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OBSERVATIONS ON RED SNOW

By Ranger Naturalist C. W. Sharsmith

As is well known, red snow is due to an alga (*Sphaerella nivalis* Somerf.), a simple and single celled form of plant life. It is of course a green plant, but with a red pigment which masks the green chlorophyll. A function which has been ascribed to this red pigment is a more effective absorption of the sun's heat by a snow-dwelling organism. Its spores are undoubtedly carried about in wind blown dust, so that they may be of almost universal occurrence; but only under proper conditions do they develop and multiply. Among these conditions are abundant snow with sufficient sunshine. When the snow is close to the melting point on the surface of large fields or banks, cell division occurs, resulting in myriads of cells sufficient to color the surface layers of the snow an obvious pink or red. Early in the summer the color may be apparent only upon crushing down the snow and thereby concentrating the cells, such as is observed after walking over a snowbank and looking back at one's tracks. The bottom of white

rubber soled shoes are often stained pink in the process. Later in the season, if the clear weather continues, the snow becomes more clearly suffused with red. In sun cups and other hollows, the red snow accumulates, probably by the movement of melt water. Here the color may be as deep as that of the heart of a watermelon, and often has an orange hue. Disturbing the snow here often deepens its brilliance. In especially favorable spots of accumulation, the color may be so deep as to suggest the remark that "something has bled to death."

With the abundant snowfall of the preceding winter and the continuous sunshine of a nearly cloudless summer, red snow was so frequent in the Yosemite High Sierra during the 1940 season as to be almost commonplace. Ideal conditions for its development were presented. It was observed to be most frequent in a zone between about 11,000 and 12,000 feet altitude, a point which is corroborated by the writer's observations in the same region in previous seasons. This

zonal restriction is no doubt due to the early disappearance of snow below these levels, but its scarcity or absence above seems difficult to explain.

A further observation made during the 1940 season was the residue of red snow accumulation on the rocks with the disappearance of the snow. This appeared as small streaks of red color, often possessing a horizontal lobate or sinuous form on the surface of rocks situated at the lower margin of a vanished snowbank. When first seen these streaks were thought to

be a coating of some red mineral. Rubbing them only slightly with the fingers brought away a stain equal in color to the red of lipstick rouge, and perhaps equal to it in persistence. Examination of the stain under a lens disclosed the spherical cells of red snow. It is suggested that in these deposits the cells have undergone an encysted or resting stage of development during which they may resist the unfavorable part of the year, and in this dry condition may be picked up by the wind to be eventually redeposited.

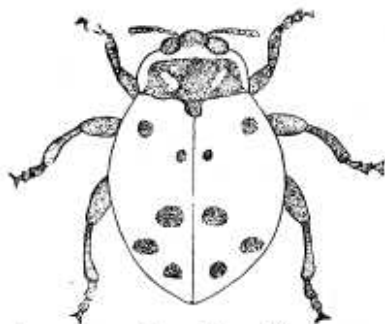
FLIGHT OF THE LADYBIRD BEETLES

By Ranger Naturalist Verlin Baysinger

During the last weeks of June, 1938, Yosemite Valley was the scene of mass flights of insects, the Ladybird Beetles, belonging to the Coccinellidae of the Coleoptera. To the uninitiated layman this might have seemed to be forboding doom for the plant life of the valley. Fortunately, however, these hordes of flying insects are predaceous, feeding throughout their larval and adult stages on the mealy bugs, scale insects, aphids, and the eggs of these Homoptera which are injurious to plant life.

These beetles are well known to most of us, due to their great abundance, wide distribution, brightly-colored bodies, and even to popular songs and stories. However, little of the life and habits of these small insects is known.

Identifying characteristics are readily noted. The Ladybird Beetles are nearly hemispherical shaped, convex above and flat beneath, some being slightly elongated and



having an oval outline. The average length of these beetles will vary from $\frac{1}{16}$ to $\frac{1}{4}$ inch in length throughout the different species. The elytra (horny forewings) are commonly of two color combinations—the reddish background with black spots and

black background with red spots. It may be assumed as a general fact that the beetles having reddish elytra with black spots feed on aphids mainly, and the insects having black elytra with red spots feed on scale insects. The elytra enclose the abdomen, but their margins are prolonged beyond its width. The head is small and fits into a notch in the prothorax and is turned downward. The antennae are short and clavate (club-shaped).

Some destructive leaf beetles look like Ladybird Beetles, but differ from the latter in that they have four segments in their tarsi, while the Ladybird Beetles have three segmented tarsi.

The members of the large genus *Hippodamia*, made up the huge flight which occurred in the valley. The adults gather together in the late autumn in various warm places, such as Indian Canyon behind the museum. These insects form large masses under the fallen leaves and among the plants where they spend their winter hibernation. Often they are buried deeply under the snow for many weeks during the winter, and stir or move only on the warmest days.

In June when warmth returns, they leave their winter quarters and set out to find some food, dispersing over wide areas. It is this wide search for food which forms the natural check on the plant destroying aphids and scale insects.

The species multiplies rapidly through the summer. Each female lays 200 to 500 eggs per season with one mating. The orange eggs are placed in small masses of a dozen or two dozen, each egg standing on end in contact with each other. These are laid on bark, stems, leaves, wherever aphids may be. The birds do not seem to destroy these eggs, and from their conduct we should take our lesson.

The pupae are not protected by cocoons, but are exposed entirely, being cemented by their abdominal extremity to the leaves. At this stage they are capable of body movement when disturbed.

The larvae of Ladybird Beetles are carrot-shaped, having flattened, gradually tapering bodies, distinct body regions, long legs, spiny backs, and are colored with patches of blue, black, and orange. It is at this stage that these insects become especially beneficial to plants and mankind.

The Ladybird Beetle begins feeding on the plump aphids when it reaches the larval stage. The diet of these insects remains consistent throughout adulthood.

Therefore, we can realize the effective check which these valuable insects place on the aphids, scale insects, and mealy bugs—the enemies of plants, and indirectly of man. Let us hope that each spring will bring these hosts of self-appointed protectors of plant life.



A NEW USE OF SEQUOIA BARK By Ranger Naturalist Verlin Baysinger

Mariposa Grove holds quite a variation in nature lore. Even though the entire grove is a mixed forest with a great concentration of trees that are common, the Sequoia gigantea hold sway, and their influence has a definite effect on the ecology and the plant and animal behavior.

I have observed birds and rodents making use of the duff of Sequoia bark for a dust bath. On the bole of the Lafayette Tree are several depressions in the bark about seven feet above the ground. In these depressions is a quantity of bark powdered finely. On several occasions during spring I have watched Robins and Juncos taking Sequoia bark baths. That set me to thinking, and I wondered why they used that instead of dust on the ground. Further watching gave me more evidence. On several successive days I saw a number of Tahoe Chipmunks (*Eutamias speciosus fater*) using the same baths. It reminded me of one of the old Roman public baths. All comers were welcome. These Chipmunks

revelled in their dusting. After their bath was completed, they would scamper up and down the trunk, leaving a stream of flying red bark dust behind. Why do they use the bark? Possibly because the tannin serves as an effective insecticide for the animals.

One day shortly thereafter, June 10, 1940, I observed a pair of Tahoe Chipmunks gathering Sequoia bark fiber for nest building. I found this nest which was located under the Fallen Giant. The nest was well made. The material used was in the large part Sequoia bark. I continued to learn something more, and devised a trap which on the following day caught the female Chipmunk that was heavy with embryos. I attempted to examine her carefully for insects, but lost her because of the fight she put up. One bite was enough.

Conjectures are possible, however. Due to the tannin in the bark, would some of the insects be turned away? It should not keep off the lice

insofar as poisoning is concerned, but it may be possible that the concentration of tannin causes the insects to stay out of the fur of these rodents.

SEQUOIAS IN THE CLOUDS

Ranger Naturalist Verlin Baysinger

It is common knowledge that the *Sequoia sempervirens* live amid the heavy summer fogs along the California coast. But it is unusual to see the *Sequoia gigantea* of the Sierras bathed in dense clouds which shroud the mighty trees.

On June 1, 1940, a heavy cloud mass moved down from the high Sierra crest, and filled the Mariposa Grove with a dense fog (pea soup) that made driving difficult and hazardous. By ten o'clock in the morning the museum had filled to capacity with beleaguered motorists who abandoned luck and decided to wait for leaving conditions. It was far better to sit around a roaring fire than to take a chance on a road which the driver could not see. The majority of the group enjoyed the experience.

We spent some time later in the morning watching the storm break up, and the effects were beautiful. Throughout the morning the Sequoias had been hidden from view in a full cloak of fog which condensed on the foliage, and caused showers as the breezes moved the branches. Before noon the clouds began to rise, and as the winds lifted the fog mass from the individual trees, it appeared as if a majestic unveiling ceremony was being performed. Each tree uncovered, as if the creator were revealing each one as an individual masterpiece.

Visitors were most enthusiastic—some took advantage of the unusual



atmospheric effects in securing photographs; others declared the unique experience of seeing the Sequoias

in the clouds was itself worthy of a trip into the park.

THE BIRD FEEDING STATION

By Ranger Naturalist Enid Michael

At our bird feeding tray in Camp 19, it has been interesting during summer months to observe and study the various feeding habits and table manners of the different species. The Brewer Blackbirds arriving



from their nesting colony in the willows across the river, swoop down with shapely wings to perch above the tray; they pounce on a bit of bread as though it were a grasshopper, and carry it to the ground. If feeding young, their practice is to knead in a certain amount of grit before carrying the food off. These birds prefer soft bread, and if only hard crusts are to be found at the feeding station, these are taken to the bird bath and dunked before eaten or carried to the young. Blackbirds, as well as Robins, handle a piece of soft bread too large to swallow by shaking it in their bills as a terrier would a rat to break it in

pieces. Chickadees and Blue-fronted Jays are more efficient; they hold the bread underfoot and tear it to bits with their bills.

When the Blue-fronted Jay comes to the feeding station, it arrives with a bluster and fanfare of wings, and will try to bluff its way to possession of the feeding tray. It is not unusual for such birds as the Robin, Grosbeak, and Tanagers to call the bluff and refuse to leave the tray. When the Jay does win possession of the tray, however, it greedily eats its fill, stuffs its throat pouch with food, and before departing grabs the largest bit that it can carry off—probably hefting the weight of several pieces of bread to be sure that the largest piece has been chosen. The Jay has the thrifty habit of storing food for the rainy day, but whether it actually finds its cupboard when needed is a matter of conjecture, since the food is often placed in a hole made in the ground, or even less secure, under faded leaves.

The Black-headed Grosbeaks, the most numerous birds at the feeding tray, are not dainty eaters—they chew their food, and allow crumbs to spill off from the sides of their bills. However, it is remarkable how efficiently and quickly they hull melon seeds. They pick up the seeds, and with a chewing motion of their mandibles, they slough off

the hulls from the sides of their bills and swallow the meat, separating the wheat from the chaff. The female Blackheaded Grosbeak will not permit her mate to eat at the same table. The male may be present at the same tray, but should he grow impatient and reach for a bite, one look from the beady-eyed mate, and he is put in his place. Young Grosbeaks as large as their parents continually whine for food, and it is up to the father to try to satisfy their appetites. He wears down all the feathers from the base of his bill from stuffing food into his children.



The Sierra Juncos coming to the feeding station fly in a straight line and only a few feet above the ground. They come to the ground with a flash of white tail feathers, and are satisfied to pick up the smaller crumbs that are spilled from the table by the larger birds. The young Juncos with their brown heads and striped breasts are independent little fellows and soon learn to forage for themselves; they do not pester their parents as do young Robins and Grosbeaks.

Of all the birds that come to the feeding station the Robins are the most bellicose. With a chip on the

shoulder they are always ready to battle any other Robin that puts in an appearance. The Robins are big feeders, and their spotted-breasted youngsters are big beggars. Soft bread is their favorite food, but they also like raisins and watermelon. A handsome male Robin often comes to the door and stares me in the face until I give him a half dozen raisins. The look from his big innocent eyes is irresistible—he always gets his raisins.

There is a special stand for the Woodpeckers that come to the station. An old Oak stump with suet hammered into a crevice just suits them. With strong feet they cling to the stump in an upright position, brace their stiff tails and pound away at the suet. They like their food cut into small crumbs for they cannot swallow large chunks like the Jay and the Robin.

The Red-shafted Flicker feeds both on the suet stump and on the feeding tray. It likes crumbs even smaller than does the California Woodpecker—crumbs so small that they can be licked up with its long, sticky tongue. The Flicker can hold its own against all comers, except the California Woodpeckers. When Flicker and California Woodpecker meet at the suet stump their displeasure is at once apparent, and they begin to jab at one another with sharp bills. The Flicker is much larger than the California Woodpecker, but evidently lacks the fighting spirit for it never seems to win the argument.

The California Woodpecker is the real boss of the feeding station. It

may make several false starts before coming to the suet stump, but when



CALIFORNIA
WOODPECKER

once there, no other bird can drive it off until it has had its fill. Often after having had its fill it will perch on a branch some twenty feet above

the ground to swoop down on any bird that attempts to feed.

Of all the birds that come to the feeding station the beautiful Western Tanagers are the most alert, quickest of wing and eye. No matter who is on the feeding tray, the Tanager can dash in, grab his bit and make its get-away. Belying their looks, the sweet, innocent appearing female Tanagers are really tough. They can drive such larger birds as Robin, Grosbeak and Jay from the feeding tray. If a dirty look is not sufficient to drive a rival from the feeding tray, the female tanager is quite willing to strike with her sharp bill.

Besides the above-mentioned birds many others appear at the feeding station during the course of a season. One never knows what new boarder may arrive on the scene, and this adds much interest to the feeding station.

GOLDEN-CUP OAK ENGULFS LARGE GRANITE BOULDER

By Ranger Naturalist Lloyd P. Parratt

On June 22, 1940, while leading a hiking party up the Ledge Trail to Glacier Point, we noticed at the left of the trail just before reaching the Staircase Fall a Canyon Live Oak or Golden-cup Oak (*Quercus chrysolepis*) with a granite boulder lodged in the main crotch. The tree had started to grow around the rock from each side of the crotch which was not far above the roots.

It seems probable that the boulder lodged itself there when the Oak

was somewhat smaller, and the tree is now in the process of engulfing it. The two main branches of the tree are about 8 inches in diameter, and the granite boulder is 36 inches by 18 inches by 16 inches.

Trees have a remarkable power of forming tissue around such foreign bodies, and ordinarily succeed in surmounting even such large obstacles as this boulder over a period of years.



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Dan Anderson