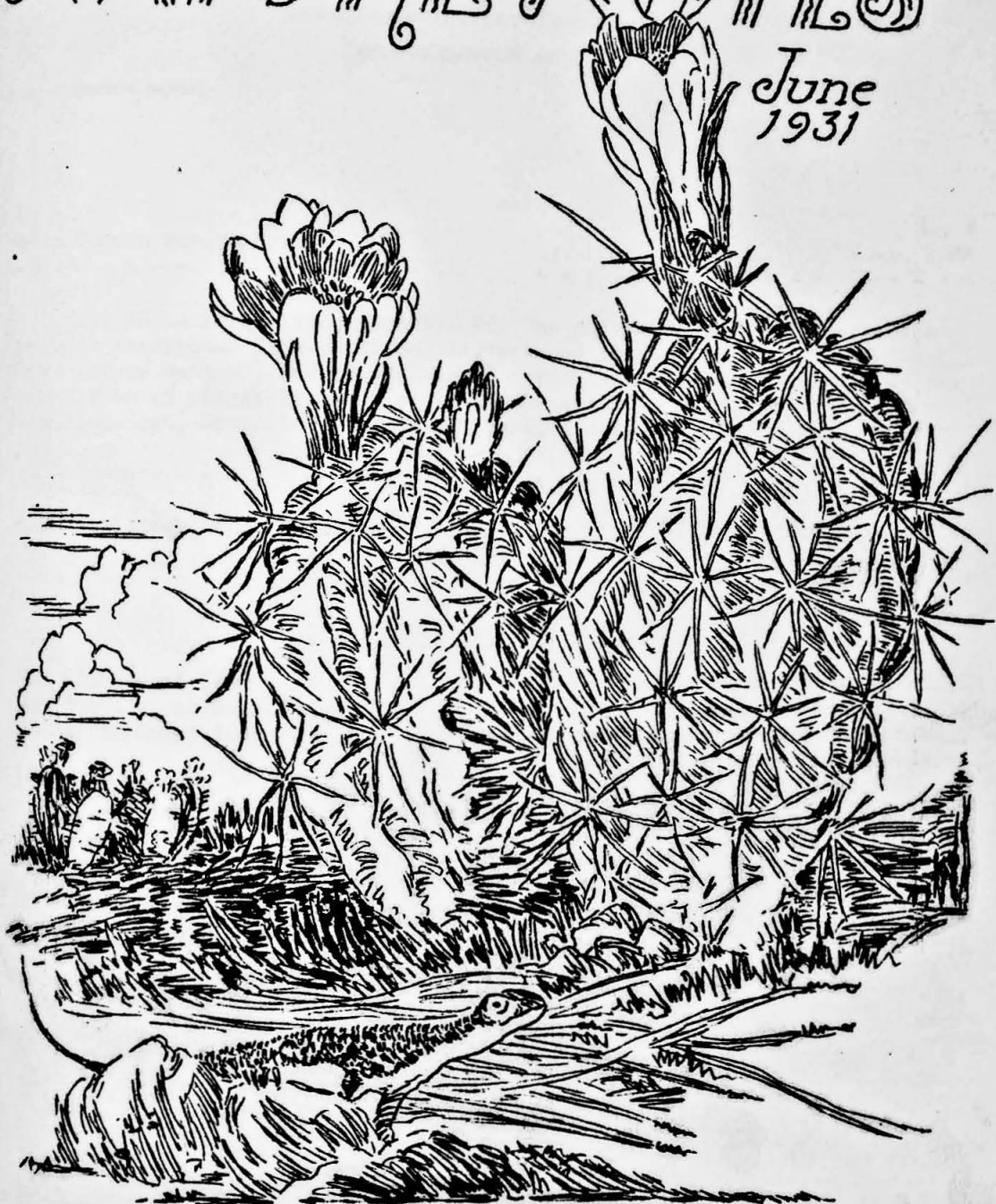


Grand Canyon

NATURE NOTES

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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.

M. R. Tillotson, Superintendent

Edwin D. McKee, Park Naturalist

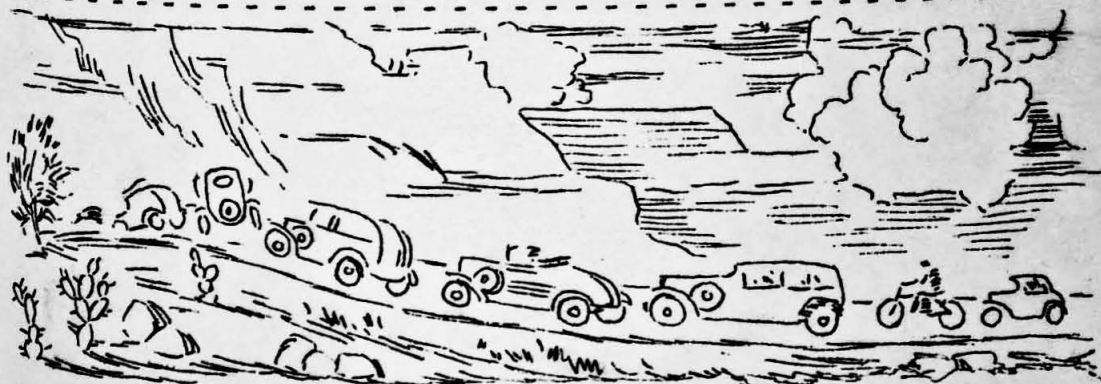
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WHERE OUR CACTI GROW

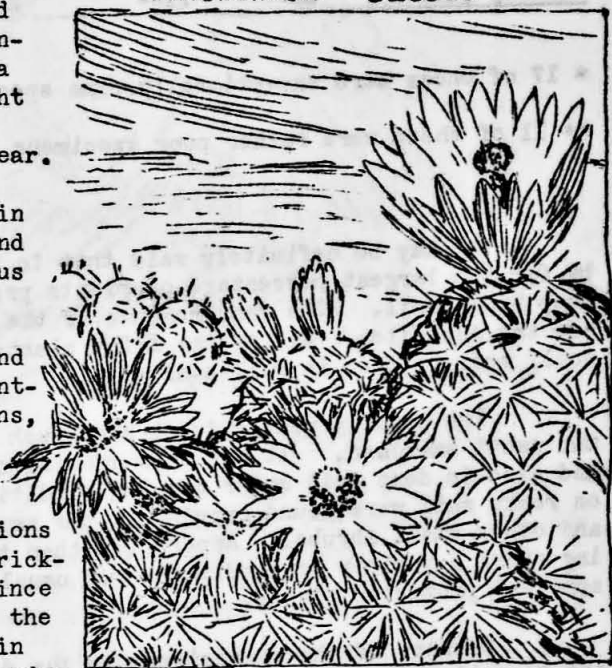
By Pauline Mead Patraw.

The hedgehog cactus (*Echinocereus coccineus*) which is the subject for our cover illustration this month was the first cactus to bloom on the South Rim of Grand Canyon this Spring. Its blood-red, tubular flowers opened about the middle of May and often covered in profusion the clumps of rounded plants. Not until the last of May and the first of June, however, did the soft magenta flowers of the pincushion cactus (*Mammillaria radiosa arizonica*) and the yellow and bright magenta ones of the prickly pear (*Opuntia polyacantha*), begin to appear.

It is while the cactus is in flower that one is best able to find the otherwise dull and inconspicuous plants and more readily to observe where they grow, and what type of soil and what degree of sunlight and shade they prefer. When transplanting cacti to our wild flower gardens, I learned to look for the hedgehog cactus on the pinyon forest floor where there is considerable shade, but to go to the exposed rocky regions for the pincushion cactus. The prickly pear was always easy to find, since it apparently grew equally well in the forest, on the rocky uplands, and in the small dry canyon bottoms. In order to determine the accuracy of this impression, I counted 50 plants each of the three species in bloom, noting the type of soil and the amount of shade in which each plant grew.

Since Cacti have widespread, superficial roots, most species can grow in rather shallow soil. "Deep soil" as referred to in this article indicates soil that is free from rocks for a depth of 4 or 5 inches.

Pincushion Cactus



The results of the count are shown in the following table:

PLANTS:	DEPTH OF SOIL		HUMUS CONTENT		EXPOSURE	
	Deep	Shallow & rocky	Humus	Non- humus	Sun	Shade
Hedgehog	44	6	35	15	13	37
Pincushion	0	50	0	50	34	16
Prickly pear	29*	21**	26	24	21	29

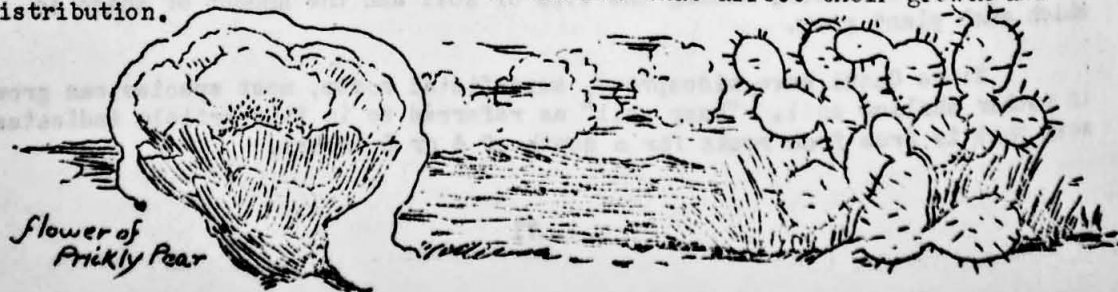
* 17 of these were exceptionally fine specimens.

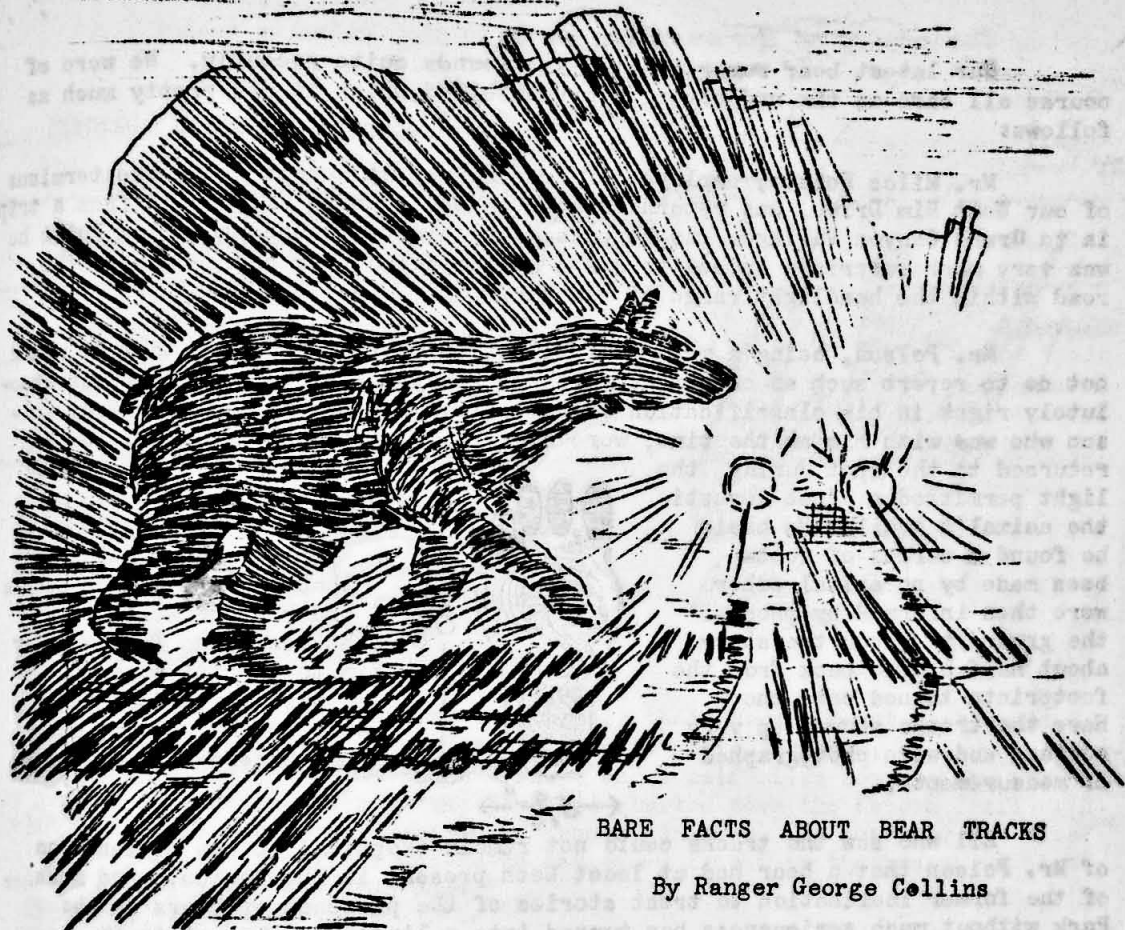
** 11 of these were rather poor specimens.

It may be definitely said that in the case of the hedgehog cactus, by far the largest percentage of plants prefer some shade and usually rather deep humus soil. The requirements of the pincushion cactus on the other hand are the opposite. All of the fifty plants observed were growing in rocky soil, most of them in full sunlight.

The prickly pear did not show such decided preferences as did the other two cacti examined. It was seen growing on bare rocks in both sun and shade and also in deep soil under varying conditions of light. Very often those on rocky soil were found growing in the protection of sagebrush, fernbush, and other small shrubs. Apparently then the prickly pear is capable of growing under a variety of conditions but usually grows best in deep soil and in somewhat protected places.

Because of the consistency in the distribution of these cacti according to soil and shade conditions it seems safe to state the above conclusions despite the fact that there are other factors that affect their growth and distribution.





BARE FACTS ABOUT BEAR TRACKS

By Ranger George Collins

During the past few years rumors have originated from time to time concerning the presence of bear along the South Rim of Grand Canyon. Records show that a few were seen years ago in the North Rim country, but on the South Rim until recently our bear stories have all proved to be simply unsubstantiated tales or rumors.

Inasmuch as the South Rim happens to be in Arizona, and moreover in a part of Arizona where bears would seem to have no business, and are not supposed to reside at all due to lack of water and proper food, these rumors are always interesting. They afford an opportunity to explain that there can't reasonably be much truth in them.

Most of the local bear stories have been traced down to mere mental pictures of bears which have developed in the minds of perfectly sincere individuals who nevertheless have been influenced at the expense of their more accurate thought by the elements of surprise and ignorance of fact, which do at times accompany a fleeting glance or other evidence afforded by some ordinary creature.

Our latest bear rumor started its rounds quite recently. We were of course all ears as the underlying story unfolded, which it did pretty much as follows:

Mr. Miles Polson, employee of Fred Harvey at Hermit Rest, the terminus of our West Rim Drive, was returning home on the evening of June 15 from a trip in to Grand Canyon Village. As he passed the old tramhouse near Pima Point he was very much surprised indeed to see a medium sized bear charge across the road within the headlight range of his car.

Mr. Polson, being a man of excellent discretion, decided that it would not do to report such an occurrence without first making sure that he was absolutely right in his classification of the animal, though both he and Mrs. Polson who was with him at the time, were certain of what they had seen. So he returned to the spot during the light permitted a close investigation of the animal's trail. No basis he found a series of foot-
prints that could have been made by no animal other than a bear. Other people were then informed by phone, and rangers went out on the ground to check the story. The trail was followed for about half a mile back from the Rim to a point where the footprints turned onto the West Rim Bridal Path. Here the tracks showed up very well in the smooth, dusty surface and were photographed and recorded by a series of measurements.



8 5/8"

← 5 9/16" →

All who saw the tracks could not remain skeptical of the declaration of Mr. Polson that a bear had at least been present in the region. And much of the former inclination to treat stories of the presence of bears in the Park without much seriousness has turned into a livelier interest in the possibility that these creatures may be present more often than we know.

Where did this fellow come from? And where was he going? We do not know and can only speculate. Only an unusual bear -- one apt to go most anywhere -- would travel the semi-desert region of the South Rim country. But probably he came from the Sycamore Canyon district, a hundred miles to the south where his kind are known to range in some numbers.

At least no one can say now with entire probity that we have no bear within Grand Canyon National Park - - - for certainly there is no disputing such bear facts as we possess.

-O-O-O-O-O-O-

The Big-eared or Desert Pallid Bat (*Antrozous pallidus pallidus*) has been recorded from Grand Canyon for the first time. A specimen was collected by Miss Carol Tyler, Assistant Clerk Stenographer on June 15. A description of this bat by the collector will appear in the next issue of Nature Notes.

BIRDING IN GRAND CANYON

By Randolph Jenks,
Curator of Ornithology,
Museum of Northern Arizona.

I arrived just before sunset at Yaki Point on the South Rim of Grand Canyon. There a great many White-throated Swifts were darting about through the air near the overhanging cliffs apparently catching some of the innumerable insects that fly at dusk. A nighthawk (perhaps the Western Nighthawk) was flying in and out among the swifts getting its full share of the evening meal. From a pine tree just back of the rim, a pair of Long-crested Jays cocked their heads at me and scolded furiously. They were defying me to approach their secret haunt near which I suspect they had a nest. There was no time to waste, however, as it was necessary for me to reach Phantom Ranch - seven and a half miles down in the Canyon - by dark. I turned my back to the jays and started down the Kaibab Trail. A friendly chickadee bade me "good luck" from a juniper. He scarcely had time to open his bill, so anxious was he to eat every insect on the branch of that tree as he clung there upside down.



Nighthawk

On reaching the Tonto Platform, I saw a pair of Western Lark Sparrows eating seeds at the base of a large tuft of grass. When I approached they flew to a rocky ledge nearby, and uttered a few musical notes. At that moment, a Rock Wren started to scold them loudly and so made them fly away. It was almost dark. The outlines of these birds could scarcely be seen as they disappeared in the exaggerated shadows and mist-like dust that hung over the huge spires and pinnacles of the Inner Canyon. These were beautifully colored by the last reflected light from the sun. A poor-will called constantly and mysteriously from the overhanging rock ledges which were surrounded by junipers. At the lower edge of the Tonto Platform, from a mesquite bush, a mockingbird continually repeated snatches of the songs of several birds which it probably had heard during the day.

From the Tonto Platform to the Colorado River, I travelled by moonlight. Innumerable bats whirled around my head, uttering at intervals very high pitched squeaks. * How they darted about near the river! I almost caught one in my

* Bats are said to utter some sounds so highly pitched that they are inaudible to the human ear.

hat. A little later I arrived at Phantom Ranch on Bright Angel Creek. There a great confusion of noises from tree-frogs and toads drowned every other sound.

Early the following morning at Phantom Ranch, I was awakened by the beautiful shrill call of the Canyon Wren. Many kinds of warblers were singing in the bushes and cottonwood trees. The Sonora Yellow Warblers seemed to be the most numerous, their songs predominating over all others. While wandering up Bright Angel Creek, I encountered many bush warblers in the dense under-brush all along the banks. They seemed to fit in well with their surroundings. Every now and then one would peep out at me from the thick brush. Sometimes one would appear at the water's edge to get a drink. Among the bush warblers, I recognized Western Yellow-throats, Calaveras Warblers and a Pileolated Warbler. In the mesquite and cat-s-claw bushes, Western Gnatcatchers were nervously searching for insects. I heard Gambel Quail calling from the edge of the bluffs.

At a point near where Phantom Creek with its high rock walls joins Bright Angel Creek, I watched a solitary Sandpiper feeding along the bank of the stream. At the junction of Bright Angel Creek and the Colorado River a spotted Sandpiper stood on top of a rock in the middle of the creek, its tail teetering up and down. At intervals it uttered its characteristic "peet-weet". Three small sandpipers flew along the river bank, but they had no time to stop.



On my return to Phantom Ranch, I saw a pair of Ash-throated Flycatchers busily preparing to build their nest.

Shortly after daybreak on Sunday I left the Ranch expecting to reach the South Rim by noon. As I neared the river, Sonora Yellow Warblers and Western Gnatcatchers were plentiful. After climbing for an hour in the heat I reached the Tonto Platform where I followed the trail for several miles to Indian Gardens, passing Burro Spring and Pipe Creek. All along the way I heard Desert Sparrows singing. Their song was similar to a part of the Towhee's, but daintier and more pleasant. At Burro Spring Green-backed Goldfinches and House Finches were very abundant. A beautifully colored male of the latter species alighted on a nearby bush and poured forth its melody -

the feathers on its throat all ruffled. Where the trail crosses Pipe Creek, I watched for some time a pair of Ash-throated Flycatchers. A Cassin King-bird uttered its harsh discordant note from a cottonwood above the creek. There, also, a pair of Black-chinned Hummingbirds were mating. The male took great pleasure in showing off to the female. He would dart straight up for about twenty feet, then swerve and suddenly come down with lightning speed, make a short semicircle near the female,, and ascend once more. He repeated this performance several times.



When I reached Indian Gardens, I saw more birds than in any other place on the trip. Four or five Chats appeared above the thick brushy growth, and some of them sang. Their song reminded me of that of the mockingbird. A pair of small flycatchers, (*Empidonax* sp.) were busily occupied building a nest near the trail. Lazuli Buntings were mating, the male displaying his beautiful feathers before his admiring lover.

It was a long and tedious walk from Indian Gardens up to the South Rim. In spite of my anxiety to push on, I stopped to watch an antelope feeding on the short grass along a ridge, and several Broad-tailed Hummingbirds chasing each other with incredible speed.

In the Pinyons near the top several Audubon Warblers attracted my attention. They were a welcome sight for their presence was a rather definite indication that the top of the Canyon, and therefore the end of the trail, was not far distant. It was only a matter of minutes before I found myself on the South Rim contemplating with pleasure the varied and unique sights and sounds which the Canyon trip had enabled me to sense and enjoy.

-O-O-O-O-O-O-

The Grand Canyon region offers a splendid field for entomologists. Many interesting insects are found from time to time. On July 17, 1930, I collected a single specimen of lantern fly - a bug belonging to the family Fulgoridae - at Roaring Springs in the Grand Canyon. The insect, belonging to the genus *Amycle* is not represented in the entomological collection of the California Academy of Sciences. It is possibly a Mexican species not heretofore recorded in this country. It was determined by Mr. E. P. Van Poyer, authority on Hemiptera

- - C. C. Searl - -

THE SONORA BEAVER

By Ranger Chester Markley



The casual motorist to the Grand Canyon usually gives little attention to the emblem on the sticker which is placed on the windshield of his car. There are others, however, who ask the name of the animal framed in the Canyon setting. Some recognize it as the beaver, and are surprised to hear that he lives within the canyon walls.

The beaver has been written about since the early days of our history; he was a goal that led pioneers to explore the far reaches of the land. His life habits, engineering skill in particular, is known to every school boy - but how many people have seen him in his natural state? Very few. Evidence of his work such

as dams, lodges, and tree cuttings, are more easily observed, yet even these are usually seen only by the individual who roams the by-ways of the forests, lakes and rivers.

The Colorado River, muddy, swift, and treacherous, with deep eddies and whirlpools, makes it perhaps the most dangerous river in our country to navigate, yet the beaver used this fearful river as his highway of travel. The courageous men who navigated the waters of the Colorado thru the Grand Canyon saw him appear and disappear in the muddy waters. From Wyoming and Colorado these voyagers have ventured down the Colorado River into the land of our southern neighbor, Mexico, and have seen beaver throughout the route.

While passing within the canyon walls, the beaver encountered many streams of clear, cold water, the objects of his trips. Wherever permanent water flowed thru the lower reaches of the canyon, he found a luxuriant growth of cottonwood and willow, trees for which he was endlessly searching. He worked his way up the roaring streams many of which had a fall of three thousand feet in seven to ten miles. Often his progress was suddenly interrupted by water falls which dropped over precipitous cliffs that he could not scale. Disappointed, he would return to the Colorado and swim up the mouth of the next stream, and where the ascent was possible, find a new home, a home that was as strange as the muddy Colorado.

So today we find the beaver wandering along our Canyon streams, cutting a cottonwood here and there, but in an endless search for something he cannot find. The beaver of Grand Canyon is the wanderer of his race. Normally he is a home lover, a great colonizer, an animal that likes community life. Here he

tries to live his life, as his ancestors did before him, but Dame Nature is a harsh master; The force of the rushing waters tears down the dams he builds in an attempt to calm them. He is unable to find a suitable place to build his lodge. Often during the low water stages of the stream, he may construct a dam and start work on his lodge, but eventually the spring freshets or storm waters of midsummer will destroy in a single night, the results of many months of labor. Often under such adverse conditions, the beaver will build a den in the bank of the stream, with an under-water entrance usually on the leeward side of a huge rock projecting out into a pool, using the surface of the rock as a side wall of the burrow leading to the den. Here again, the beaver meets the inevitable, for sand and gravel soils are poor materials in which to burrow, with the result that his burrow caves in. - With sorrow and disappointment in his heart, the beaver roams from the mouth of the streams to their source, or as far as progress is possible. His trails and dry canals can be followed easily along the streams; wherever these become too fast and rough for comfortable water travel, the beaver takes to the land - his trails are in evidence around every rough stretch of water.

Only very rarely do we find a sly old beaver who has adapted himself or his ideas of engineering to meet local conditions. In occasional places a beaver has constructed a combination lodge and bank den, with one entrance under water, or with an exit above the water surface as well as below it. The burrow is very short, averaging from three to six feet long, often the den-lodge is rather small, seldom exceeding three feet in diameter, which is evi-



dence enough that the beaver raises a very small family. Wherever the animals find a deep pool in which to start the burrow, the den-lodge will be well underground with the roof about flush with the ground surface. If the entrance to the burrow is in shallow water, the living quarters will be above ground, resembling a water lodge built on the land. Willow and arrow wood are chiefly used for home building with a few branches of cottonwood and brush. The beaver even uses pieces of cloth and canvas when available.

In some of the small streams tributary to the larger ones that flow into the Colorado, we find good beaver dams, which have a longer existence than those in the main streams, yet, they are always subject to destruction, more so from storm water than from spring freshets. Along these small tributaries, the land surface is far too steep to allow the small flow of water to form a large enough pool for a lodge, so after a few attempts at homesteading, the beaver finds it more desirable to seek out an existence along the main waterways, where they continue to lead a solitary life, traveling up and down the stream, seeking those desirable conditions that are foreign to Grand Canyon.

Until that time when the beaver of Grand Canyon can learn the engineering secrets of the few 'wise beaver' of Bright Angel Creek, and enjoy a home life of matrimonial bliss, he is doomed to remain a wandering, unhappy member of the specie Castor canadensis frontator, the Sonora Beaver.

-O-O-O-O-O-O-

A MOTHER SQUIRREL TRANSPORTS ITS YOUNG

By Ranger Naturalist R. A. Redburn.

On May 13, 1931, as I was walking along the East Rim Road, I chanced to come upon an Abert squirrel (*Sciurus aberti*), running along on the lower limb of a large Western Yellow Pine (*Pinus ponderosa*). The squirrel was carrying something in its mouth, but as I had often seen them carry food in this manner, I was not greatly impressed until I noticed that the object was exceptionally large. I walked forward to get a better view. To my surprise I found that a mother squirrel was carrying one of her young, much in the same fashion that a mother cat carries her kittens. The young squirrel, however, was being carried upside down with its tail extending between the mother's fore legs. In this position the baby squirrel, which appeared to be about one-fourth grown, could help support its own weight by grasping its mother's fur with its claws. The mother had a firm grip with her mouth on the loose skin of the young squirrel's neck. Thus she too helped support the weight of the young one.



The mother squirrel continued down the tree until she noticed that I was watching her, then she stopped, waited a few seconds, and continued on her way. I followed at a short distance, but this did not seem to disturb her. She carried her baby some three hundred yards over the ground, then went up a pinyon pine (*Pinus edulis*) tree, where she put her little one in a new nest. After doing this she immediately came down, stopped and looked around, then returned to the Yellow Pine in which I had first seen her. She went up near the top to a nest which she entered. Soon she came out carrying another one of her offsprings, in the same manner as before. She travelled the same route to the new nest, although she stopped many times to see if I was still watching.

She took the second young squirrel to the nest but this time she remained quite a while before coming out to look around. She went back in, but soon returned, came down the tree and ran back to the old nest. She remained inside for a few minutes, then came out with a third youngster, carrying it in the same manner as before. This youngster, however, did not appreciate being carried in such a way and would often squirm around. The mother would then stop and get a better grip and so finally got this young fellow to the nest where she had the other two. After going in with the third baby, the mother squirrel did not come out again, although I waited nearly twenty minutes to see.

The Western Yellow Pine, in which was located the old nest, was very close to the road along the East Rim of the Canyon, and as the traffic had been increasing upon this road during the past few days, the mother probably thought it unsafe to school her babies in this area, so moved them farther back into the woods. Although the Pinyon Pine, in which the new nest was located, was not nearly so high as the Yellow Pine, it was much denser and afforded better concealment for a home.

The Abert Squirrel is one of the most beautiful squirrels of North America. He is found entirely in the high plateau pine-forested regions of northern Arizona and New Mexico where the altitude ranges from six to nine thousand five hundred feet. He is characterized by his conspicuous ear tufts, his red brown back, light colored sides, white underparts, and broad feather-like tail. He is one of the most industrious inhabitants of Grand Canyon National Park.

FIELD OBSERVATIONS

Four squirrels and a skunk - a most unusual combination! But as a matter of fact they did not mix well. When Lloyd Davis, trail caretaker at Indian Gardens, detected a characteristic skunk odor near his Canyon home recently, and then heard some faint but excited noises from a clump of bushes

lead to investigate. Four large apparently were surrounding the closing in. They were soon his approach and close investigation showed that a very small spotted skunk was defending the entrance of a hole in the bushes. The latter Davis' approach but at the end of the tunnel which was shallow and seven feet long. Concerning the cause of the combat, one can only speculate, however, it must have been a very interesting affair to watch.



-O-O-O-O-O-O-

A very wonderful view of cloud formation was seen by visitors, Thursday morning June 4, 1931, from Yavapai Observation Station. Nearly fifty visitors had gathered there on the parapet by nine o'clock, when the rain which had been falling for the past few hours was reconverted into clouds.

Large white clouds formed in the depths between Yavapai Point and Yaki Point. Although the river could be seen from the parapet, the immediate foreground below was hidden by clouds. These were blown past the observation station from east to west at a rapid rate of speed. Often they completely shrouded the parapet room and so extensive were they that it was quite difficult to see from one side of the room to the other.

At one time one could see two individual rainbows in the foreground of Grandeur Point, caused by the sun rays shining through the loosely consolidated clouds passing through that area. Also at this same time the Colorado River was easily seen through an opening in the rising clouds.

Many clouds formed along the Deeps below the South Rim. They traveled from the junction of the Little Colorado and the Colorado Rivers, westward down the Grand Canyon to a point opposite Powell Memorial, then went out over the South Rim into the Tusayan National Forest. Many of the clouds rose over the rim all along this distance.

The probable cause of these wonderful cloud formations was that the rain clouds above cleared away and permitted the sun to shine through upon the formations of the Canyon, and therefore the resulting heat converted the water on the damp ground into clouds. No doubt much of the falling water was changed back into clouds before it reached the flat platform below, due to the warm air currents in the lower levels of the Canyon.

-- R. A. Redburn --

-O-O-O-O-O-O-

An abundant supply of food seems assured to squirrels and birds of Grand Canyon next fall by the many seed cones now forming on pinyon trees. The last big crop of pinyon nuts was grown in 1927. In succeeding years, only the male flower appeared on the pinyons except for a few seed cones in small, scattered localities.

I have been informed that one crop of seed cones will follow another at irregular intervals of three years, four years and even seven years. At first thought, one might say the variable intervals were due to fluctuating weather conditions, but if so, it would still seem reasonable to suppose that there would be an occasional cone or two on the trees, rather than the total absence of any, during the years of less favorable conditions.

It is curious to note that the staminate, or male flower forms on the lower branches, and the seed cones on the upper branches of individual trees. The writer, not being a botanist, can only hazard a guess at nature's reason for this arrangement, and that is that the male flowers, being short-lived and needed for the sole purpose of fertilizing the seed cones, do not require nearly as much sunlight as is needed to develop and mature the seed cones.

There is also promised this year a good crop of juniper berries and of western yellow pine cones.

-- P. P. Patraw --

-O-O-O-O-O-O-

Some interesting bird records for May:

- May 1 Western Gnatcatchers numerous at Pipe Creek.
- May 3 Rusty Blackbirds - a flock at Community Field, South Rim
- Black-throated Gray and Audubon Warblers abundant at Grand Canyon Village.
- May 4 White-throated Swifts - first arrivals seen at Grand View
- May 7 Pale Goldfinch and Ash-throated Flycatchers seen at Phantom Ranch.
- May 10 Evening Grosbeaks seen in Grand Canyon village.
- May 12 Grace Warbler recorded from South Rim
- May 15 Golden Eagle seen near Redwall on Kaibab Trail.
- May 16 Long-tailed Chats, Lazuli Buntings, Black-throated Desert Sparrows - several of each seen at Indian Gardens.
- Western House Wren seen near top of Bright Angel Trail.

-- E. D. McKee --