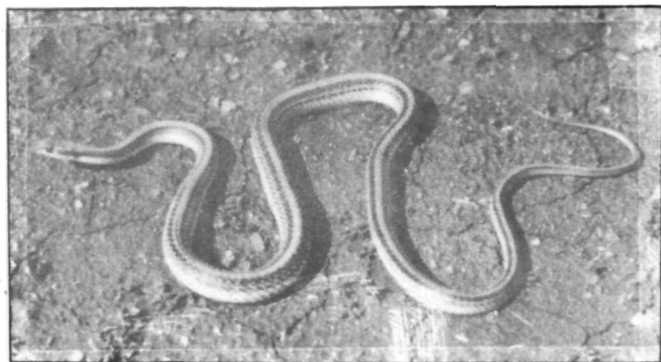


GRAND CANYON NATURE NOTES

September 1932



WESTERN PATCH-NOSED SNAKE

A REPTILE APPARENTLY CONFINED IN
GRAND CANYON BELOW THE REDWALL

(See page 65)

Vol. VII

No. 6

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Grand Canyon Natural
History Association

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

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A Baffling Piece of Plate Glass

By Ranger Naturalist Hugh H. Waesche

YAVAPAI OBSERVATION Station on the South Rim of Grand Canyon is an interesting place from which to view the canyon and to learn about its interesting geological history. At the same time the station has a number of features which are intended to appeal purely to a person's sense of beauty. One of the ways in which this is accomplished is by means of large plate glass windows placed at several advantageous points within the walls of the building. There are three of these. One is located in the west wall, another at the east, and a third, a very large one, directly in front of the entrance where one may look out toward the canyon. The largest window gives a very beautiful view of the great masterpiece of erosion, including the North Rim, Bright Angel Creek, Phantom Ranch, the Colorado River at two places, the Tonto Trail, part of Bright Angel Trail and a number of fantastic temples sculptured by the Colorado and its tributaries. Since this large window is situated directly in front of the main entrance to Yavapai Station, it is the first thing which a visitor sees upon entering the doorway. The exclamations of surprise and admiration by the many people who see it speak for its charm to the public. Because of its clearness and its resemblance to a large painting, the visitors often ask if there is not some unusual feature in the glass itself causing this illusion. Such is not the case. The sides of the window serve as a frame for a restricted view, thus making an indescribably beautiful picture.

To the average insect, however, a very different impression is evidently given. That this large plate glass window is a baffling mystery to great numbers of large, brown wasps, Polistes flavus, is apparent. Day after day these busy creatures in their flights to and fro above the canyon rim attempt to make a short cut through the door of the station and through this window. For some reason, inexplicable as

far as the wasp is concerned, the short cut does not work and he is abruptly and rudely stopped in his flight. But the wasp seems to have perseverance if nothing else, for he will continue to fly up and down the plate glass seeking some explanation of the unusual phenomenon or more likely some avenue of escape. Just behind him is the door through which he entered and just around the corner several feet away is the open parapet of the station. Why doesn't he fly out through one of these? That is a question! He seems never to do this without some outside assistance. He will flutter up and down the glass for hours and finally drop to the bottom exhausted. New explorers of the wasp world try this supposed short route daily with the same experience. At times there have been as many as a dozen of them at work getting nowhere.



Although wasps seem to be most easily fooled, other visitors are not uncommon. During the second week in July two birds were victims of this unintentional trap. A red-shafted flicker, Colaptes cafer collaris, was the first. He was temporarily "disqualified" by trying to dash his brains out on this short cut to the canyon. He was taken into the office of the museum for first aid, but soon after, during one of the daily lectures, he left in a hurry. The second bird within two days was one of

the white-throated swifts, Aeronautes s. saxatalis, which are often seen over the canyon. They fly at an exceptionally high rate of speed. This particular individual crashed into the pane of glass on the canyon side apparently intending to go through the door and out the opposite side of the building. Because of his tremendous velocity at the time of striking the glass, the swift was fatally injured and died shortly after from a crushed skull.

The latest victim of the Yavapai death trap was a small

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Rufous Hummingbird, Selasphorus rufus. He, like the wasps, flew in the door and then to the window, where he fluttered aimlessly until caught by a young man who was washing the glass at that time. This hummingbird was not harmed other than being temporarily stunned from his first impact with the pane, and after being identified at the naturalist's office, was allowed to escape through the window.



INSECT NOTES

By Ranger Naturalist Clyde C. Searl

SINCE CITRICOLA scale, whose host is hackberry, has recently become a menace to citrus growth in southern California, Mr. Stanley E. Flanders of the Citrus Experiment Station, Riverside, California, has just made a trip through Arizona, Utah, and Nevada, to examine native hackberry for the presence of this scale. At Grand Canyon the writer was privileged to accompany him down the Bright Angel Trail during his examinations. The first bushes of hackberry to be found were near the base of the Supai formation, and on them two species of common scale were collected. These were later determined as Pulvinaria vitis and Lecanium corni. Both have been reported before on hackberry, the latter from the United States as far north as Canada and as far east as Indiana. Pulvinaria vitis occurs on hackberry in Zion National Park, Utah, near the temple of Sinawava.



THE 1933 "PINE NUT" CROP

By Ranger Naturalist A. Russell Croft

THE PINE is one of the few trees which may have the fruit crops of two successive years developing on the same tree at the same time. Consequently, it is possible at this time, July 1, 1932, to determine the size of the 1932 fruit crop, and also to estimate the approximate size of the 1933 crop--about fifteen months before the latter crop of so-called "nuts" is mature.

The "nut" of the pine is not a nut at all, but a true seed. In this very brief discussion the term seed will be used.

The seed crop of the Pinyon Pine, Pinus edulis, on the South Rim of Grand Canyon will in all probability be considerably below normal in 1933. Before giving the reasons for this belief it seems advisable to explain how the seeds of the pine originate and grow to maturity. The process is fundamentally the same for all pines, but this statement is made with special reference to the Pinyon Pine.

Pines bear two kinds of flowers, commonly called cones. The male flowers, born in lateral clusters, principally on

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the lower two-thirds of the tree, produce pollen. Their function is completed as soon as the pollen is mature. The female flowers are small cone-like structures born terminally, principally on the upper third of the tree. They contain the embryonic seeds and normally remain on the tree until mature, developing into the fruit. Two naked seeds are usually produced on the upper surface of each scale of the fruit (cone).

Under favorable conditions a tree with a developing crop of year old fruit will often bear a crop of female flowers or cones which, at least for one summer, will undergo their early development along with the year old fruits. Thus, two fruit crops may be found on a single tree at the same time so it is possible to estimate the fruit crop for two consecutive years.

The Pinyon exhibits another interesting phenomenon in connection with flower bearing which is possibly true, more or less, of all pines. In the spring the vegetative buds elongate into branches with the embryonic leaves spaced proportionately along them. Then, almost simultaneously, two buds appear on the end of this new branch. They are, (1) the vegetative bud with its embryonic stem and leaves for the following year's growth, and (2) the female flower bud. This latter bud develops immediately into the female flower and differs also from its companion bud in that its primordia existed in the parent bud from which the new stem grew. Thus, nature makes two important steps which insure future growth before expending the energy necessary for the production of leaves on the current stem growth. (See sketch).

As has been stated previously, the female flowers appear on the upper third of the tree, especially near the top, and consequently are not easily detected with the unaided eye when they first appear. However, with a good binocular the tree tops may be easily examined for the presence of the flowers.



In estimating the fruit crop for any given year a

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standard by which to make a comparison must be selected. In estimating the 1933 crop, the only tangible basis of comparison is the 1932 crop now on the trees. The estimate has been based on the following observations:

1. A scarcity of fruit on the young trees of bearing age.
2. A scarcity of fruit on trees now maturing a fruit crop.
3. A scarcity of fruit on the mature trees which will not bear fruit in the fall of 1932.

The 1933 fruit crop, estimated on the basis of the number of female flowers at the present time, will be reduced considerably before maturity by the following factors:

1. Failure to pollenate.
2. Failure to fertilize.
3. Mechanical injuries due to storms.
4. Consumption for food by animals.
5. Natural thinning.
6. Unknown causes.

In certain localities around Grand Canyon, notably at Hermit's Rest, a very good crop of seeds will be produced in 1933. Also, along highways where drainage from higher ground has provided a greater supply of soil moisture, a very favorable crop of seeds will probably be produced, but in general the crop will be considerably below normal, as already stated.



HERPETOLOGICAL PROBLEMS
~ AT ~
GRAND CANYON NATIONAL PARK

By Ranger Naturalist Charles M. Bogert
(Photographs by the author)

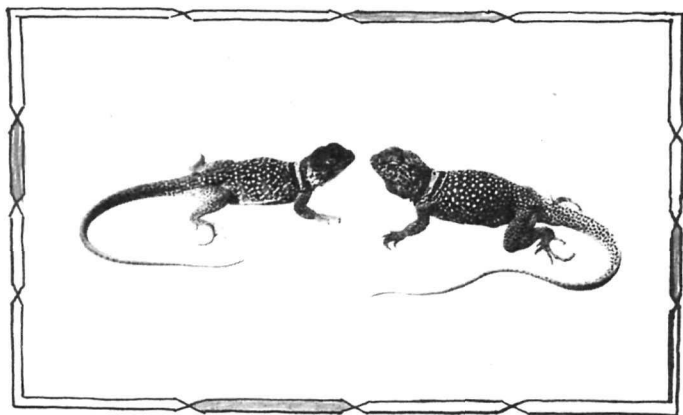
BEFORE discussing the herpetology of Grand Canyon, it should be pointed out that all the problems to be confronted are not now apparent, owing to the relatively small amount of collecting that has been done in the region. Collecting here, as in other parts of the arid southwest, is difficult for while species are fairly abundant, individuals are not. Especially is this true in regard to the snakes. To date three amphibians, thirteen lizards, and thirteen snakes are known to occur within the park limits. Two or three other snakes are almost certain to occur here and collecting in some of the more or less inaccessible areas along both the east and west boundaries of the park will probably reveal the presence of more lizards.

My record of the Lyre Snake, Trimorphodon lyrophanes, from Zion National Park, Utah, probably indicates that this species occurs in Grand Canyon. Likewise, some species of Tantilla should occur here. But the secretive nature of these as well as some other small ophidians makes their collection difficult. Collecting at night by automobile headlight, which has proven so fruitful on the open desert, is, of course, impossible at Grand Canyon, except on the rims, which are normally too cold after dark for nocturnal reptiles. Collecting with flashlight on a mule was tried without success.

Men working in the canyon have the best opportunity to collect snakes and so far this has proved to be one of our best sources of material. Particularly are we indebted to Mr. Lloyd Davis at Indian Gardens for his assistance, and it is hoped that other men may become sufficiently interested (or sufficiently overcome their fear) that they will aid us in collecting.

Several species of lizards in the region in and around

the park exhibit considerable variation, perhaps not worthy of even sub-specific rank but interesting, nevertheless. For instance, the Collared Lizards, Crotaphytus collaris, in the



Collared Lizards of California closely resembled by the phase found in Grand Canyon.

canyon are colored somewhat like those of California and southwestern Utah, the males usually possessing a dark patch on the throat and darker lateral patches extending from the posterior of the belly on to the rear limbs. The ground-color above is greyish or pinkish brown in live specimens unlike those to the south on the Colorado Plateau which are decidedly greenish in their general coloration.

The Swifts, Sceloporus, undoubtedly are in need of an

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extensive revision before problems connected with their taxonomy are settled. There occurs along upper Bright Angel Creek a phase of Sceloporus which I first noticed in 1928 and which several observers have commented upon since. Individuals, both young and adult, are without markings, the upper surface possessing a uniform bronze coloration. Study of the Sceloporus group may reveal this to be a distinct species. Field observations would lead one to expect this, for while inhabiting the rocks along with Sceloporus elongatus it is easily distinguishable and there appear to be no "intergrades".

The Horned Lizards, Phrynosoma, which occur within the park limits only on the plateaus so far as known, are apparently the same on both North and South Rims. Following Van Denburgh, I would call those within the park on the wooded plateau Phrynosoma douglassii hernandesi, while specimens from the desert at Tuba City I have called P. d. ornatissimum. Intergradation would be expected to the east of Cocconino Basin where the timber ceases and brushy desert begins.

Concerning the snakes, we have fewer problems of a taxonomic nature. The Gopher snakes, long the bane of existence to herpetologists, present perhaps the hardest problem. While the two sub-species, Pituophis catenifer rutilus and Pituophis catenifer stejnegeri (the latter is not recognized by some herpetologists) have for several years been pointed to as an example of diverging development resulting from the canyon barrier, the finding of specimens well down in the canyon tends to detract from the validity of the barrier hypothesis in this case.

With the reptiles, probably our best example of the canyon as a barrier is to be found in the rattlesnakes. Klauber's sub-species, the Grand Canyon Rattlesnake, Crotalus confluentus abyssus, seems to be nicely consistent, the only specimen so far found to occur outside the canyon walls being a specimen collected this past July by Bert Long and David Smith on the west slope of Cedar Mountain near the east boundary of the park. The specimens of abyssus from the east end of the park seem to be less distinctly marked than those

from Indian Gardens and Roaring Springs, but they are distinctly different from the yellowish green Prairie Rattlers, Crotalus confluentus confluentus, found a few miles south of the rim. Rattlers are exceedingly rare along the South Rim and any specimens found may aid considerably in establishing the relationship existing between the "pink" and the "yellow" sub-species of Crotalus confluentus. No specimens have been collected at the canyon edge on the North Rim and the only specimen from the Kaibab Plateau apparently is a juvenile from Jacob's Lake. Any specimens from the Kaibab are likely to prove of great value.

The one Black-Tailed Rattlesnake, Crotalus molusaus, collected in the canyon is of interest in extending the range of this species to the north and the Grand Canyon probably marks the northern limit of its range. Only extensive collecting to the north of the Colorado River in the west end of the park would establish this, however. The Black-Tailed Rattlesnake is apparently not rare in Havasu Canyon, according to a Havasupai Indian with whom I talked.

Regarding the problem of life zones, we have few reptiles which may be regarded as good indicators for a single zone. Of the lizards, only the Desert Brown-Shouldered Lizard, Uta stansburiana stejnegeri, seems to be very strictly confined to the Lower Sonoran Zone. The Gecko, Coleonyx variegatus, probably is confined to Lower Sonoran, but too few specimens are available to say definitely. If we follow the zoning outlined in "Ornithology of the Life Zones" by Randolph Jenks*, we find several desert lizards ranging well up into the Upper Sonoran; I have collected Sceloporus magister on the rim at Yavapai Station which Jenks regards (and properly I believe) as the upper limit of the Upper Sonoran Zone. Likewise, I have collected the Chuckwalla near the top of the Redwall limestone well into the Upper Sonoran Zone.

Except for Sceloporus magister the other members of this genus here seem to have Upper Sonoran propensities, but their range extends well into the Transition Zone. In the case of Phrynosoma the preference for the rim would seem to be one of terrain rather than of climate.

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To what extent ophidians are affected by life zones in the canyon not much can be said concerning most species until more collecting has been done. The Western Striped Racer, Masticophis t. taeniatus, the Gopher Snakes (considered as a genus), and the Wandering Garter Snake, Thamnophis ordinoides vagrans, are apparently affected but little by varying conditions between the canyon bottom and the rims while the King Snakes, Lompropeltis, the Patch-Nosed Snake, Salvadora g. hexolepis, and the Bi-colored Ground Snake, Sonora Semianulata, are probably confined to the Lower Sonoran Zone extending upward into the Upper Sonoran to the base of the Redwall limestone.

Concerning the rattlesnakes, it has been perhaps the climatic factor which has brought about the evolution of the distinct Crotalus confluentus abyssus, a snake confined to the canyon and to the Lower and Upper Sonoran Zones. Collecting to date indicates this. If we dare to offer any hypothesis regarding the origin of the Grand Canyon Rattlesnake, the effect of the canyon as a climatical or environmental basis would appear to be one of the best.

*Jenks, Randolph, Ornithology of the Life Zones, Technical Bulletin No. 5, Grand Canyon National Park, 1932.

