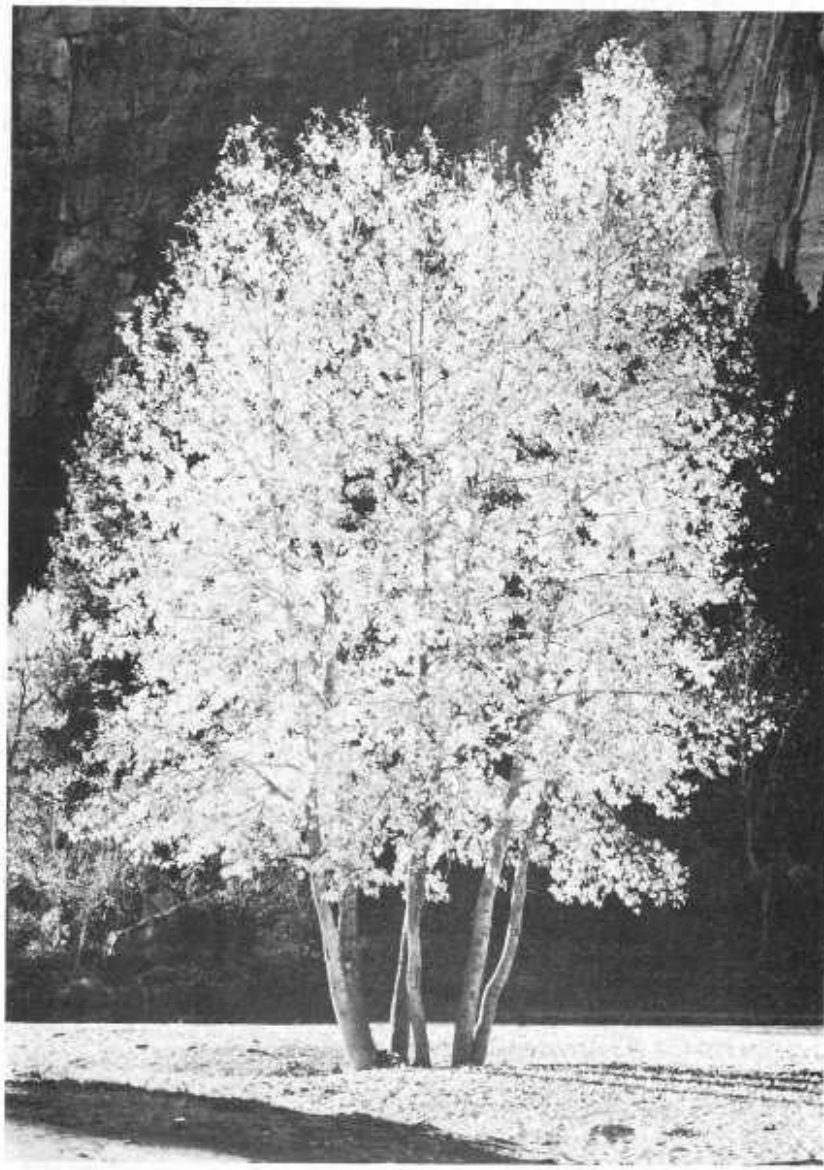
YOSEMITE

NATURE NOTES

VOLUME XXXVII - NUMBER 10 OCTOBER 1958



—*Anderson, NPS*

Autumn in Yosemite.

YOSEMITE · NATURAL · HISTORY · ASSOCIATION ·

NATIONAL PARK SERVICE
Department of the Interior

In cooperation with the National Park Service.

—*Anderson, NPS*

Storm over Tuolumne Meadows.

YOSEMITE
Nature Notes

in its 37th year of public service. The monthly publication of Yosemite's park naturalists and the Yosemite Natural History Association.

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A RAIN HIKE IN THE HIGH SIERRA

By Allen Shields, Ranger-Naturalist

The admonition, "He doesn't know enough to come in out of the rain" can now be changed to read "He knows enough to go out in the rain." Counting the naturalist, 13 people learned more about themselves and Tuolumne Meadows by hiking in the rain than they had thought possible before it happened.

The rain, snow, and hail had been coming down for almost an hour before the time scheduled for our geology hike. The naturalist arrived at the Tuolumne Meadows Information Station ready to go back to his tent, sure that no one would be going on the hike. Inside the station were a few people looking at copies of *Yosemite Nature Notes* and talking quietly, glancing occasionally out of the windows to see what the weather was doing. It was doing its worst.

"Anyone for the geology hike?" "Well, I guess so," someone answered. Twelve people walked out into the heavy downpour, wet before entering the three cars for the ride down the meadows to the first stopping point. Lightning and thunder urged the rain in greater intensity as the naturalist slogged across the meadow to the glacial polished granite surface. Twelve people hunched their shoulders against the cold and listened to a rapid resume of 200 million years of geologic history, felt the polished surface, looked at Ragged Peak, Unicorn, Lembert Dome, Johnson Peak, and heard about glacial evidences that were obscured by the storm clouds. Through a sudden break in the cloud waves, Erratic Dome showed itself—looking very wet—for our final objective. As the group plop-plopped its way back to the cars, Sierra shooting stars and Yosemite asters looked particularly brilliant against the water-filled meadow where Brewer blackbirds and Cassin's finch were feeding.

Our second stop was made at Pothole Dome at the end of the meadow. The storm's full fury was whipping the meadow grasses, filling the small stream to overflowing—and all feet

became wet. On the dome sides we could see for the first time how streams and rivulets contribute to weathering, where lichens are more likely to grow and begin their timeless process of making soil. The climb up the side was made through a stream that had come into being as we watched. Wind sounds and thunder helped us to realize what weather can do to a granite surface.

By the time all had returned to the cars, no one could claim many square inches of dry area, and all were thoroughly cold. Upon reaching the parking place for the third stop only a couple or two called it quits. The wonder was that more didn't go back then. It was now that our rewards started coming, one after another, for we had a whole series of experiences that are completely missed during routine weather in the high Sierra.

Morainal ponds were strangely new under the pelting rain, patterned with lace. Hemlocks heavy with water became more languid than we had ever seen. Cones of lodgepole and hemlock by the hundreds of thousands were swelling closed, while dry cones near the bases of trees stayed open, teaching their own secret lessons. Bear trails that were normally difficult to find showed very clearly as small round puddles. Strange fungi and mushrooms rarely seen were fairly springing up from the forest duff. On the dome we had our greatest insight, for high above the meadows we were part of the clouds, at the same time we were a part of the rock surface. The wind whipped at us, driven full force from Half Dome, barely visible under the lip of a huge cloud. Fog and scudding clouds helped us to experience one condition of weather in an unusual way. The entire Tuolumne Region varied a changed aspect as clouds revealed and obscured all in an ever-changing scene.

Thoroughly wet, chilled and inspired, we descended and "squished" our way back. Just before entering our cars, we stopped to admire a lupine, jeweled by large drops of rain, now subsiding. One woman remarked, "Lupine wears its water so much more beautifully than we do." We looked at each other. Rarely have I seen a more bedraggled bunch of people or a more satisfied one, for we had received much more than we had a right to expect by doing together, in high spirit, what individually we would probably have never done alone.

—*NPS*

PROSPECTING FOR TOADS

By Ernest L. Karlstrom, Ranger-Naturalist

A Civil War tune with folk ballad lyrics has been popular with Yosemite ranger-naturalists for many years:

"I've wandered all over the country
Prospecting and hunting for gold"

This song, with a slight change in words, has been my theme as I tramped, Geiger counter in hand, across a Sierran meadow in search of radioactive toads. Field biology has come of nuclear age. Previous investigators have used radiosotopes in studies of movements or food habits of such diverse animals as mosquitoes, click beetles, plovers, field voles and moles. As one means of gaining information, the writer had adopted the method to the study of the Yosemite toad (*Bufo canorus*) occupying Dana Meadows just outside the east border of Yosemite National Park(1).

Special tags containing the relatively "hot" Cobalt-60 were designed for placement under the toad's skin. Medium-sized fisherman's split lead shot, hollowed out by drill, were filled with the isotope solution and the shot flattened with heavy pliers into aspirinlike capsules. Application of several coats of plastic insured a smooth surface which would protect the animal from possibly injurious effects of the lead. (Work of this nature should be carried out only at a recognized center of research such as a university because of the special equipment and methods necessary for handling radioactive materials. The isotope should never come in direct contact with the skin, and the researcher should wear a dosimeter to record his accumulated exposure to radiation.) For my protection and to prevent exposure of my camera film, the ready-made capsules were transported to the study area in a lead bottle.

Implanting the tags was a quick and simple procedure. An incision was made in the loose skin on the upper surface of the toad, the capsule inserted with forceps and slipped beneath the skin to the underside. Except for a slight bulge in the nether region, the tagged toads hopped nimbly on their way. Later recovery of animals showed that the skin knitted within a matter of weeks with barely a trace of the surgeon's cut.

Geiger counters and the much more sensitive scintillometer were used in later prospecting for the critters. The searching technique involved criss-crossing over the meadow area with the sensitive receivers dangled close to the ground. A rapid staccato of clicks or the bounce of the meter needle was the signal to start digging.

There were several reasons for attempting the radioactive tagging method. The Yosemite toad lives

only at relatively high elevations—6,400 to 11,300 feet—in the central Sierra. Because of cold nighttime temperatures the animals are forced to be active during the day (most toads are nocturnal) and find cover at night to prevent freezing. I was interested in finding exactly where they retreated at night and at what temperatures they would reappear during the day. A second point was to attempt recovery of the animals in their winter hibernation sites.

A total of 63 Yosemite toads were unceremoniously loaded with the capsules during the summer of 1955. During subsequent visits to the meadow in 1955 several "strikes" were made. Tagged toads were detected in their subterranean haunts, rodent burrows 3-6 inches below the meadow surface. It was a strange and exciting experience to be tracking a moving animal which was completely hidden from my senses yet "audible" to the Geiger counter. By digging up animals and recording their body temperatures with a small bulb thermometer I found that these so-called cold-blooded animals consistently appeared on the surface when they and the environment warmed to 46-48° Fahrenheit. Amphibians are not necessarily cold-blooded but variable in their temperature. By mid-afternoon, after basking in the Sierran sun, Yosemite toads might register temperatures of 80-85° F. No tagged toads were discovered in hibernation, but one radioactive capsule minus its bearer was excavated from a depth of 15 inches in meadow sod. This suggests that the animals may escape the rigors of Sierran winters by retreating underground to considerable depths.

How long can the toads survive

Yosemite Toad. —*Anderson, NPS*

with their radioactive cargo? Theoretical calculations of the amount of poisoning radiation received by their vital organs would lead one to predict death in a matter of months. Such is not the case! On July 29, 1956, a full year following tagging, two "hot" toads were recovered. The big surprise, however, occurred this summer when again, scintillometer over my shoulder I began prospectin' for toads. At noon of July 3, hundreds of breeding toads were active in the meadow, the males calling their bird-like trills and chirping excitedly as they jostled one another in search of the fewer females. My chief assistant, five-year old son Kris, and I began grabbing every toad in sight. In approximately one hour we collected 149 adult animals which we stored temporarily in a carton box. Each toad in turn was brought close to the sensitive instrument to determine possible radioactivity. Five normal-appearing, active males registered from "warm" to "hot". Two which had retained the tags gave off rays readily detectable at a distance of about three feet; the others had lost their capsules but still caused an abrupt rise of the indicator needle due to apparent assimilation of some of the radiosotope. Survival for three years is a definite indi-

cation that long-range studies can be made of amphibians using this method. Because Cobalt-60 has a long half-life of 5.3 years (i.e., the isotope loses one-half its original energy in that time), it is possible that radioactive toads may be retrieved in years ahead.

"Discover any uranium?" you might ask. Yes, several small pockets of soil containing naturally radioactive material (possibly uranium) were found. After careful excavation, the source (nothing to excite the Atomic Energy Commission) was traced to several handfuls of soil. Possibly the material had been leached out of the metamorphic rocks at higher elevations and been deposited in highly localized pockets along the meandering meadow rivulets. Considerable energy was wasted in digging for toads not there. But then the miners also had their "fool's gold."

The high point for this old toad prospector is yet to come. I can picture myself bent over my instrument in Dana Meadow. Coming up behind me will be an avid uranium hunter or otherwise curious character. To his insistent question, "What are you finding?" I can reply, "Toads". Then I'll want to see his face.

(1) See *Ecology*, vol. 38, no. 2, April, 1957.

Dana Meadow —*NPS*

—NPS

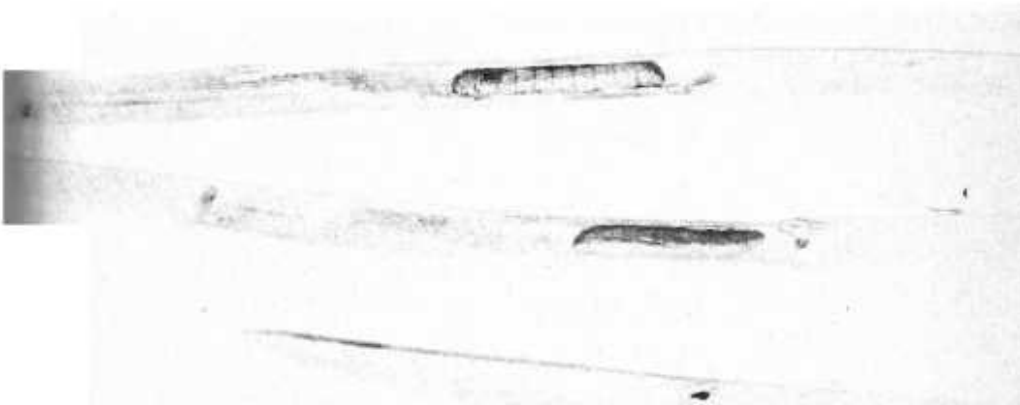
A needleminer infestation before 1920 near Tenaya Lake has resulted in a "ghost forest" of lodgepole pines.

THE SCOURGE OF TUOLUMNE

By David Essel, Ranger-Naturalist

With over 50,000 acres heavily infested and the needleminer moth spreading its devastation among the lodgepole pine forests at the rate of about two miles every flight period, concern has increased about an effective control of this tiny insect.

Much public pressure is being exerted toward a satisfactory solution of this insect plague that promises to make much of the high country of Yosemite into a ghost forest, as it did earlier in the century, around 1916. With our civilization expecting men of science to be able to come up with immediate answers, it comes as a surprise to find that to work out a solution to the problem, the entomologists would possibly require a ten year period for their investigations. This was back in 1953. Much work has been done in the slow, painstaking, precise way of the scientist. Their aim? To understand the biological nature of the needleminer moth so well that they can intelligently prescribe treatment where and when the need arises. Yes, an immediate solution if possible. But then this problem of the needleminer is by no means new; it's been here for hundreds of years. In the past it has solved itself by the very simple process of the moth literally eating itself out of house and home. With the death of the trees and no more succulent needles to eat, the moth population is wiped out. Then what? Well, George R. Stuble who is in charge of research at Tuolumne Meadows says nature has endowed the lodgepole with an extremely large reproductive capacity. So the tiny seeds and seedlings commence the slow



—Anderson, NPS

Needleminer larvae at work.

—NPS

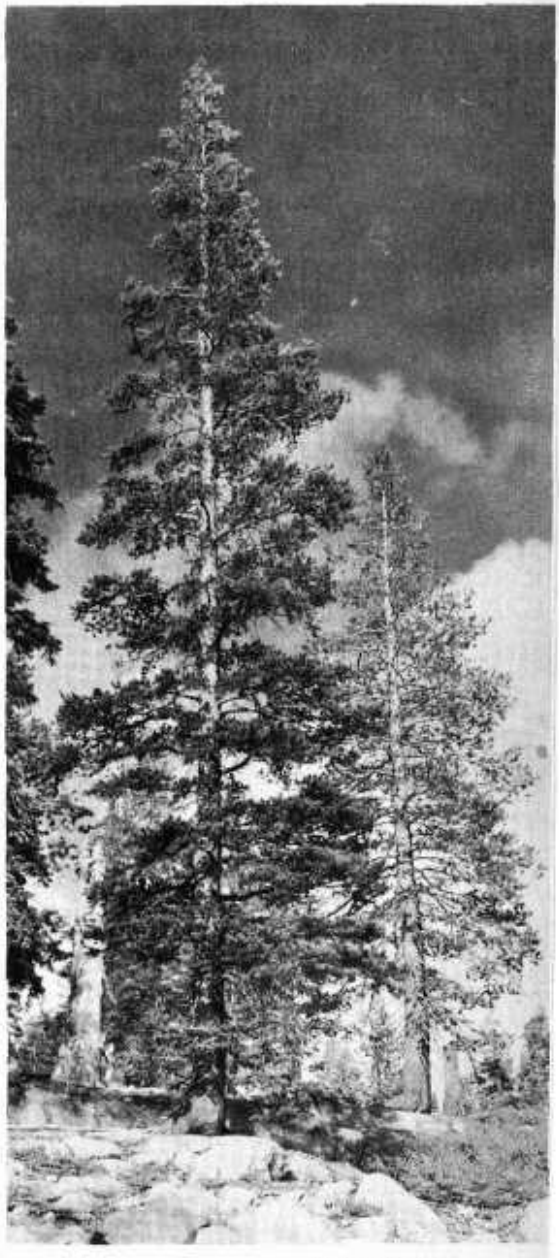
A helicopter was used to spray a solution of malathion in diesel oil over infested areas.

process of growing a new forest to cover our mountains. This is what will have to happen in the Conness basin, Glen Aulin and the Virginia basin, the basins of Dingley and Delaney Creek, as well as around Cathedral Lake. These forests are destined to become ghosts. Tall skeletons of trees whose bases will slowly be invaded by the fungi, and carpenter ant; whose trunks will furnish nests for the whiteheaded woodpecker. The rumor that the forests will be changed in type from lodgepole pine to the mountain hemlock is unfounded. The lodgepole seedlings will again produce the tall, straight thin-barked trees of Tuolumne Meadows. But won't the seedlings also be eaten by the larvae? By some phenomena, mainly climatic, the tiny seedlings usually escape their ravages.

What about the needleminer itself? Well, it's a tiny silvery-brown moth less than a half inch long which spends most of its two year life cycle as a tiny pink caterpiller inside the needles of the lodgepole pine. Emerging, it lives only about a month as an adult moth. After mating the female lays her eggs on the scaly bracts along the stems. In new infestations the larvae that hatch exhibit characteristic behavior patterns—migrating to the oldest needles first, eating their way through and then, upon finishing their first needle, they crawl to the very tip of the growing branch to attack the newest whorl of the 60 or so needles the lodgepole pine puts out each year. When this happens the trees have a scorched appearance, as though fire had gone through the area. Later on in the fall of 1958, these newly infested areas (Lyell, Rafferty Creek, Gaylor Lakes trail)

will look ghostly, but the larvae aren't finished because each has a total of about five needles to eat through before they achieve adulthood. From the tender new needles they migrate down the branch towards the older needles again. From about mid-July to October this gorging occurs, the larvae molting five times in the process. They remain over winter in the needle in which they happen to be working in October of the even numbered years, then emerge as moths the next year (odd years) to mate and lay eggs. It is then that the spreading of the infestation occurs. Usually the moths remain in the immediate vicinity, but a gentle breeze of 5-12 miles per hour will waft the moths to a new area. In a strong gusty wind, the little insects cling to the branches for dear life, going nowhere. For many years the west side of Tenaya Lake has remained clear of the needleminer, while the east side has been hit repeatedly. Then, in 1955-57 the air currents reversed themselves, perhaps only for a few hours one night when the moths were flying, and the west side was infested. Lucky for Yosemite, the prevailing winds are from the west, for just to the south of Mono Lake is a lodgepole needleminer that flies in even years and remains over winter in the needles in the odd years—just the opposite of Yosemite's variety. It may be another species, and the chances are slim that they will get into the area, the prevailing winds, the mountains, the strip of desert between, all preventing.

The new infestations, Lyell Canyon, Rafferty Creek, and Tuolumne could be saved if an effective spray program could be begun soon. But here the keyword is "Effective". In



—*Anderson, NPS*

Lodgepole Pine.

the early days of DDT, it was tried with little or no effect. Since then many sprays have been used on test areas, but results still do not measure up to the 75 per cent effective mark the scientists are shooting at. This summer a crucial test using malathion in diesel oil sprayed from a helicopter was conducted while the larvae were very tiny, and while encouraging, the percentage of kill was not satisfactory, at least for use at this particular stage of the larval growth. Later on when the larvae are larger more tests will be tried. While Mr. Struble is concentrating on effective evaluation of needleminer damage and the use of chemical insecticides, his associate, Dr. A. D. Telford, is studying the 40 different genera of insect enemies that closely associate with the larvae. There are 7 species that positively are parasites, including one wasp-like creature that lays its eggs on the eggs of the needleminer. A virus has been found, too, of the granulosis type, which attacks the internal cellular structure, liquidating the interior. In 1953 biological controls by the virus were thought to be a good possibility, but they have not yet proven effective. One big item hinders the work of the investigation—it takes 2 years from egg to adult. Thus, one cannot investigate any particular stage of the life cycle one may wish but instead must patiently work away as the seasons come and go. Biological control is an effective method of combating many harmful insects, however. For example much money and effort were saved by investigating the extent to which parasite control of the spruce budworm was effective in an area where the destructive pest was found. The entomologists sprayed only the areas where parasite activity was inadequate. In this way thousands of acres were eliminated from the spray program.

Spraying appears to be the most promising control method, and probably this fall malathion spraying with a ground mist blower will occur in camping areas and along the roads of Tuolumne. In 1959 and 1960 an extensive spray program against the moths themselves may be tried.

Whatever the immediate success or failure of control programs, the cooperative research of the National Park Service, the U. S. Forest Service and the University of California at the research center in Tuolumne Meadows will point the way toward future effective control over one of the ravages of our high sierra forests.

(*From an interview July 24, 1958 with Dr. George Stuble and Dr. Telford.)

Dead Lodgepole Pines.

—*Ernst, NPS*

OLD INITIALS

By John C. Preston, Superintendent

For three days recently, August 15, 16 and 17, along with others (Mrs. Mary Tresidder, Mrs. Lucy Butler, Mr. and Mrs. Hilmer Oehlmann, and Mrs. Preston), I camped on the shore of the Upper Cathedral Lake. Mrs. Tresidder had established camp there the previous Wednesday.

On Thursday, August 14, Mrs. Tresidder and Mrs. Butler, and the packer, Mr. Malcolm Fulmer, rode down the Sunrise Trail towards the Valley. About two miles from the lake they left the trail and bearing right, rode completely around what is now known as Tresidder Peak. On their way down at a point approximately 2,000 feet from the west shore of the lake and perhaps 500 feet above the lake level, and at the right of the inlet of the lake as you face Tresidder Peak, Mr. Fulmer discovered initials carved in the bark of a lodgepole pine.

The following day with Mrs. Butler and Mrs. Preston, Fullmer and I hiked to the location. The tree is approximately two feet in diameter. The carving is obviously very old and as far as I know has never been previously reported. The initials were "MAT" or "NAT" and below them "86" (bark had partially grown over the first initial).

Who was MAT (NAT) and what was he doing well above the upper Cathedral Lake 72 years ago? It's anybody's guess. Perhaps just enjoying the beautiful countryside as we were doing.

—*Ernst, NPS*

Initials, dates, and symbols are found on many trees throughout the park. This tree has them all!

OUT OF YOSEMITE'S PAST

A One Picture Story

FIRST AIRPLANE TO LAND IN YOSEMITE VALLEY

In variance with present-day modes of travel is the pioneer trip by air to this region. On the morning of May 27, 1919, Lieut. Krull of the U. S. Army, after a previous inspection of the Valley in which he passed upon the practicability of the flight, hove into sight over Sentinel Rock at an elevation of 7000 feet. Following a series of descending turns to 500 feet he swept down the valley from the vicinity of Washington Column to land in Leidig Meadow. Within a few years one or two planes repeated this performance. Flying at less than 2000 feet elevation is now prohibited over all national parks.

PUBLICATIONS FOR SALE AT THE YOSEMITE MUSEUM

All mail orders should be addressed to, and remittances made payable to, YOSEMITE NATURAL HISTORY ASSOCIATION, YOSEMITE NATIONAL PARK, CALIFORNIA. Prices include postage, insurance, and on proper items, California State Sales Tax 3%, plus 1% County Tax.

GENERAL

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Auto Tour of Yosemite National Park - Ditton and McHenry	.60
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