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LEAF MOSAIC OF SOME YOSEMITE TREES AND SHRUBS

By Ranger-Naturalist Julian A. Howard

In connection with plants, mosaic is a term which has been applied to certain fungus diseases. "Leaf mosaic" however, denotes no pathological condition but refers to leaf arrangements. Most plants exhibit leaf patterns which can be correlated with their habitats and with sun intensity.

Plants of drier, sunny situations are often provided with one or more adaptations which reduce the amount of sunlight striking the photosynthetic parts. The Mariposa Manzanita (*Arctostaphylos mariposa* Dudley) which is found abundantly on the drier talus slopes of Yosemite Valley exhibits such adaptations. An examination of the leaves shows that in addition to being clothed with tiny glandular hairs each leaf tends to be vertically arranged, thus it receives a minimum of sunlight. Leathery or succulent leaves such as those of the Manzanitas are indicative of dry habitats.

On the other hand, plants of moist, shaded situations usually possess foliage characteristics which provide the leaves with a

maximum of illumination. The Western Azalea (*Rhododendron occidentale* Gray) which borders the Merced River in the valley is an excellent example of this type of plant. As one views a branch of this shrub from above, the leaf pattern becomes immediately apparent. Each leaf is attached to the branch so that it receives the maximum benefit of the sun. The leaves of azalea are essentially alternate. However, near the tip of each branch this alternate arrangement becomes confused in the abundance of closely clustered leaves. Yet, despite the presence of many leaves in such a restricted portion of the stem there is little overlap. This arrangement produces a distinct leaf mosaic which is characteristic for this species.

The Mountain Dogwood (*Cornus nuttallii* Aud.) possesses leaves which are oppositely arranged on the stem, two leaves being attached at each node. The last internode is very short, thus bringing two pair of leaves very close together so that the stem tips appear to have four leaves at the same

level. The dogwood leaf mosaic thus differs from that of the azalea, but functions for the same purpose, that is, to obtain maximum illumination for each leaf.

Since both azalea and dogwood are plants of moist, shaded areas water loss is not a controlling factor and it is to their advantage to receive all the light possible for photosynthesis. These leaf mosaics make possible a maximum illumination with a minimum leaf surface.

Another and intermediate condition is to be found in the White Alder (*Alnus rhombifolia* Nutt.). A close examination of the leaves on outside branches fully exposed to the sun shows that they are creased along the mid-rib so as to give them a v-shaped cross section which prevents them from receiving full illumination. However,

the leaves on the shaded branches toward the center of the tree remain flat, fully exposed to all light which filters down to them.

It has been observed that coniferous trees may also exhibit leaf mosaics. Needle arrangements at the top of the crown of mature White Firs (*Abies concolor* Lindl. & Gord.) often differ from the arrangements of those needles near the base of the same tree. The needles on the upper branches are most often arranged vertically whereas those on lower branches less exposed to full sunlight may be situated on either side of the twig thus they receive more light per unit area.

Although these examples of leaf mosaic are perhaps the most striking, it would be possible to find numerous others in the trees and shrubs of Yosemite.

OBSERVATIONS ON WESTERN TANAGERS

By Hazel B. Adams

The insistent cry of a baby bird drew my attention to its presence at the base of a large oak tree in our back yard at noon on July 27, 1939.

Apparently it had just left the nest for it was still partly covered with down. From the markings on its wings I suspected it was a tanager, although I couldn't be sure. About five minutes later a female tanager came to the bird tray to feed and a young, fully fledged male perched on a Coffee-berry

bush close to the tray. The female occasionally hopped to the limb beside the young male and fed it. Finally I noticed the female tanager making trips from the tray in the direction of the baby bird described above. Much to my surprise the same female that had been feeding the 'nearly-grown' male was also feeding this tiny baby. Apparently she was taking care of young of two broods concurrently.

Suddenly my attention was di-

ected to the vicinity of the feeding tray where the mother tanager and the young male were flying down toward the ferns, then flying back and forth from cedar tree to tray, scolding excitedly, all the while. I



looked carefully around trying to determine the cause of the tanagers' disturbance. Crouched underneath a fern was a Blue-fronted Jay absolutely motionless. I watched it for several seconds and it didn't move,

but the tanagers continued to scold and frequently flew toward it.

Being unable to continue this observation I decided to frighten the jay away thus preventing any possible harm to the baby bird and to allow the tanagers to finish their feeding without further disturbance. The jay didn't go far, but flew into a small oak tree. It had hardly reached the tree when the female tanager and the young male flew after it. After chasing it to the top of the tree they flew about 200 feet away into another oak. Is it possible that a young bird of an earlier brood, still being fed by its mother, was helping the parent protect a more helpless baby of a later brood?

WHISTLING SWANS ON LAKE ELEANOR

By District Ranger G. M. Eastman

During the early part of December, 1939, three Whistling Swans (*Cygnus columbianus* (Ord).) were observed several times on Lake Eleanor by the writer. They were easily identified by their large size, all white plumage and their black bills and feet.

Although a new addition to the park check-list, Mr. A. M. Peterson, dam-tender at Lake Eleanor, states that he and his wife observed four Whistling Swans on the lake in February, 1937. One of these was caught on the frozen-over portion of the lake by a coyote and killed. Mr. Peterson chased the coyote on snow shoes and recovered the bird which

measured 8 feet in wing spread. It may be that the three observed in December, 1939 are the same ones that visited the lake in 1937.

NATURE NOTELET

Two female Hooded Mergansers were observed on the Merced River near Stoneman Bridge on December 16 by W. J. Fitzpatrick and Vincent Mowbray. The same birds were observed on successive days throughout the month by the above observers and other individuals. This is the third record for this species in Yosemite Valley.



THE ARNICAS OF YOSEMITE NATIONAL PARK

By Ranger-Naturalist Enid Michael

Of the eight species of *Arnica* listed from Yosemite National Park none is common. However, where they do occur, often in widely separated districts, they are likely to be found in colonies. Strangely enough, four different species of *Arnica* are to be found along the Nevada Fall trail, each species in its own little colony. One must ever marvel at the choosiness of plants. Three species of *Arnica* all grow on rocky slopes of the open coniferous forest, and all three species separated by not more than a half mile or so. What nice discrimination causes each species to choose its own particular niche?

All three of these *Arnicas* of the open woods are wholesome looking plants, standing from a foot to two feet high and all three have highly aromatic leaves, which aroma is remindful of lemon verbena. One species, *Arnica discoidea*, is a rayless form, the other two have showy sunflower-like blossoms. All three of the *Arnicas* of the woods have more or less woolly leaves which are soft to the touch. The leaves of *Arnica cordifolia* are beautifully heart-

shaped and nicely scalloped around the edges. The leaves are similar in discoidea, but longer than broad and therefore not so perfectly heart-shaped.

The third species of the wood, which we shall call the Wood *Arnica* for the want of a better name, has oval leaves which narrow off to a point. The leaves of this species ooze oil and when rubbed leave a definite oily film on ones fingers.

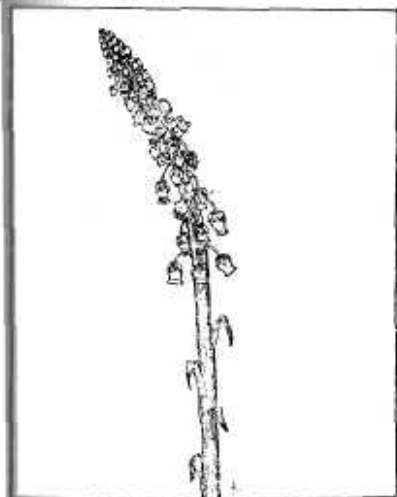
The fourth species is *Arnica latifolia* var. *viscidula*, a plant of smooth, shiny green leaves that never grows more than a foot high. This plant, known as the Mist *Arnica*, grows happily in the drenching mist of Vernal Fall. It also grows in other places where bouncing mountain streams scatter their mist, but it is never found far from water for it insists upon having wet feet. A rather leafy plant, clean and green, with gay sunflower-like blossoms during the flowering season.

All four of the *Arnicas* of the Nevada Fall trail bloom during the month of May and all four may be seen in flower within less than a mile of one another.

PINE-DROPS

By Ranger-Naturalist Enid Michael

Pine-drops (*Pterospora andromedea*) is a member of the Heath Family and like the many other members of this tribe found growing in Yosemite Valley it has dainty bell-shaped blossoms. Visitors to the valley and not familiar to the flora often mistake Pine-drops for its close relative the Snow Plant. It is true that when it first comes up it does resemble the Snow Plant, but it is much more slender and as it grows rapidly it soon leaves the plump, squat Snow Plants far behind. The Snow Plant seldom reaches a height of more than a foot while the Pine-drops often rise to a height of well over three feet.



When the Pine-drops first pushes through the ground it looks like a shoot of asparagus and is likely to be nearly white, or perhaps but slightly rosy. Soon the almost leafless stalk becomes a rich reddish-brown. The leaves, reduced to mere

scales, are also reddish-brown, and thus the whole plant before the white bells begin to bloom out is a rich reddish-brown shaft as straight as an arrow. Growing mid the soft green foliage of an azalea clump it is a very striking plant. As the name indicates Pine-drops is a plant of the pine woods. It is very tolerant of shade and seems to best prosper when it springs up through some sort of underbrush. In the Yosemite Valley it often comes up through a cover of azaleas or brake ferns where it can best show off its beauty.

On June 3, 1938, a Pine-drops poked its shoots through the brown pine needles at the base of a still leafless azalea bush where Pine-drops had appeared the two previous years. This was an especially sturdy stalk with a great list of buds closely clenched at its top. The stalk grew rapidly and as it reached upward it left a scattering of irregular whirls of buds along the stem. On July 18 the plant was 56 inches tall and had developed 167 buds. The bottom buds that had developed first had gone to seed, while at the top there were still many tightly closed buds. By July 26 the plant had gained another 2½ inches, but it had apparently reached about the limit of its growth as there only remained three unopened buds.

To me the Pine-drops are most beautiful when they reach full maturity, when their rich red stems standing straight and tall are graced

with scattering whirls of plump seed-pods. Even in death Pine-drops retain much beauty, for the dainty seed-pods may deck the tall brown

stems all through the winter months. Often it is the stems of the previous year that calls one's attention to the first spring shoots.



YOSEMITE ANIMALS

A GOLDEN-MANTLED GROUND SQUIRREL MOVES IN By Ranger-Naturalist Harold E. Perry

The camp attendant of the Glacier Point area lives in a very neat camp which consists of two parts—sleeping quarters in a tent on a regular platform and cooking quarters under a fly extension at the front. In order to augment the effectiveness of his larder, located under the fly extension, he recently sank a rectangular can into the ground to serve as a cooler. Almost immediately a Golden-mantled Ground Squirrel discovered the cooler and appropriated it for its own use. It succeeded in prying off the cover and was soon carrying torn paper into the can to use in lining its winter's nest.

In an effort to discourage further activity along that line, the camp attendant laid a small rug over the cooler. But the Golden-mantled Ground Squirrel was a determined

little fellow and before long had squirmed its way under the rug to its objective and the nest building activities continued unabated. The camp attendant, being of a kindly disposition and being of the opinion that such persistence should be rewarded, finally bequeathed his cooler to the little squirrel who chose to share its quarters with him, and he decided to build a little shelter over the cooler as a protection against stormy weather.

Before long the snows of winter will close in on the unique home of this Golden-mantled Ground Squirrel. Soon it will be comfortably asleep in its waterproof nest and perhaps the knowledge of that fact will give additional warmth this winter to the heart of the generous camp attendant.

A DEAD CONY

By Lloyd M. Smith, Field School '39

On the summit of the eastern shoulder of Shepherd's Crest, at an altitude of 12,000 feet, was found a dead cony (*Ochotona schisticeps muiri*). It lay on the very brink of a huge glacial cirque on an open boulder. There were no wounds of any sort visible to the eye. What killed this pika?



Dead animals of any sort are surely met with in the wild, and usually the cause of death is readily determined. But in this case the cause was inascertainable. This fact, coupled with the fact that rigor mortis

had not set in and that the animal had only been dead a few hours made the find doubly curious. The death may have been due to old age, but the cony was not a large one, although fully adult. A crude autopsy was performed after the skin had been mounted for the Yosemite Museum but the only unusual fact observable was a deep discoloration of the lung tissue. It is possible that this cony had been a victim of a septosemic type of sylvatic plague, but as no microscope was available, this hypothesis was not fully probed.

When death does occur, scavengers are usually the first to remove the carcass. Insect larvae and the direct heat of the sun both aid materially in the decomposition. Natural chemical disintegration will occur if time allows. But in the case of this cony, none of these agents had begun, so it is quite evident that the animal had been very recently killed, if it had been killed.

APLODONTIA ON SHEPHERD'S CREST

By George Petrides and James Huss, Field School '39

Like the Sequoia, the Mountain Beaver or Aplodontia (*Aplodontia suta californica*) is found only along the west coast of North America and has a corresponding fossil ancestry. It is a secretive burrowing rodent, but distantly related to the true beavers, and in appearance is much like a foot-long meadow

mouse. Characteristically, it lives in high, wet meadows forming an interlacing system of burrows in which it is believed to be active at all times of the year. During the summer and fall months, the Aplodontia collect plants which they dry as hay before storing it away for winter use. Whether this is to

be used as food or as bedding, however, seems undetermined.

While on the 1939 High Sierra trip of the Yosemite School of Field Natural History, a colony of these unusual mammals was discovered, on August 6, by Dr. Robert Usinger and Wilford Miller, at about 10,000 feet on the north slope of Shepherd's Crest. Here a rapidly flowing stream spread itself into several brooklets over the steep hillside, supporting a willow growth about a half-mile in length and two hundred feet wide. Almost hidden by the willows and adjoining the rivulets were systems of oval burrows, about six inches high and eight inches wide, seeming to form intricate networks just beneath the surface of the ground. As nearly as could be determined, the highest burrows were the more recent; those at the bottom of the slope being so old as to have been washed out completely by the streams.

Two small active burrow systems were found, one, half-way up the slope, and the other two hundred feet higher. In both cases the burrows covered an area about 15 feet square and were quite dry (those in which water was flowing appeared uninhabited). In addition they were characterized by the presence of small bundles of "hay" whose cut ends encircled the several entrances of the burrows.

Approximately a bushel of this "hay" was collected from the mouths of two burrows and the contents identified. Of this bushel, forty per cent (approx.) of the

plants were Lupine (*Lupinus longipes*); thirty per cent Fireweed (*Epilobium angustifolium*); twenty per cent Willow (*Salix geyeri*); four per cent Senecio sp.; four per cent Queen Anne's Lace (*Carum* sp.); two per cent Indian Paint-brush (*Castilleja miniata*); Fleabane (*Erigeron* sp.); Button-parsley (*Sphenosciadium capitellatum*), *Juncus* sp., and an unidentified grass. In order to determine whether these plants were merely collected at random or whether some preference was exercised, it was noted that on the inhabited area, sedges, grasses, Queen Anne's Lace, Senecio, Button-parsley, Monkey-flower, and gooseberry, though common, were largely ignored. A plant census on a similar, but "ungrazed" area nearby, further showed that while lupine, fireweed, and willow (measured by available twigs one foot above the ground) grew more commonly than any other species, fireweed was but half as common as willow. Despite this, however, more fireweed was collected, by the *Apodontia*, than willow. There is some slight evidence, then, of selection of the most available plant species with some preferences as indicated by the greater proportion of fireweed, as compared with willow, and by the species left more or less untouched.

It is to be hoped that any persons, seeing these interesting animals will record their observations to thus make more complete our knowledge of a species little noticed by the casual hiker.



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Dan Anderson