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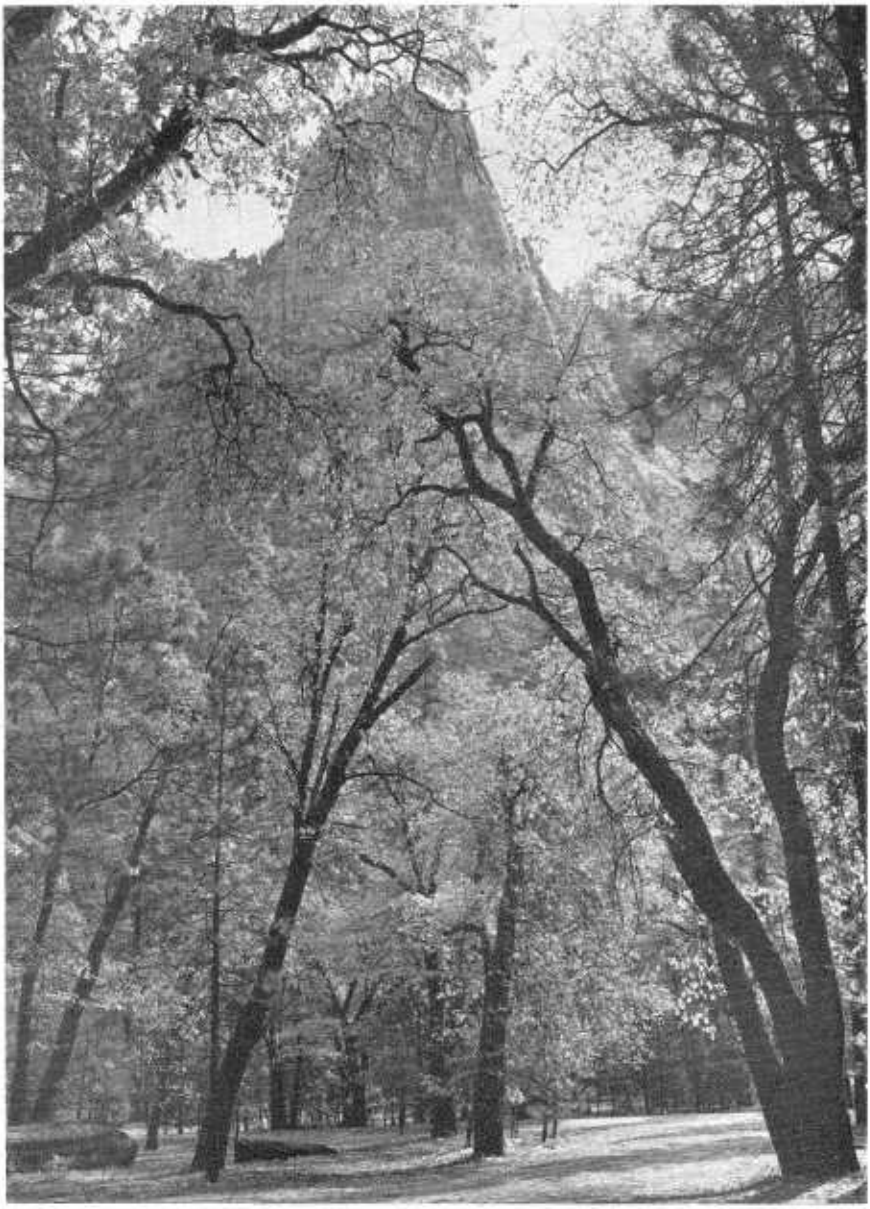
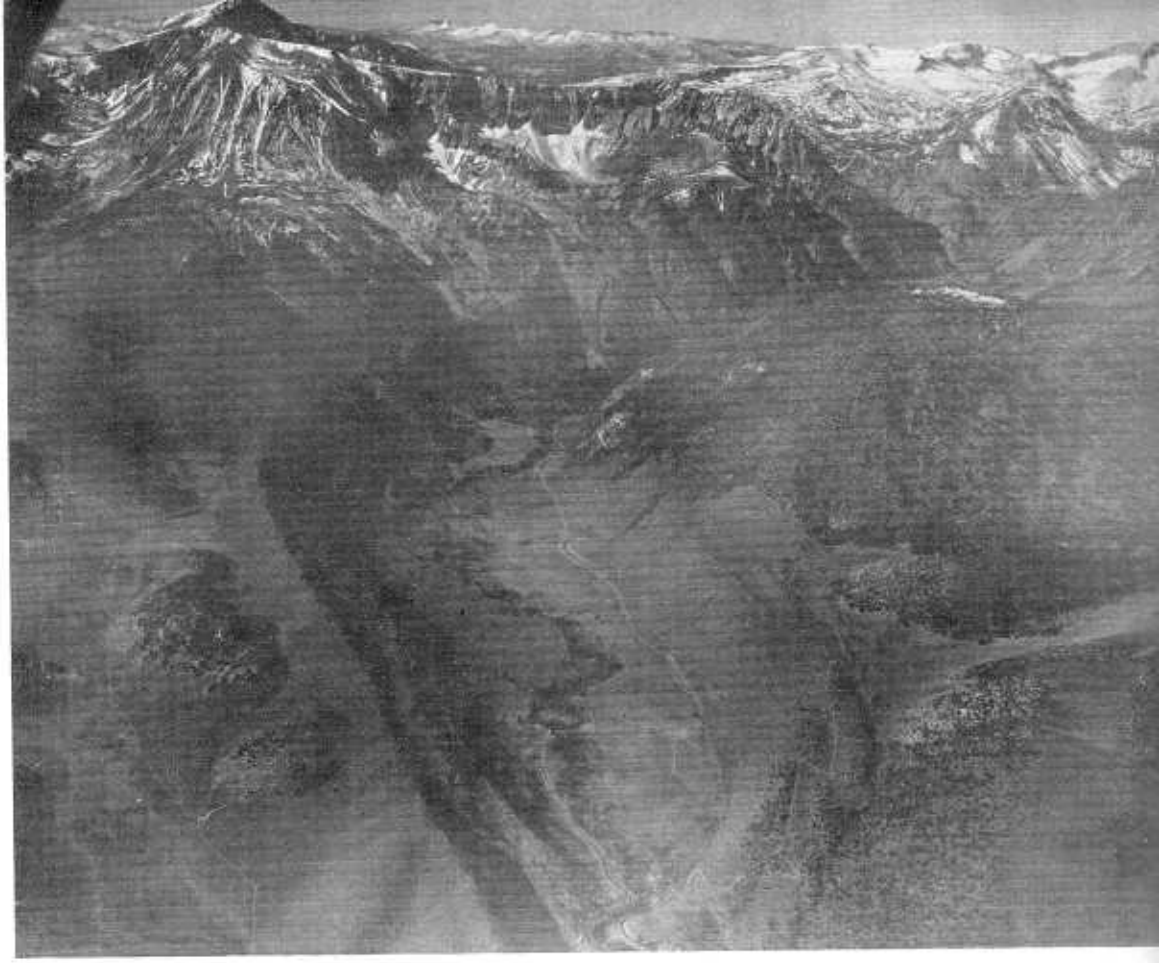


Sentinel Rock and autumn foliage of California black oaks
—Ansel Adams



Aerial view of Mount Dana and Lee Vining Canyon, looking west toward Yosemite National Park. The Tioga Road is seen running through Lee Vining Canyon on its approach to the park. Photographed and presented to the Yosemite Museum by Mr. Clarence Srock of Aptos, California.

Yosemite Nature Notes

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THE STORY OF THE TIOGA ROAD

By Ronald E. Bainbridge, Yosemite Field School, 1953

Women shudder and brave men blanch at the very mention of that word—Tioga. At least, that is how many feel about one of the few old mountain roads still accessible to the motorist. Plunging through timbered gulches, running smoothly along flats, avoiding massive granite boulders, skirting the shores of placid Tenaya Lake, the road winds on through peaceful Tuolumne Meadows, then rises to an elevation of 9,941 feet at Tioga Pass. Even the "ghost forest" east of Tenaya Lake, where past infestations of needle-miner moths have ravaged the stands of lodgepole pine, gives an air of mystery to the road that twists forever onward. Some would change this, taking out the turns and twists, the humps and bumps, transforming it into a modern two-lane highway.

How did the Tioga Road come into being? The chapters of its history are numerous, for the idea of the road was long in developing. Perhaps the first chapter of the Tioga Road story should start just one year after the discovery of Yosemite Valley in 1851 by the Mariposa Battalion. In 1852 a party of prospectors in the valley was attacked by the Yosemite Indians and two of the miners were killed. When news of this outrage reached nearby Fort Miller, an Army detachment led by Lt. Tredwell Moore was dispatched to capture the Yosemite tribe. Though a few of the guilty Indians were captured and shot, crafty Chief Tenaya eluded the soldiers and fled with his people to their Paiute allies at Mono Lake east of Yosemite. While searching for the departed Yosemites, Lieutenant Moore made some discoveries of gold-bearing quartz in the Bloody Canyon area. As the weary soldiers returned to Mariposa, the samples of gold ore were shown. The town surged with excitement, and Leroy Vining, with a few chosen companions, hastened to the eastern slopes of the Sierra Nevada to prospect. Their route took them into what was known thereafter as Vining's Gulch, or Lee Vining Canyon, a deep gorge with cliffs rising 3,000 feet from its floor. It is through this canyon east of Tioga Pass that the present extension of the Tioga Road now passes.

In our second chapter we find that the roaring gold camps of Monoville and Dogtown and later Bodie and Aurora brought hundreds of sourdoughs streaming eastward through the Sierra in their quest of gold. How did they get through the mountains? The Lee Vining route had been forgotten. However, not forgotten was

the old Indian trading route—the Mono Trail. For centuries the Monos and the Yosemites had taken this trail in exchanging goods. So it was that the miners from the slowly dying mining camps on the western slopes of the Sierra followed this trail from Big Oak Flat through Tamarack Flat, past Tenaya Lake, thence to Tuolumne Meadows, finally cutting to the east through Mono Pass into Bloody Canyon and the Mono Basin which lay beyond. In the years that followed, this became the accepted trail through this part of the Sierra.

Opening our history book to the third chapter, we find one William Brusky prospecting in the Mount Dana area. In 1874 he came upon an old prospect hole with the rusty remains of a pick and shovel nearby. A tin plaque indicated that the mine was known as the Sheepherder. Brusky presumed that the original locators had perished. Grasping samples of rock, the discoverer hurried back to his home town of Tuolumne. There his fellow townsmen had enough faith in him and his samples to invest money to develop the prospect. Eventually the Great Sierra Consolidated Silver Mining Company was organized, which operated the old Sheepherder under the name Tioga.

Operations were launched on a grand scale for the new company suffered from no lack of funds. The mining town of Bennetville was erected. A sawmill was built. Men worked day and night driving a tunnel through rock so hard that from three to five shifts were often necessary to put in a single round of holes for the blasts. Great quantities of supplies and equipment were packed into the mine at much expense. At first the mine was accessible only via the Bloody Canyon Trail. This was a roundabout route and proved most unsatisfactory. A new trail was then built from the busy camp of Lundy. This route was better but it too approached the mine from the eastern side of the mountains where the grade was steepest.

If the Tioga Mine were to be a success, large-scale operation was necessary. Heavy machinery would be needed—an engine, a boiler, an air compressor, countless drills, bits, and pipes. The smaller items were packed in by mule over the Bloody Canyon route. Heavy equipment was shipped to Lundy via Reno.

Then the Tioga miners settled down to await winter. Soon the arctic weather descended, freezing the lakes and covering the talus slopes and boulder-choked gulches with a mantle of white. Meanwhile, six heavy sleds were built of hardwood. Nearly one mile of 1-inch Manila rope was purchased, and heavy double blocks and tackle were assembled. Machinery weighing a total of 16,000 pounds had to be hoisted up 4,000 feet of mountainside from Lundy, parts of it almost vertical. After a short descent another 800-foot rise had to be overcome. Inch by inch the freight was sledded across the frozen lakes, up the icy talus slopes and over towering cliffs. Every bit of forward movement was provided by muscle of humans and mules. All available trees along the route served as points for attaching the blocks and tackle. Again and again the loaded sleds broke through the crust of snow, wedging the runners between rocks so that they had to be pried loose with crowbars.

Finally, after many days of arduous toil, the job of snaking the 8 tons of freight up the mountainside was completed. As the machinery was put in place the mine manager was heard to remark, "It's no wonder that men grow old." It was obvious

that if the Tioga diggings were to be exploited properly, a new route—a route from the west—must be found to bring equipment into the mine.

Our next chapter tells of the building of the now famous Tioga Road. In the fall of 1882 the survey of the Tioga Road was begun, and continued in the following year. Branching off from the Yosemite Road at Crocker Station, the chainmen worked through Aspen Valley, eastward to White Wolf, on to Porcupine Flat, swinging around Tenaya Lake, through Tuolumne Meadows, up over Tioga Pass, and into the mine. Close behind followed the burly construction crew—250 strong. They were fed by a Chinese cook and housed in a tent camp that was moved as work progressed. This was not a job done with tractor, bulldozer, and heavy road-grading machinery. The 56 miles of mountain road were built by human brawn, using axe, pick, shovel, and sometimes dynamite. By 1883 the road was completed at a cost of about $64,000. The mining company named it The Great Sierra Wagon Road. Soon wagons were rumbling over it, carrying needed equipment and supplies into the mine.

However, these wagons were not to rumble for long, for in 1884 financial disaster overtook the young company that operated the Tioga Mine. Well over $300,000 had been invested in a hole in the ground and in the road leading to that hole, and not one ounce of ore was ever milled. On July 3, 1884, orders to close the mine were received. These were obeyed so promptly that tools were dropped in the tunnel and dishes remained on the tables in the messhalls. Thus the Tioga Mine and Road were given back to the wilderness.

While the eastern owners paid taxes on the property, the Tioga Road deteriorated to the status of a horsetrail. However, it is significant that in 1899 the California Legislature appropriated $25,000 to build a wagon road connecting the old Tioga mining road with public roads of the Mono Basin. This connecting link followed the spectacular Lee Vining Canyon. Meanwhile, in 1890, Yosemite National Park had been created to include the region through which the privately owned Tioga Road passed.

As we turn the pages of our history to the last chapter, we find that a group of citizens realized the desirability of using the old Tioga in bringing visitors into Yosemite from the eastern side of the Sierra. Headed by Stephen Mather, first director of the National Park Service, this group purchased the road from the mining company in 1915 and presented it to the Federal Government for all the people to enjoy. Since this date considerable realignment and reconstruction have taken place, but 21 miles of the old, handmade road remain.

Yes, Yosemite has Bridalveil Fall and firefall; El Capitan and Half Dome. It also has its mining road—the most famous road in the park—the wonderful old Tioga Road.

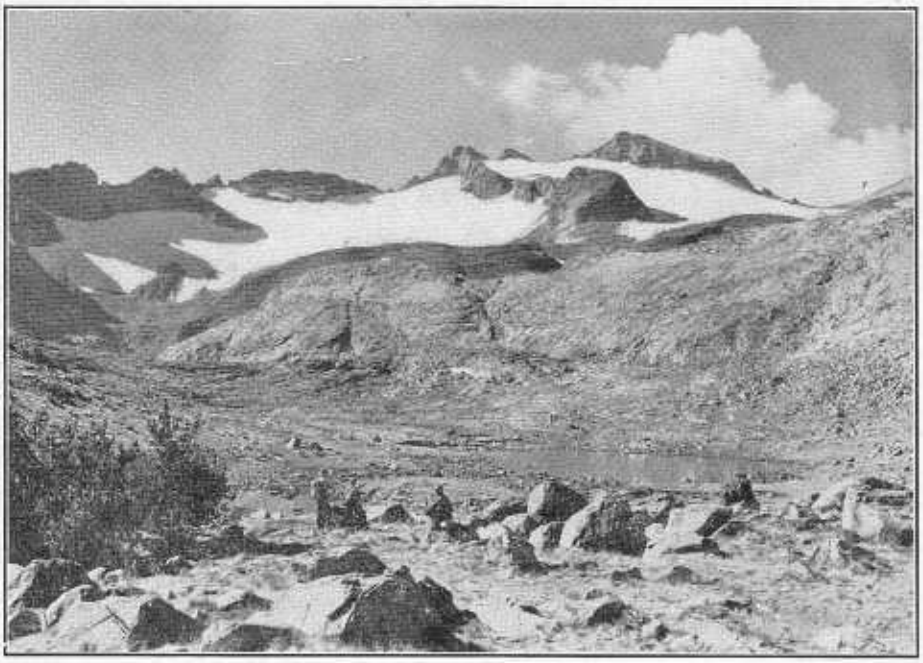
BUTTERFLY INDICATORS OF LIFE ZONES

By Vorsila L. Bohrer, Yosemite Field School, 1953

Instruments such as the altimeter indicate elevations for us as we easily drive up the mountains. But for the knowing hiker, some insects indicate both altitude and environment. An explanation hinges on certain plants that act as "indicators" of the different life conditions or climates that prevail in the different altitudes. Each of these species of plant indicators is so particular about its environment that it occurs only in a zone where it finds its required kind of climate. Several of these zones of life conditions can be recognized. Botanists call them *life zones* and have given them names. For example, Canadian, Hudsonian, and Arctic-Alpine are names given to our higher altitude life zones. Once a plant is known to occur only in a given zone it *indicates* this zone whenever it is found. This can be true of insects too. Most insects are dependent on plants for food. If an insect is dependent on a specific plant indicator, it then becomes an insect indicator of a life zone. A butterfly may indicate a life zone if it fulfills two conditions: (1) the caterpillar must be dependent on a plant indicator for food or must be restricted to that zone by some other ecologic factor; (2) the mature butterfly must be restricted in flight to the same life zone.

The Ivallda arctic *(Oeneis ivallda)* is a butterfly indicator of our higher elevations—actually both the Arctic-Alpine Life Zone and the upper fringe of the Hudsonian below it. The caterpillar feeds on grasses in the latter. The butterfly ranges from timberline to the tops of our highest mountains such as Mts. Lyell and Dana, which exceed 13,000 feet in height. It satisfies the requirements of a life-zone indicator since its flight is known to be fairly well confined to the Arctic-Alpine Life Zone, whereas there seems to be some ecologic factor operating to restrict the caterpillar to the upper part of the Hudsonian Zone; often these two zones are considered together as forming a single larger one, termed the Boreal Zone. The Ivallda arctic is useful as an indicator also because it can be identified readily on the wing and because it is abundant enough to be of practical value. It can best be seen in midsummer darting among boulders of the high peaks. When it alights on a granite rock the gray mottling on the underwings harmonizes so well with the surrounding color of the rock that the butterfly is difficult to see. On the upper surface of its body the brown blends into a creamy color on the wings. The wingspread of the Ivallda arctic is about 1½ inches.

Behr's sulphur *(Eurymus behrii)*, a butterfly found in Yosemite at Tuolumne Meadows, is an indicator of the Hudsonian Life Zone. It is not difficult to identify in flight, for it is the only greenish sulphur butterfly in the high Sierra with blackish or smoky edgings around the wings. It is slightly smaller than the Ivallda arctic—about 1¼ inches in wingspread. The caterpillar feeds on two plant indicators of the Hudsonian Life Zone. One is a small gentian *(Gentiana newberryi)* and the other is the dwarf blueberry *(Vaccinium caespitosum)*. The mature butterfly can be seen commonly in Tuolumne and other adjacent alpine meadows.



Anderson

Mt. Lyell and the Lyell Glacier

It was not so long ago that this butterfly was considered a rarity. Early insect collectors coming into the area in summer found the season very short and the road long, so they showed Jean (John) Baptiste Lembert, a homesteader at Tuolumne Meadows in the 1880's and 90's, how to collect specimens and left their addresses with him for further correspondence. Since the Behr's sulphur is local to this area, it was not long before museums and institutions all over the country and in many parts of the world were asking Lembert for specimens. When the Tioga Road was purchased by Stephen Mather in 1915 and presented to the Federal Government, Tuolumne Meadows became more accessible and the butterflies became better known to science. Meanwhile, Lembert gained fame as a hermit-turned-collector.

These are only two examples of butterfly indicators of life zones. There are many others. However, information on the life history of many kinds of butterflies is lacking. There are about 100 known species of butterflies occurring in Yosemite National Park. Of these, there are 22 species whose host plant is unknown or whose distribution in flight is not fully understood. Past investigations have emphasized the naming of these insects rather than the learning of their life history. Yet from such information as distinguishing features, abundance, host plant, and range of flight in life zones, an interesting story is to be told. It might appear under the title, *Butterfly Indicators of Life Zones in the Sierra Nevada.* The threads of this story lie here in the mountains, but they must be observed and prepared for weaving.

SUMMER SHOWERS

By Woodrow W. Smith, Ranger Naturalist

It is something of a shock to stoop down to unhook a flapping 10-inch trout and find that while your back is turned the peaceful Illilouette Creek suddenly rises over your shoetops, knocks branches and stones against your calves, and begins to roar like a full-grown spring freshet. Letting the fish go, your first reaction is to rescue a drowning fishing rod, then leap to high ground.

The afternoon of July 13 was a good one for fishing in the Illilouette above the Mono Meadows Trail junction. There were high-banked thunderclouds black and growling above the peaks of the Clark Range to the east, but they seemed to hang there with no closer inclinations. Yet at 3 o'clock the peaks were blotted out in a downpour of rain.

By 5 o'clock the storm had moved very little. An enthusiastic fisherman and three Cub Scouts had pitched camp and were out along the streambanks angling for a fish dinner that evening. Their fishing ended quickly, however, when the deluge of muddy water descended upon them from the headwaters of Red, Gray, and Ottoway Creeks, turning the Illilouette into a rampaging "Little Colorado." The chocolate flood rose swiftly until in a few minutes it overflowed the large pine snag that had afforded a natural bridge from the south to the north bank. At least 18 inches of high water was pouring down the Illilouette basin, gathered from the bare rock slopes of Clark, Gray, Red, and Merced Peaks and flung down the gradient, frothing and roaring.

One who has lived in the arid Southwest and has traveled the mesas, arroyos, and "badlands" areas knows what is meant by the term "flash flood"; so also in the semiarid lands of dry riverbeds, such as in the foothill regions of southern California. Inhabitants there during the late thirties will recall the experiences of people whose mountain cabins and valley homes were in the path of sudden onrushing torrents of water, mud, tangled limbs, and boulders swept down the ravines. Flood-control dams now provide security for life and property in many of the more populated areas where man has realized what a gully-washing cloudburst has the power to do.

Fortunately, in Yosemite National Park there are timbered basins, shrub-protected lower slopes, meadows, and open creekbeds. These afford an opportunity for flooding waters from bare slopes above to dissipate without the disastrous effects noted in areas that are more arid, of less vegetative cover, and of soft sedimentary deposits and dry streambed gorges. And so, without great hazard, one can thrill to the dramatic scene of summer lightning and thunder, black clouds, and the whirlwind roll cloud when the showers come. Seeing the sheets of water cascading off the smooth-sculptured slopes of Clouds Rest, one adds another never-to-be-forgotten image to his memory of Yosemite's magnificent vista.

Twice in the summer of 1953, at intervals just a month apart (mid-July and -August), refreshing showers broke the cloudless pattern over the western half of the park (Tuolumne Meadows at a higher elevation was served a day or two more).

Glacier Point is a box seat overlooking the drama as moist air drawn in from the Pacific is forced up over the heights of the eastern peaks until it chills and condenses into great towering cumulo-nimbus thrones. Something of a chain reaction appears to the observer who sees first a white puff cloud which soon mushrooms into the level of free convection, and in a few short minutes rises aloft. From Glacier Point's "crow's-nest" one can scout the movements and the advance of the dynamic forces which, in the distances, mutter at intervals following intermittent slashes of lightning. To the east the Lyell group and Conness are the peaks first to disappear behind the curtain. While we watch the northeastern darkening veil, a heavy cloud has formed behind the Clark Range to the southeast. Orchestral accompaniment is added by the counterpoint in deep bass tones of echoing thunder.

Camera enthusiasts exult over the imposing cloud formations and the variety of interesting shadows now cast on Half Dome and playing on Nevada and Vernal Falls. Cloud masses build up closer and a shroud of rain blots Tenaya and Echo Peaks from view. The approaching storms are wheeling in from northeast and southeast. Merced, Red, Gray, and the bladelike Clark Peaks receive the attention of the southern storm, which competes with a show of rapidly striking flicks of lightning and sharpening cracks of thunder above the continuing roll in the valley of the Illilouette.

Not to be outdone, the northern storm spreads its mantle over Mt. Hoffmann; the mist approaches the rim of Yosemite Valley and, already, ribbons of white water are plummeting down the granite shoulders of Clouds Rest. North Dome and Basket Dome turn shiny and wet as the rain reaches them. At our point of vantage across the way a strong gust of wind roars over to twist and toss the tops of the tall Jeffrey pines; onlookers scurry for cover as the roll cloud sends a vortex of air and a spattering of raindrops. Tinkling cinders swirl up from the firefall ledge below to settle on the overhanging rock and the pathways.

Yet, even as the storms join forces or grapple overhead, the Glacier Point visitor may still be the spectator on the sidelines. The storm hovers, and the sprinkle increases to a light shower, but the trees make good umbrellas. Already in the east one can see a blue patch opening over Parsons Peak and Vogelsang. Ten minutes and the struggle lessens; the veil of rain thins to reveal a dozen cascades from the domes across the way; the hard contours of the thunderheads have softened into misty outlines, and the thunder is receding in the distance.

Afternoon sunlight penetrates the western fringes of the storm and the visitor is assured that there will be a firefall tonight. To the camera fan it is time to recommend the color of sunset following the storm. In fact, at the moment in the thinning drizzle east of Half Dome, the red-orange-yellow bands of a begining rainbow promise a sight in the next few minutes not to be duplicated perhaps for the rest of the summer.

The warm granite is steaming where the exposed areas dry quickly; in the shadowed vales where moist air has been chilled, foggy clouds are forming. We watch for telltale signs of bluish smoke where lightning strikes have started snags and stricken trees smoldering. Is that mist or smoke north of Starr-King? Watch it as it plumes; it doesn't melt away, but keeps spiraling upward. Yes, it's time to call it a fire, and to act.

But what about that cloudburst on the bare western slopes of the Clark Range? One ranger naturalist will tell you sadly of the 10-inch trout that got away in the excitement of the flash flood that surprised him when his back was turned. The visitors to Yosemite Valley will remember the evening they found a "root beer" liquid instead of clear mountain water when they went to the campground faucets. But one can balance the inconveniences of summer showers — which dampen unprepared campers, flash-flood the fishermen, and color the tap water with sediment—with the refreshing stimulation of the storms. Were it not for the threat of devastation to our forests brought by the attendant lightning, one could wish for more summer showers.

DISCOVERY DAY IN THE "SADDLE"

By Harry L. Buckalew, Fresno

I came to Tuolumne Meadows to photograph wildflowers. Two factors influenced my choice. One was that a large variety of the Arctic-Alpine flora lay within reasonably easy access. The other was that Dr. Carl Sharsmith, one of the great living authorities on these boreal flowers, was a ranger naturalist close at hand for consultation.

On the morning of July 22 I set out under a bright sunny sky to climb into the "saddle" between Mts. Dana and Gibbs, photographic equipment slung over my back. I was in a mellow mood for the string of dark cloudy days with afternoon rain had broken. The preceding day had brought good fortune around Mt. Watkins, where the glorious Yosemite bitterroot *(Lewisia disepala)* and the rather scarce and spectacular sugarstick *(Allotropa virgata)* fell under the camera's eye. The objectives for the day were the rare snow willow *(Salix nivalis)*, the Sierra lewisia *(Lewisia sierrae)*, and the alpine spiny rattleweed *(Astragalus tegetarius)* which I had spotted on a previous day too cloudy for camera work.

But as I trudged up the long moraine slopes with their cover of fine lodgepole pines and emerged into the wet grassy meadows fringed with hardy whitebark pines, my mind kept going back to a remark of Carl's at the close of the campfire program the night before. I had discussed going up onto the Dana Plateau. He had said, half jestingly and half seriously, "Keep your eye peeled for the rare *Cerastium beeringianum*. You could be the fourth person to discover it in California." True, this was not the Dana Plateau, but it was close, was about the same altitude, and lay in the same metamorphic rocks. So I resolved to keep my eye peeled.

I spotted the lewisia first but marked it for the return trip because there were but four shots left on the roll of film, and nearby whitebark pines offered shade for changing to a new roll. Way up near the crest the rattleweed was captured, and then, while backtracking, the snow willow. The roll was finished but I again remembered *Cerastium*. Bending low I combed the ground with my eyes. I located three tiny plants with needlelike leaves and a single white five-petaled blossom, which proved to be the alpine sandwort

(Arenaria obtusiloba), and then a foot away another plant about an inch and a half high with five white flowers in bloom. The petals were cleft in the middle. Now I had never seen a *Cerastium*, but I knew some closely related starworts and silenes and this was a hot clue. I could feel a mounting excitement. An empty camera! Carefully marking the spot with my red bandana, I hurried to the limited shade of a clump of Mono willows and, lying flat, covered the camera with the flap of my G.I. knapsack. Working somewhat clumsily by touch, I managed to change film rolls. Then back to record my find in Kodachrome, with a second shot for good measure.

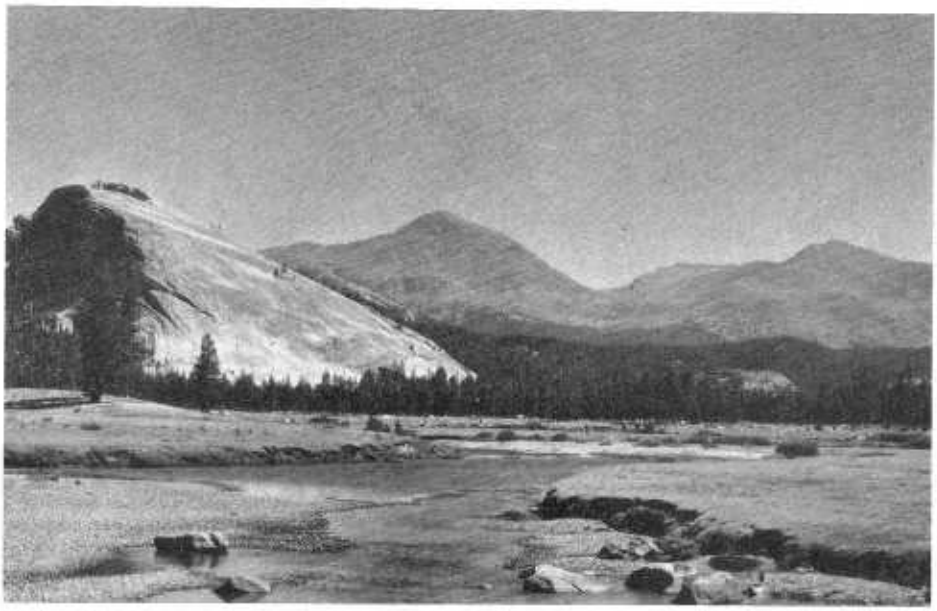
Carefully I removed one of the plants, pressing it between the pages of my notebook, and proceeded down to the lewisia and recorded it.

The homeward trail, though downhill, was longer than it had been up. There was excitement and doubt. I did not know!

Back at camp, my Abrams' *Illustrated Flora of the Pacific States* offered little help; it did not list *Cerastium beeringianum* but there was a distressingly similar *Stellaria*. So with my tiny specimen in the notebook I made haste to Carl's tenthouse. "Will you look at something for me in the midst of your supper preparations?" I asked. "You sent me out to get a *Cerastium* and this is the best I could do."

Taking the notebook, he walked to the door for the better outside light and peered through his little 10-power handlens. Be it said to my credit that I didn't bite my fingernails. Then he turned with a smile and said, "You've got it! This is the fourth specimen of this species ever collected in California and the first within the boundaries of Yosemite National Park!"

The pressed specimen will rest in the herbarium of the Yosemite Museum as tangible evidence of a truly memorable day of discovery.



Anderson

Tuolumne Meadows scene: Lembert Dome on left; Mounts Dana and Gibbs, with their "saddle," on right.