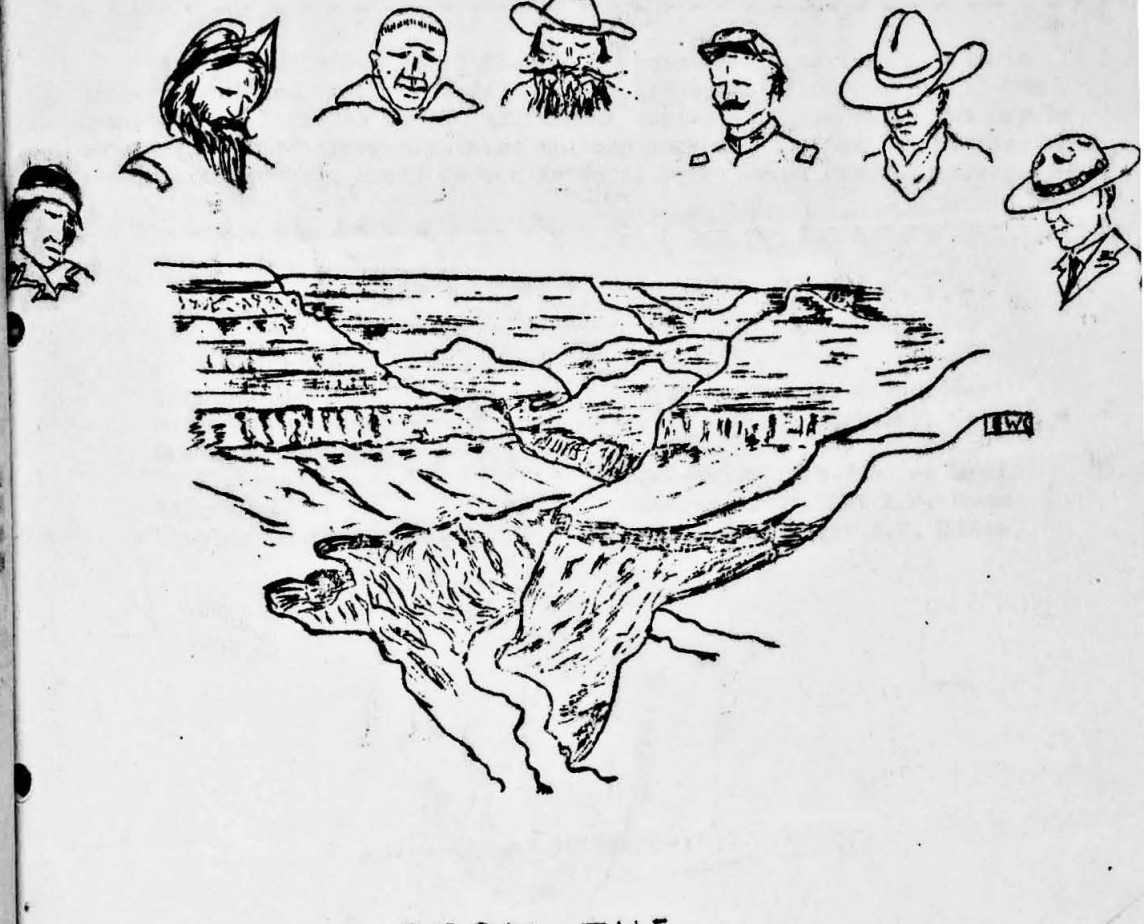
NATURE NOTES



FROM THE

GRAND CANYON

Vol. 4 Oct. 1930 No. 1

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

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GRAND CANYON NATURE NOTES October 31, 1930

This Bulletin is issued 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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DEER ANTLERS

By Ranger-naturalist Clyde Seagl

The great herd of deer on the Kaibab plateau calls forth almost as many questions as there are deer. The most common question is, "Is it true that deer lose their horns every year?" It is hard for many people to believe that deer actually do this.

If one wanted to argue the point, deer do not really lose their horns, inasmuch as they do not have horns to begin with. True horns are found in oxen, sheep, and antelope. The horns of deer being solid are technically called antlers.

Antlers are simply protuberances of the frontal skull bone. While growing, the outgrowths are covered with sensitive, vascular, hairy skin, commonly called velvet. The blood supply to the antler stops as soon as the growth is completed. When the blood supply ceases, the skin dies and peels off, leaving the bone bare, and in the late winter the bones, by a process of absorption near the base, become detached from the skull and are dropped. This process is repeated every year, the new antlers budding out on the stumps left by the shedding of the old ones.

With the sole exception in North America of the Reindeer or Caribou, antlers among deer are borne only by the male. In full-grown bucks or stags, antlers usually consist of a stem or beam bearing branches commonly called tines or points. New tines or points are added from time to time but they show no direct relationship to the age of the deer. Sometimes only one side will send out a new point giving the antlers a lop-sided effect. The antlers of Bill, pet buck at the North Rim camp center, have an extra point on the left side.

Many people have remarked that they would like to go out into the woods and pick up some shedded horns, but the deer seldom drop the antlers until the snows start to fall and by this time they have moved to the winter ranges at lower elevations.

BUTTERFLIES OF THE GRAND CANYON

By Robert G. Wind, Berkeley Calif.

The Grand Canyon offers great variety in butterfly collecting. There are three distinct areas - the South Rim, North Rim and the bottom of the Canyon.

On the South Rim are the low forests of Pinyon Pine and Juniper, with large Yellow Pines scattered about. The collecting is at its best in May and June when the flowers are in bloom. Because of the great number and variety of these at Yavapai Point, it is one of the best collecting spots on the South Rim. There, one may find butterflies such as skippers, hair-streaks, and satyers in abundance. Below the public camp grounds and along the railroad tracks is another of the favorable localities of the South Rim. Here one finds blues, hairstreaks and checkerspots. South of Grandview Point probably is the best collecting grounds for blues and checkerspots.

On the North Rim the high forests of Engelmann and Colorado Blue Spruce offer an entirely new field. The season here is much later, being best in July when the flowers are at their best. Here one finds a new group of skippers, checkerspots, and crescent spots.

At the bottom of the Canyon along the part of Bright Angel Canyon the best collecting comes in April and May. Here the swallowtails and small yellows abound. Little yellow skippers and the large Queene butterflies mingle together over the stream.

The upper end of Bright Angel Canyon is still different as both the species from the top of the Canyon and those from the bottom mingle with entirely new species.

The Grand Canyon National Park taken as a whole is one of the most varied collecting grounds for butterflies in the United States.

A Preliminary Check List of the Dinural Lepidoptera of the Grand Canyon, With Data

1. Papilio rutulus arizoniensis. Luc. North Rim. June 13, 1930. Found near ponds on roads and in open fields and meadows.

2. Papilio philenor. Linn. Along Bright Angel Creek in month of June.

3. Papilio Daunus Kirby. North and South Rims and on the slopes of the Canyon along creek beds in month of May and first part of June.

4. Papilio bairdi. Edw. South Rim from May 15, to first of June. Found most commonly along edges of Pinyon Pine forests.

5. Papilio hollandi Edw. South Rim and Indian Gardens. End of June to middle of July.

6. Pieris protodice. Edw. South Rim May and June. Common in open glades of forests.

7. Pieris protodice occidentalis Reak. South Rim May and June.

8. Colias Eurytheme. Edw. South Rim, June. Common around public camp grounds and along railroad tracks.

9. Colias Eurytheme ♀ amphidusa. Bdw. South Rim and North Rim. End of June in same localities as Eurytheme.

10. Nathalis Ille. Bdv. South Rim and Phantom Ranch in month of June.

11. Eurema nicippe. Cram. Rare on South Rim but common along Bright Angel Creek near entrance to river. Month of June.

12. Eurema mexicana. One lone specimen in poor condition captured on southern boundary line. Evidently a stray. June 17, 1930.

13. Danies Bernice strigosa. Bates. South Rim and Phantom Ranch. End of June. Rare.

14. Euptoieta claudia Cram. Common on South Rim flying around in shrub brush. Also found on North Rim. Month of June.

15. Melitaea minuta Edw. Very common in wooded lanes along dried creek beds. Caught in great numbers in canyons running off from Grandview Point to the south. Entire month of June. The Grand Canyon is probably the pbest place for collecting this rare Melitaea as it is more common here than imost places on its range.

16. Melitaea acastus Edw. Along Kaibab Trail near top of North Rim. Rare. June 10, 1930.

17. Melitaea alma Stre. A rare species caught in May. Very scarce here.

18. Phy. pallida, very rare. Along Kaibab Trail near top of North Rim. June 20, 1930.

19. Phyciodes camillus Edw. North Rim June 15, 1930.

20. Vanessa huntera. South Rim June. Common.

21. Vanessa Antiopa. North Rim June.

22. Vanessa caryae Hub. Common on the South Rim in June.

23. Basilarchia Weidameyeri. Edw. Rare at the Grand Canyon. Found on the North Rim and on the Kaibab Trail as it nears the top of the North rim. This species is not easily caught and is found in the month of June.

24. Heterochroa californica Butler. Found in oak tree groves on North and South rims in month of June.

25. Coenonympha ochracea Edw. Common South Rim along open flats around El Tovar Hotel in the month of June.

26. Satyrus meadi (Edw). Yavapai Point is the favored locality of this species. It is not easily captured as it flies around in the Pinyon Pine forest losing itself in the trees. Found in June.

27. Neonymphia henshawi (Edw.) Found along the railroad tracks below El Tovar Hotel on slopes of Canyon in the month of May.

28. Thecla siva Edw. Found commonly on Penstemon along road to Yavapai Point in early June. Another brood comes out in late June.

29. Thecla behri Edw. Found along with siva on road to Yavapai Point in June.

30 Thecla calinus Hub. Rare on South Rim of the Canyon. Found in early June.

31. Thecla melinus. Comon along railroad tracks south of hotel in June.

32. Lyceana marina. Along railroad tracks below hotel in June. Common.

33. Lyceana exiles Bois. Found at Phantom Ranch in early June.

34. Lyceana isola Rea. South Rim along railroad tracks below hotel in the month of June.

35. Lyceana melissa (Edw.) Most common south of Grandview Point In June.

36. Lyc. Pseudoargiolus arizoniensis. Bois. South Rim along railroad tracks below hotel in month of June.

37. Epargyreus tityrus Fa. North Rim everywhere in month of June.

38. Urbanus montivaga Rea. South Rim everywhere in June.

39. Urbanus scriptura Bois. Very rare. Found on South Rim in July.

40. Urbanus ericitorum. South Rim at Yavapai Point, first of June.

41. Urbanus xanthus Edw. South Rim end of May. Rare.

42. Erynnis juvanalis Fab. Yavapai Point in June.

43. Erynnis Persius afranius. Yavapai Point, June.

44. Erynnis pacuvius Lint. Yavapai Point, June.

45. Copalodes procris Phantom Ranch in June.

46. Lemonaies cleis. Edw. North Rim in May, rare.

SEEDS OF SOME GRAND CANYON WILD FLOWERS

By Ranger-naturalist Pauline Mead

During the spring and summer, wild flowers bloom in abundance under the pinions and junipers of the Grand Canyon region. First the sego lilies and delphiniums, later the many varieties of brightly colored pentstemons, lupines and wild gereniums and finally in the fall, the purple asters appear. Some such as the cliff-rose bloom throughout the three seasons.

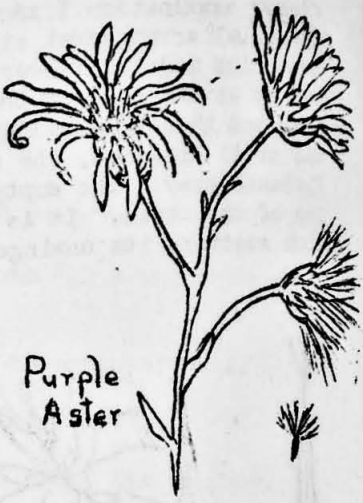
In October and November the woods begin to look desolate and a few of the last bright oak and service berry leaves cover the ground as though to compensate for the loss of the flowers.

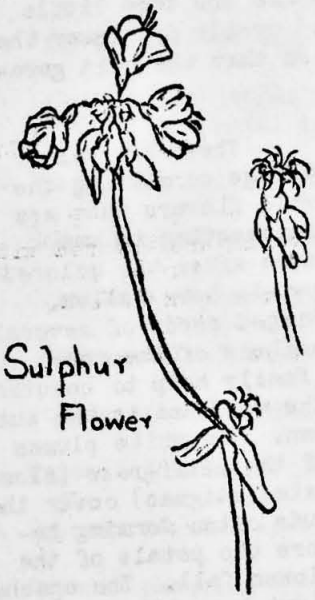
Poking about among the leaves one day in late October in search of geranium seeds for a wild flower garden, my attention was directed toward a group of cup-like pods arranged in a ring around the elongated style of

a withered flower, a little more than half way up its length. Upon closer examination I saw why the pods assumed this position instead of the usual arrangement at the base of the style. As the seeds had become ripe and the flower parts dry, the pod had pulled away from its pocket at the base of the style, at the same time splitting half way open and then by a sudden curling up of the style fiber, to which it was still attached, the seed had been thrown from the pod some little distance away. The empty pod had been left turned upside down near the top of the style. It is by this ingenius mechanism that the wild geranium scatters its unwinged seeds.

There are many things concerning the wild flowers that are interesting to watch even after the colored petals have fallen. Winged seeds of several members of the rose family help to beautify the woodland in the autumn. The white plumes of the cliff-rose (elongated stigmas) cover the buds often forming before the petals of the flower fall. The apache plume has silky tassels of a delicate silvery lavendar and pink. The plume of the mountain mahogany is very much like that of the cliff-rose, except that it curls. These plumed seeds are carried but little by the wind and usually they fall near the base of the parent bush.

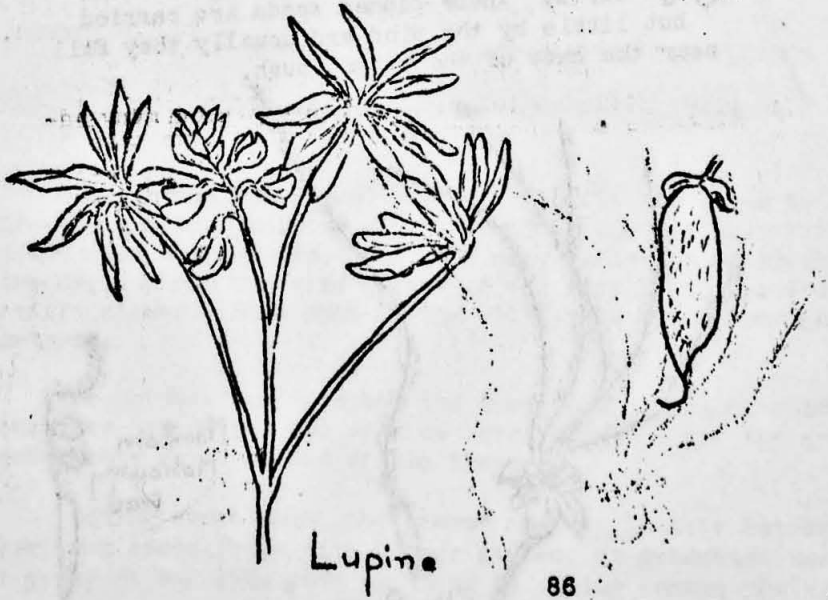
Many of the winged seeds of the aster family are much more efficient in dispersal than those of the rose group described abeve. Good examples are the seeds of the purple aster and those of the wild dandelion.





The wild buckwheat or sulphur flower uses the petals of the dead flower as wings. The petals persist after the seed has ripened. Each flower stalk is brittle and breaks easily, and the dry petals are lifted by the wind carrying the seeds with them. The cup that held the flower group is left with the broken stalks.

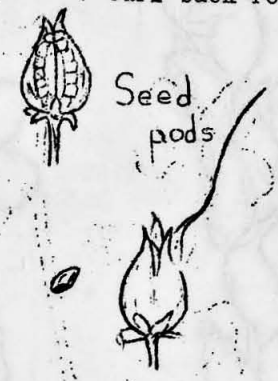
In many cases seed pods open in such a way as to scatter the seeds. The lupine or blue bonnet illustrates this. The seed pod of the lupine has the shape typical of many members of the pea family. It is rather purlish in color and is covered with a silvery fuzz. The seed is rounded and is a tan color with brown spots. When the pod dries, it splits and curls, forcing the seeds from the pod.



The seeds of the pentstemon or scarlet bugler are contained in two chambers in the pod. The pods split regularly into four parts and drop the seeds.

The Indian paint brush of the same family has a pod which is somewhat similar. It has two chambers, but splits in half with the opening cutting through the middle of each chamber.

The small black seeds of the thistle poppy which are covered with regular rows of tiny bumps, fill the open pockets of the pod. The four ribs of the pod stay in place while the softer divisions between the ribs curl back releasing the seeds.



In the case of the mallow, each seed has a papery case of its own. These cases are arranged in a circle forming a green ball to begin with. When the pods dry they open at the top and separate, spreading out like the petals of a flower, the seeds dropping to the ground.

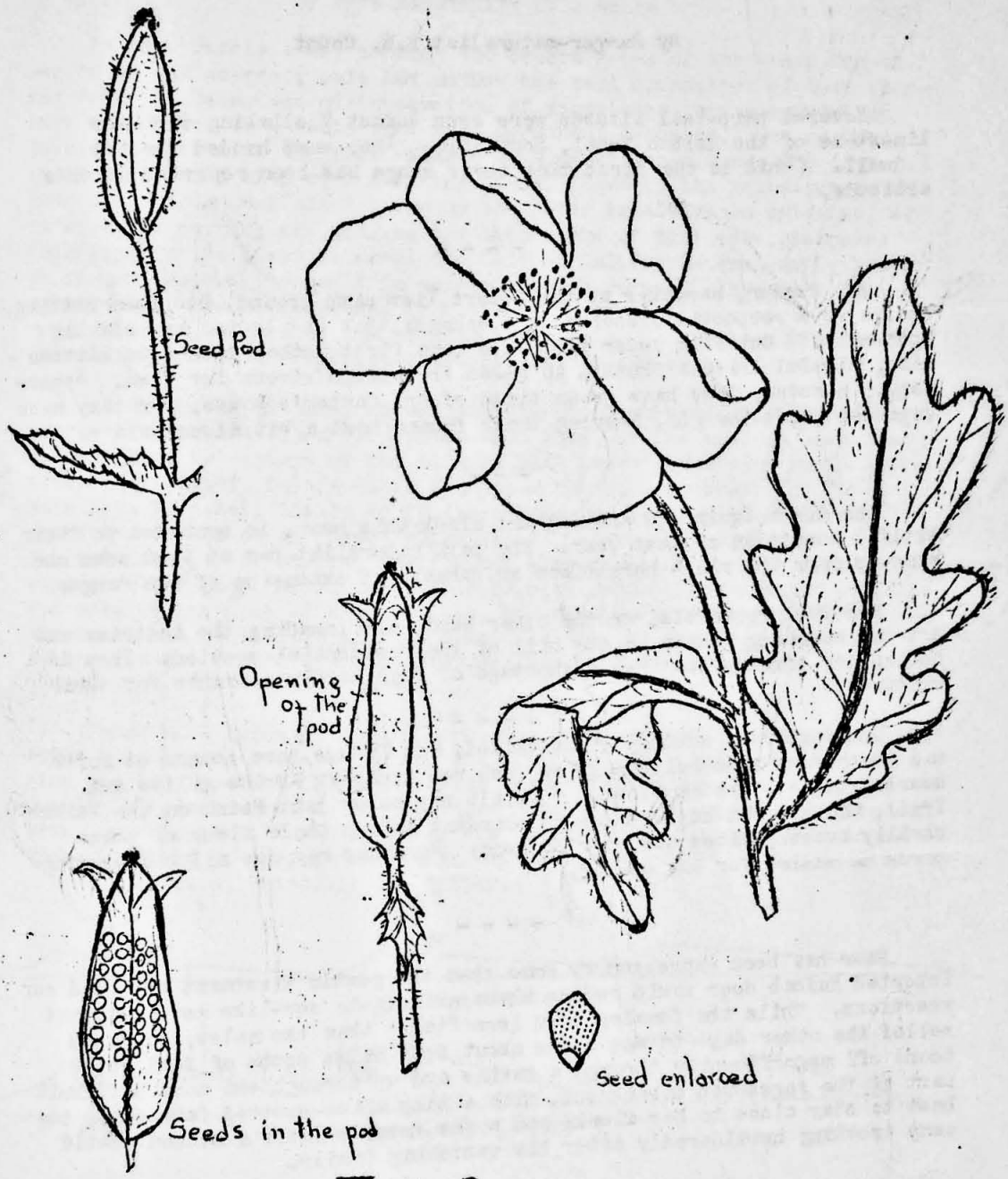
Plants when in seed appear very different from those in flower. There are a good many advantages in recognizing plants that have gone to seed, particularly in connection with wild flower garden work. Plants should not be transplanted when they are in bloom and it is well to be able to recognize the desired plants late in the fall. Collecting and planting seeds in wild flower gardens is usually more satisfactory than transplanting, although it is rather slow work since relatively few wild flower seeds reach full development.

Indian Paint-brush

(seed pods enlarged)

Seed Pods

Globe Mallow



Thistle Poppy

BRIEFS

By Ranger-naturalist E.W. Count

Several whip-tail lizards were seen August 7 climbing the Muav limestone of the Kaibab Trail, South Rim. They were headed for the Redwall. (This is the first time their range has been reported at this altitude.

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Mr. Carter, caretaker at the Desert View camp ground, has been setting chairs at a respectful distance of evenings, that the ladies may see his "pet cats." Out from under his house come first mother then five kittens - nice, playful Arizona Skunks, to glean the scraps strewn for them. Apparently, however, they have grown tired of Mr. Carter's house, for they have departed below the rim, leaving their former host a bit disconsolate.

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The Abert Squirrels are fat and sleek this year, in contrast to their pitiful condition of last year. The park naturalist has at last seen one come up over the rim - heretofore an unheard-of extension of the range.

The Rock Squirrels, on the other hand, are invading the interior and are now becoming common on the hill of the residential section. They do not appear scrawny, so that a shortage of food hardly accounts for their ventures.

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Hummingbirds, notably Broad-tailed, and Rufous, are common on North and South Rims when hollyhocks or such red trumpets as the gilias and scarlet buglers are in bloom. A little way below Yaki Point on the Kaibab Trail, the scarlet buglers are so abundant that a whole flock of these shrilly buzzing mites are ever on hand: Here one may see all the hummingbirds he wishes for the asking.

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Fear has been expressed by some that the gentle treatment accorded our imported Kaibab deer would reduce these animals to cow-like movements and reactions. While the females seem less "tame" than the males, it was a relief the other day to see a doe about four miles south of Yaki Point bound off magnificently through a ravine and up through the most difficult part of the sagebrush embankment, with a tiny white-spotted fawn doing its best to stay close to her flank; and a few seconds later a second little camp trotting bewilderedly after his vanishing family.

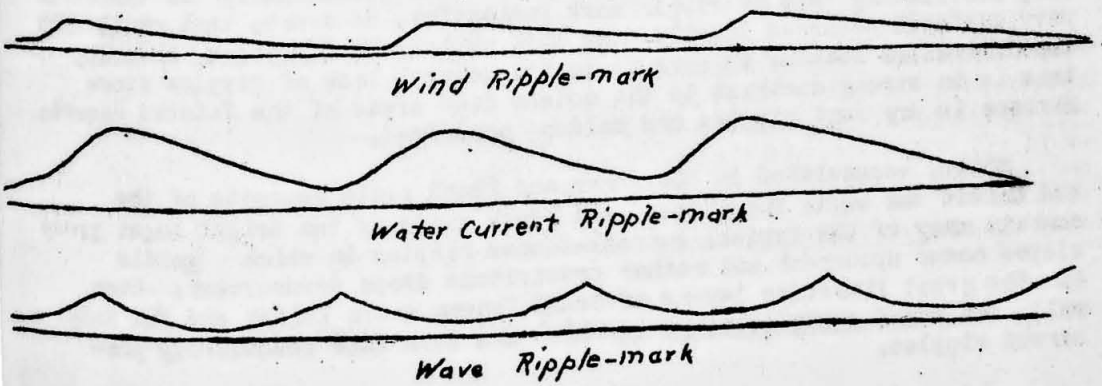
RIPPLES IN THE SANDS OF TIME

By Park Naturalist E. D. McKee

As one travels today through the desert areas of the Grand Canyon region he can scarcely help but notice the vast quantities of sand forming from the decay and disintegration of sandstones, and accumulating here and there, as momentary or more permanent deposits. Out in the Painted Desert near the Hopi village of Moencopi vast dunes are seen piled up by wind with ever shifting sands. Down by the turbulent Colorado a veritable sand blast borne by the river is always in evidence, as it works at cutting and gouging the hard rocks of that area, yet even this sand in its hurry to reach the Gulf of California frequently stops to form a temporary deposit in some sheltered corner. These are demonstrations of the methods used in building up great strata of sandstone such as cover so much of the plateau surface in the American Southwest, and which form most of its spectacular cliffs and mesas.

As the sands of today accumulate a vast quantity of records are made of the life which walked or crawled upon them, of the wind or wave that formed them, or perhaps of the climate that prevailed during their deposition. What proof of life could be better than the existence of footprints made by a Whip-tail Lizard as it ran across the sand by the Colorado River or of the tracks of an insect which clearly crawled along a dune in the Painted Desert? Of similar importance, also, are the ripples left by wind or water upon the surface of depositing sand. They are the evidence not only of its mode of accumulation, but also in some measure of the environment and conditions at that time. To him who is of an observing nature and who carefully makes distinctions, these ripples tell a great story.

Three main types of ripple marks may be distinguished almost wherever found and they do much to explain the origin of the sands containing them. Wind ripples have low crests and wide spaces separating them. Ripples formed by water currents, on the other hand, have high crests as compared with their lengths. Both of these are assymetrical and therefore in contrast to those of perfect symmetry, which are the result of the oscillatory movement of waves agitating the bottom.



Air current or wind-ripples vary but little with the wind velocity, though somewhat with the size of the particles moved. Usually they are two to four inches in length and from 1/8 to ¼ inches in height. In the Painted Desert area where examined they were found to be seldom straight but usually parallel, and often forming a network. Their lengths extended both up and across the slopes of the dunes and in many cases small interference ripples were within the troughs and at right angles to the main ripples.

It is interesting to note that "water current ripples travel downstream as the sand grains are rolled up the gentle slopes and dropped on the lee side. The ripples are completely rigid with the grains of the top layer moving along the surface. Above a certain velocity, however, a smooth sheet is formed due to the movement of sand beneath. In brief, a layer of mixed sand and water is in motion. With speed still further increased (above 2.2 feet per second) an upstream motion is begun and ripples formed. There is erosion upstream and deposition downstream."*

Wave-ripples which are caused by agitation of the bottom by an oscillating movement of the water above are always symmetrical.

So far as known ripples range through all depths of water, and of course many combinations of types occur. One set forming after the completion of another, or wave ripples following current are known as compound ripples.

It is a very impressive thing while travelling up Bright Angel Creek where currents are constantly forming ripples along its course, to see in the same vicinity the marks of similar ripples appearing as great washboards in the red rocks of Algonkian Age - formed hundreds of millions of years ago. As a matter of fact, in practically every formation in the walls of the Grand Canyon have been found ripple marks of one type or another, and in some cases they are the only evidences that remain there to tell us about the environment of a particular period far back in history.

In that high white cliff - the Coconino Sandstone, which usually forms a barrier to travel down the Canyon sides, have been found many of the long sweeping ripples with low crests which are so typical of wind action in dune areas. Here also are found occasionally the symmetrical, oscillating type of ripple mark indicating, no doubt, that pools with wavy surfaces occurred locally. In this mysterious formation, however, the remarkable feature appears to be the general lack of ripples since this is in strong contrast to the modern dune areas of the Painted Desert. Perhaps in dry sand ripples are seldom preserved.

Silts, accumulated in the river and flood plain deposits of the red Hermit and Supai formations, and beach sands of the Bright Angel group contain many of the typical current-formed ripples in which gentle slopes occur upcurrent and rather precipitous drops downcurrent. Even in the great limestone layers of Grand Canyon - the Kaibab and the Redwall, are found sandy sections in which are seen some beautifully preserved ripples.

So the great changing, moving story of the early part of the earth's history is partially recorded in rocks of the Grand Canyon region, and the ripplemarks in these do their part in illustrating the events. Ancient landscapes - first a sea, then a river's floodplain, or perhaps a sand dune area, took their place one after another in this region and left fragmentary records of a great series of events.

*Treatise on Sedimentation - Twenhofel.

The following measurements and observations are from rocks of various ages which occur in the Grand Canyon region. Those with index above 1/20 are probably wind-formed; those below and assymetrical are current-formed; and the symmetrical ones are fromwave-action.

FORMATION	AGE	LENGTH	HEIGHT	INDEX	OBSERVATIONS
Hackatai Shale	Algonkian	1-1/8"	3/16"	1/6	Fairly coarse sand, Red
" "	"	7/8"	1/8"	1/7	Very fine silt, Red
" "	"	1¼"	3/16"	1/7-	Fairly coarse sand, Red
" "	"	1-1/16"	1/8"	1/8-	Ripples at rt. angles in consecutive layers
" "	"	2¼"	¼"	1/9	Trough-like cross veining
Bright Angel Shale	Cambrian	2½"	¼"	1/10	Track of crustacea along ridge greenish purple micaceous shale.
" " "	"	1½"	5/16"	1/5	Crests not parallel by forming network
Muav Limestone	"	2½"	5/16"	1/8	Sandy Ls. Network formed. Fucoids in both troughs and crests.
Redwall Limestone	Mississippian	2½"	3/8"	1/7-	Casts in limestone, 17 in series.
Coconino Sandstone	Permian	7"	3/16"	1/37	Fine, even grained white sand
" "	"	6"	3/16"	1/32+	Three crests
" "	"	3"	3¼"	1/12	Symmetrical
" "	"	2"	3/16"	1/11+	Symmetrical
" "	"	2¾"	3/16"	1/14+	Symmetrical
Moencopi Shale	Triassic	1¼"	3/16"	1/17-	Fine red sand, ripples regular.
" "	"	1-1/8"	1/8"	1/9	Fine, yellow sand
" "	"	1"	1/8"	1/8	Pink, coarser sand, badly eroded.