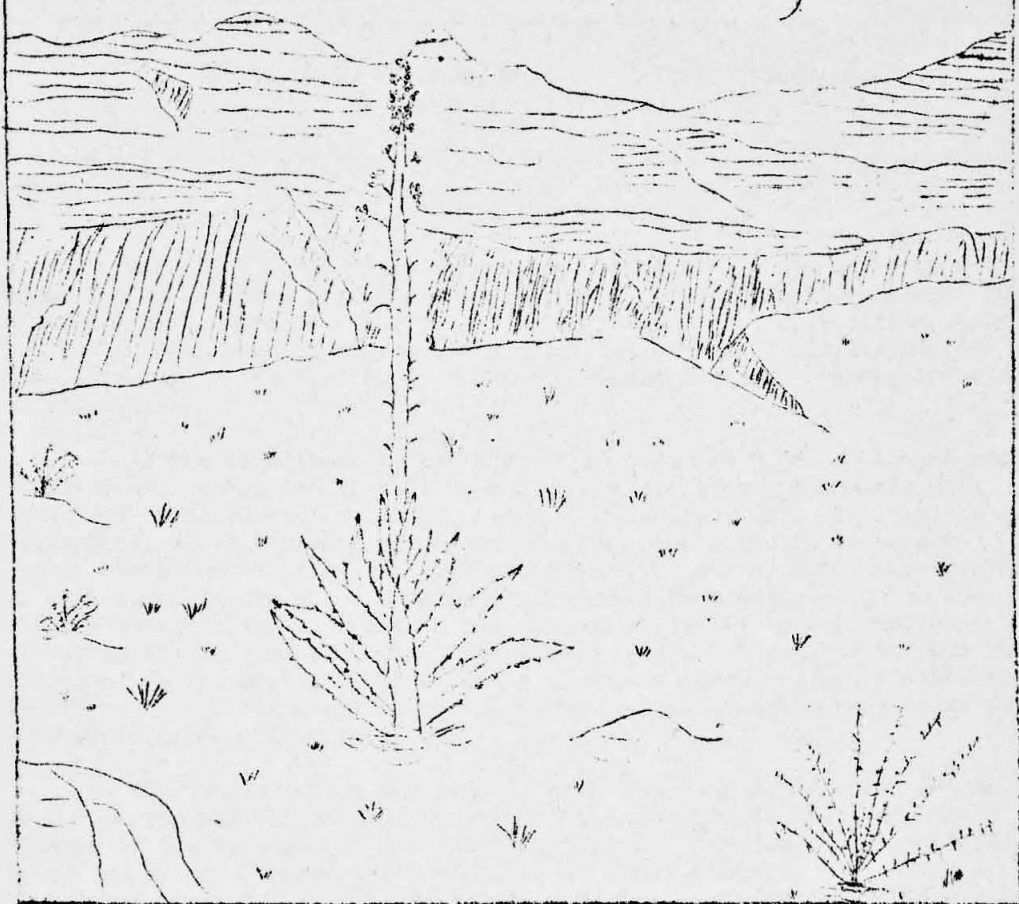


June
Vol. 1 - No. 4
1926

GRAND CANYON NATIONAL PARK

Nature Notes of Grand Canyon



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

VOL. 1.
GRAND CANYON NATURE NOTES

NO. 4.
JUNE 26, 1926.

J. R. Eakin, Superintendent.

Glen E. Sturdevant Ranger Naturalist.

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, Ariz.

(By Dr. C.W. Gilmore, Curator of Vert. Paleontology
U. S. National Museum)

FOSSIL FOOTPRINTS

Some 25,000,000 years or more ago the area now set aside as the Grand Canyon National Park was inhabited by a large and varied assemblage of animal life, none of which were like any of the creatures living there today. The evidence of the previous existence of these animals consists of fossil tracks and trails found preserved in certain rocks forming the walls of the Canyon.

At the time these tracks were made there was no Grand Canyon and what are now rocks were then loose sand and mud. In the thousands upon thousands of years that followed, after these animals left the imprints of their feet, other rock-making materials were accumulated in successive strata above them to many hundreds of feet in thickness. The great weight of this superimposed mass, combined with cementing materials in the sand and mud consolidated them into sandstone and shale and in this hardened state the tracks remained hidden for untold ages until finally through the erosional action of the Colorado River in cutting down through the strata in its work of carving out the Grand Canyon, these track-bearing rocks were again exposed to view.

The trails of extinct animals have been found at several places in the Canyon but those most accessible and extensive in occurrence are crossed or lie immediately off the Hermit Trail as it descends into Hermit Basin and Hermit Gorge. These imprints of extinct animals were first brought to the attention of the scientific world by Professor Charles Schuchert of Yale University, when from a study of a small collection made by him, Professor Lull described the new species Isoporus schucherti and I. nobeli from the Coconino sandstone and Megapiza ? coloradensis and Exocoelma ? delicatula from the older Hermit shale.

No further attention was given the tracks until ten years later a large collection was made for the U. S. National Museum and the study of these materials increased the list of known kinds to nine genera and twelve species.

It was quite apparent that there were many other kinds yet to be found as indicated by poorly preserved imprints in this first collection. Consequently the discovery in 1926 by a second expedition from the National Museum of many new kinds of tracks did not come as a surprise to those in charge of the work. Not only was the fauna of the Coconino greatly increased but a fine series of plants and tracks were secured from the Hermit shale and a smaller variety of kinds from the older Supai formation. It will thus be seen that in this one geological section there are three distinct faunas occurring at three distinct levels. In relation to the top of the Canyon these occur in the Coconino sandstone 900 to 1080 feet below the rim; the Hermit shale 1350 to 1400 feet down and the Supai sandstone 1800 to 1850 feet below the top of the Canyon wall.

This is probably the only place in the world where fossil tracks of three succeeding groups of animal life separated by such great geological intervals can be found. They are, therefore, of great interest scientifically, and equally interesting to the laymen for their great antiquity is so clearly demonstrated here that the veriest tyro in geological phenomena cannot help but get the lesson they teach.

What kind of animals made these tracks? That is a question that can only be partially answered at this time. It is known that there are tracks made by both vertebrate and invertebrate animals, but as to the kind of backboned animals only this can be said. In Texas are rocks regarded by geologists as being the same age as those bearing tracks in the Grand Canyon. In these Texan rocks, skeletons of many kinds of extinct animals, some of which have the right proportions of foot, limb and body to have made tracks and imprints similar to those found. It therefore seems fair to assume that similar animals must have formerly inhabited the Grand Canyon region. If these deductions are correct then we know from a study of these fossil skeletons that the tracks were made by primitive crawling reptiles and amphibians all of which are unlike any creatures living today.

A critical study of the tracks show that some of the animals had five toes, some four, some had toes provided with long sharp claws, others had toes terminated by blunt rounded nails, and still others apparently without claws. All appear to have been quadrupedal - that is, they walk and crawled on all four legs. They also varied greatly in size and character. Some were no longer than a mouse while others had large feet with a stride of two and one half feet. Some had short limbs, with heavy wide bodies, while others had long slender limbs and narrow bodies. Many of the trails are beautifully distinct and the course of the animal may often be traced for considerable distances.

In addition to the footprints there were trails evidently made by crab-like animals or insects, the imprints of their pointed toes in

clusters of two and three with a distinct furrow between caused by the drag of a tail being clearly impressed. There are also burrows believed to have been made by worms.

The great age of these tracks, their excellent preservation and great abundance both in kinds and numbers make this one of the most important footprint localities known anywhere in the world. Occurring as they do in three successive and well established geological horizons, they have a value all their own in throwing light upon the land animal life of the Permian. Intensive study of these tracks may eventually tell us much of the habits and characteristics of the creatures living in these long past ages.

To the geologist in the absence of other fossil criteria they may be eventually of great assistance in the correlation of widely separated rock deposits and to the layman they will ever be a source of wonder and speculation registering as they do the former presence of creatures now long extinct.

DRAGON FLY

----- (By Glen E. Stardevant, Ranger Naturalist) -----

A recent communication from Dr. C. W. Gilmore of the National Museum indicates that giant dragon-fly-like insects lived at the Grand Canyon at least 25,000,000 years ago.

Dr. Gilmore made a collection of fossil footprints and plant impressions at Grand Canyon during April and May 1926. One of the slabs collected, containing plant remains, was found upon examination at the National Museum to contain also the well-preserved wing of a large dragon-fly-like insect. According to Dr. Gilmore, "This wing is over four inches in length and well enough preserved to be identified when once I get around to study it." This interesting insect was found in Hermit Basin in the Hermit shale of Permian age.

Although the Hermit shale has previously been noted for an abundant occurrence of well-preserved animal tracks and plant impressions; this unique discovery of the first fossil insect in this part of the country will undoubtedly prove to be a considerable scientific value.

"MESCAL"

(*Agave utahensis*)

(By Glen. E. Sturdevant, Ranger Naturalist)

The "mescal", with its interesting ancient and modern history, is a species of *agave* that grows everywhere in the canyon.

The early explorers noted blackened ruins of circular pits where the ancient Indians had roasted the "Mescal". That the modern trails in the Grand Canyon are merely improvements on those used by the ancient Indians is evidenced by the occurrence of these pits along practically every trail. These ruins were and are undoubtedly the incentive that causes many an uninitiated tourist to return home with blistered hands ill-rewarded for his efforts in collecting jewelry, pottery and Indian trinkets.

The Supai Indians, dwelling in Havasupai Canyon in Grand Canyon National Park, are one of the few remaining tribes that still use this plant for food. The Plant is more familiar to them under the name of "voyel".

The "Voyel" is gathered in the spring after the bud is started. The plant is cut off close to the ground and the leaves trimmed off except the asparagus-like tender leaves near the protruding stem. Considerable precaution is necessary in gathering and trimming the "voyel" as the sharp denticulated structure and spines on the leaves may cause great bodily discomfort. The "voyel" resembles a pineapple to some extent at this point in its preparation.

When a sufficient supply is gathered a roasting pit is prepared. This is about three and one-half feet deep, two feet wide, and three feet long. The sides are walled up and rounded water-worn rocks thrown in until the pit is about one-half full. Fire wood is gathered and piled into the pit.

Who should light the fire? To a white man such a question would be immaterial. Not so with the Supai Indian. However, for certain tribal customs have been handed down that govern precisely who shall and shall not light the fire in the "mescal" pit. It is an ancient belief among the Supais that the fire shall be started only by members of their tribe whose birthdays occur in summer. It is accepted as a fact that if one born in winter should start the fire, the "voyel" would never cook but instead would look white rather than the customary brown, roasted, color. The fire is kept burning until the pit is assured of "plenty of heat and plenty of smoke".

When the fire is finally allowed to burn down one Indian taps the rocks. This is done by taking a rounded boulder weighing fifteen or twenty pounds and repeatedly throwing it in the pit until the rocks

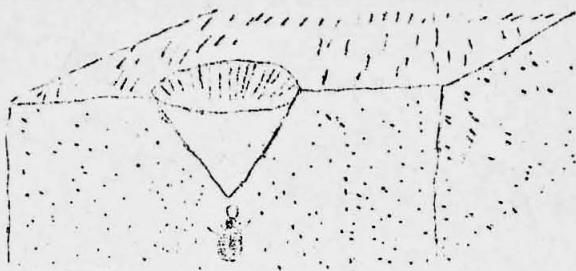
are thoroughly packed with a uniform slope to the center. The heat from the pit necessitates fast work on the part of the tamper. The large rock is then thrown away and the "veyel" placed into the pit to roast.

The plants are put into the pit bottom side up. This, according to the Indians, assures more steam and better cooking. When all of the "veyel" has been placed in the pit, the top is covered with hay or a sack and finally covered with dirt and allowed to roast for thirty six or forty eight hours.

The Indians paint their faces with oxide of iron (hematite or limonite), so as to insure a thorough roasting of the "veyel". The iron pigment is not removed until the "veyel" has been tasted and found quite palatable. This is ascertained by one of the old members of the tribe who acts as official taster. One of the "veyel" is removed from the pit. Members of the tribe standing around can soon tell the condition of the edibles by merely observing the taster's face.

They are finally removed from the pit and served to the tribe. The bottom part is sliced and cut into small portions. These are chewed and the sweet syrup-like juices extracted. The upper part is sliced, dried and served as a sweet bread. The tender asparagus-like leaves are ground into a meal and placed on a woven frame to dry. The frame is made from the dried stalk that shoots up in the spring of the year. The meal is then placed in containers until it is needed as a sweet cake flour. When needed it is soaked in water for a few minutes and mixed with corn meal. The sweet cakes made from this mixture are one of the choice dishes of the Supai Indians.

Although the custom of roasting the "mescal" is still prevalent among the Supai Indians, it is feared that another generation will find it a lost art; with the purchasing power of the dollar familiar to them and where a can of beans may be purchased for a few cents, the incentive that has formerly caused the Indians to perform the arduous labors attached to roasting the "mescal" will be lacking.



DAILY BATTLES

(By G. E. Sturdevant, Ranger Naturalist)

Have you noticed those small conical holes near the path along the rim leading to Yavapai Point? Perhaps you were too absorbed looking at the canyon to notice such miniature structures. If you failed to observe them you are excused as a witness to some of the death battles that occur daily in this vicinity.

The combatant forces are generally confined to a doodle bug, who acts as the strategist, with an ant for an opponent. The baffling battle line thrown out by the doodle bug consists of conical-shaped hole in the ground one or two inches in diameter at the top and about one and one-half inches deep. He lies carefully hidden in the loose dirt at the bottom of his structure waiting for the zero hour to attack. The industrious ants, scurrying around for food for the colony, occasionally step into these small volcanic-like holes. The unfortunate member that carelessly falls into the entrapment tries to stave off the impending disaster by climbing up the steep sides away from the danger zone. Frequently he succeeds in his retreat to safety. More commonly, however, a puff of loose dirt thrown out in a spiral form completely baffles the ant. He loses his foothold and rolls to the bottom of the hole. There may be a repetition of this act before he is finally seized in the sharp mandibles of his enemy and slowly pulled to his death where he serves as food for the victor.

Regardless of the question "Why is a doodle bug?", a certain admiration must be accorded these members of insects for their cleverness in eking out an existence.