

# YOSEMITE NATURE NOTES



NEVADA FALL

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# Yosemite Nature Notes

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## Some Waterfall Phenomena

By Ranger Naturalist PAUL W. NESBIT

When our higher waterfalls such as the Upper Yosemite are near their prime, one often hears a loud pounding noise as if big rocks were being carried over the fall. The loudness of the reports would indicate that they were quite sizeable boulders. However, it is very unlikely that large boulders, or even small ones, are swept over the brink of a fall during steady stream flow. The clearness of the water indicates that it contains little of even the finest sediments, and these are transported much easier than larger particles or boulders.

One explanation of the loud poundings may be looked for in the nature of the falling water itself. A simple illustration may be made by turning a faucet nearly off so that a small smooth stream of water leaves it. One may then observe that as this stream of water falls, it gains in speed, which causes the size of the stream to de-

crease in size proportionately. As the speed of the water increases and the size of the stream decreases, it finally breaks into drops. These drops of water, striking on the surface below, may set up quite a clatter, especially if that surface tends to act as a sounding board as a kitchen sink might do.

If this simple illustration were magnified a thousand times, it would be comparable to our waterfalls, at least to those in which the water falls free of the rocks in one single leap. However, the water is apt to come over the brink of the fall as a churning mass of water mixed with air and whitened. This churning and mixing with air continues during the fall, which, with the resulting spray and mist, tends to hide and confuse the tendency of water to separate into masses or gobs. But these masses of water do tend to show to some extent as rockets, or comet-like features

which may be frequently seen streaking their way down the fall, and which may so fascinate one that he can watch them by the hour. What probably happens is that by the time the water reaches the bottom of the fall, it is pretty well broken into particles of all sizes, most of which are small, but some of which may occasionally remain of fair size.

The pounding noise and variations in the roar of a waterfall may then be due to variations in the striking of these masses of water against the rocks beneath. Sometimes just the right combination of forces will produce a mass of water that strikes flatly against the bottom with a tremendous slap due to the momentum it has gained in falling a great distance. If this then receives the right echo and reinforcement of sound from the cliff behind, it may make a loud sounding report. This sound effect in front of the fall being best, and also by variations in the air which conducts the sound.

Another closely related phenomenon consists in the larger falls literally shaking the ground. These tremors can at times be felt nearly a mile away from Yosemite Falls and must be due to the striking of rather compact masses of water as explained above.

It is interesting to see the effect of the winds on a waterfall. A strong breeze may blow much of the mist to one side and give a bridalveil effect, at the same time

exposing to some extent the "structure" of the fall. One has little conception of how much water may be carried by the wind in this way until he sees a whole series of little falls developed on the rocks beside the main fall. It is also unusual for a strong draft to carry the mist some distance outward from the bottom of a fall. Fir trees a quarter of a mile from the Upper Yosemite Fall, and just below the trail, are whipped perfectly clean of branches on the side toward the fall. On the opposite side, sheltered by the tall straight trunk of the tree, the branches extend away from the fall like long streamers. Needless to say one can get quite wet from mist at some distance from the bottom of such falls, this being a frequent discovery of different visitors to Yosemite. At times an up-draft carries spray back over the top of a fall in streamers, and if the amount of water is small, such a draft may almost make the fall disappear in thin air.

No mention of the mist formed at the foot of a fall is complete without reference to the rainbow effects which may be seen when one is in the right position with the sun behind him. If one is close to the mist, this rainbow is of the usual brilliant, narrow and arched type. When one is at a distance, the whole of the mist is diffused with color which is a small segment of a huge rainbow, but gives a beautiful cloud-like effect. Such a rainbow is seen on the mist below

Bridalveil Fall when one is at Tunnel View at about a quarter after three in the afternoon, the time varying somewhat with the seasons. From that viewpoint, one first sees the red colors of the spectrum creep upon the mist from below. These colors gradually progress upward followed by the other colors of the rainbow. By the time that the violet and indigo colors appear, the whole cloud of mist has become a diffused glow of beautiful color, not glaring, but softly and richly blending with the whole scene giving an effect such as can be accomplished only by nature.

Other interesting phenomena are the waterwheels which occur in some of the falls. These usually occur on a slanting slide where a stream of water is deflected upward and outward by a projection. As the water falls, again, it completes part of the arc of a wheel, and its continuity gives an effect of a revolving wheel of water. Sometimes this effect is best gained from a position somewhat beneath the wheel. At the famous Waterwheel Falls on the Tuolumne river, there are a whole series of such waterfalls. One of the best waterwheels which may be seen is that on Snow Creek above Mirror Lake. In order to see this, one must climb quite a distance up steeply sloping granite where there is no trail. If this climb is made in May, one is rewarded by seeing great streams of water shot over the edge of a projection at terrific speed, and arch-

ing outward to make an impressive "wheel." Such sights and others that may be seen if one watches the falls throughout the seasons, help to make Yosemite's wonderful waterfalls still more wonderful.

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### GNATS ENTOMBED IN SNOW

By Ranger Lon Garrison

Last February, while on snow gauging patrol to Beehive Meadows in the Tuolumne River watershed near Hetch Hetchy, Ranger Otto Brown and the writer discovered living mosquito-like insects entombed in the snow. Dipping up a pall of snow to melt for drinking water revealed the insects which crawled very sluggishly until warmed. Some put in a match box for preservation, warmed up sufficiently from the body warmth so that when the box was reopened to add more specimens, the first ones flew away. Those that were returned to Hetch Hetchy, were sent to the Division of Entomology of the University of California and identified by Dr. Wm. B. Herms as a type of blood sucking gnat, one of the genus *Culicoides*. His explanation of their presence is that overwintering eggs might have been hatched by unseasonable warm weather, and the next storm have entombed the living adults. That apparently is what happened, as this was shortly after a very heavy storm that had been preceded by warm weather.

## IN MEMORIUM

## Charles Goff Thomson



1883 - 1937

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It is with a deep feeling of sorrow that we announce the death of Superintendent C. G. Thomson from heart failure on Tuesday, March 23, at the Lewis Memorial Hospital. Colonel Thomson had served as Superintendent of Yosemite National Park since 1929 and for five years previous in a similar capacity at Crater Lake National Park in Oregon.

An appreciation Memorial Service was held in Yosemite on April 4 at Tunnel View on the Wawona Road. Representatives of the California State Park Council, California State Chamber of Commerce, Sierra Club, and National Park Service delivered appreciations. The tribute of Chief Engineer Frank A. Kittredge, representing the National Park Service, is printed here.

## His Contribution to the National Parks

By Frank A. Kittredge Chief Engineer

It is given to comparatively few to have the capacity to serve as was possessed by Colonel Thomson. Fewer still have the ability he had, both to recognize the need and opportunity for service, and to also be able to serve.

All his life the Colonel has sought opportunities to serve and has found them. He has used each experience, each disappointment, and each success as a stepping stone to further labors for others.

His service in the Philippines, in the Army during the World War, and in the National Parks, were a natural sequence. Where could his particular ability, training and personality have found greater field of action, a more appropriate sphere of influence than in the National Parks, in assisting in the development of policies, service to the public, and in the protection of the national park areas.

Since returning from France Col. Thomson has, through his dynamic personality and energy, and the wealth of his experience, been an influence and inspiration not only to the thousands of Park visitors with whom he has had personal contact, but especially to the Park Service itself. His keen sense of the fitness and desire for the harmony of things in the national parks, has made itself felt in the

design of every road, every structure, every physical development in the Park. He recognized the importance and practicability of harmonizing necessary roads and structures into a natural blending of the surroundings. He has set a standard of beauty and symmetry in construction which has been carried beyond the limits of Yosemite into the entire National Park system. The harmony of the necessary man-made developments and the unspoiled beauty of the Yosemite Valley attest to the Colonel's injection of his refinement of thought and forceful personality, into even the everlasting granite itself of the Yosemite he loved so well.

We might dwell upon the park's loss, the country's loss, his family's loss, upon the loss of this stalwart idealist and practical doer taken in his prime, and at a time when his invaluable experience, his delightful personality and sterling character are most needed, but we must not. Instead, we, in the Park Service, must endeavor to feel only a deep sense of gratitude for having had him with us, and for having known, for having worked with and absorbed at least some of his character, his determination to be fair to individuals, in time of discouragement and sickness as well as in health,

His influence in guiding the physical developments of the Parks along artistic, protective and appreciative lanes of thought shall carry on.

Superintendent Thomson's personality, his accomplishments and life in the National Parks will live on in the lives of his associates and will continue to give enjoyment and pleasure to the multitudes in the years to come. He will live on in the very walls of the canyons and the beauty of the valleys which have felt his sympathetic touch and treatment in their protection.

We are thankful that Colonel Thomson has lived and that he has left his indelible mark upon the National Parks as a guide for the future.

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### ECOLOGY OF THE WAWONA ROAD

Written expressly for Nature Notes  
by Superintendent Thomson  
shortly before his death

Nine years have elapsed since we began construction of the new Wawona Road; the heavy grading work was completed three years ago. During construction we were worried over the possible loss of a broad zone of trees and vegetation below the great cuts and fills; it was thought that the extremely heavy work might interrupt subsoil water tables and do irreparable damage to

flora. Last spring Park Forester Ernst was assigned to make a thorough study of the situation.

Mr. Ernst availed himself of the services of Francis E. Matthes, Senior Geologist, U. S. Geological Survey and they made a joint study of ground water and forest conditions along this road. Cores were taken from 100 trees adjacent to the road and checked against cores taken from control norms. An analysis of these cores revealed that there was no appreciable difference between the growth of the trees adjacent to the roadway and of those at some distance, since 1914. Mr. Ernst and Dr. Matthes each submitted reports; which indicate:

1. The road cuts have not affected the ground water conditions below the road, and as a consequence the vegetation there is uniformly healthy and evidently unaffected.

2. The percentage of forest trees affected by insect ravages immediately below the road is no greater than the percentage observed in other parts of the forest, indicating that the vitality of the trees below the road has not been impaired.

3. New vegetation is establishing itself at a satisfactory rate on many parts of the road embankments.

4. Apparently, modern massive road embankments have not produced any undesirable effects on ground water conditions in the zone immediately below them, and consequently do not injuriously affect

the vegetation there. Due to the scattering of soil and seed during the construction process, there is a notable increase in new vegetation.

Our main concern now is to stimulate reproduction of vegetation upon the ugly cut banks and huge fills. Plantings, by CCC men, have proved disappointing, so we have resorted to engineering—the steep slopes have been sloped back to give Nature a chance to heal the scars. We expect no early success; but much of the damage will have been repaired by about 1945.

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### COMPARISON OF VERNAL AND NEVADA FALLS

By ROBERT JOHNSTON  
Ranger-Naturalist

The trail winding down from Little Yosemite to Happy Isles passes through a region spectacular in water falls. The river descends 2,000 feet in a distance of one and one-half miles. Throughout the lower half of the canyon the river tumbles in foaming cascades and rapids, but in the upper half it drops from the steps of a giant stairway, producing the Vernal and Nevada Falls.

At first glance these two falls appear to be quite similar. However, a closer approach reveals innumerable differences.

The difference in the heights of the falls in round numbers is well shown on paper, but not so apparent in the falls themselves. The

Nevada Fall is nearly twice as high as the Vernal, but lacks the broad magnifying form of the latter. To be exact the Vernal Fall drops 318 feet while the Nevada Fall drops 594 feet.

In general shape the two falls are wholly unlike. The Vernal Fall assumes the form of a broad water curtain dropping over a straight vertical cliff. It is distinguished from all other falls in the Yosemite region by the partly translucent, soft green hue of undivided water that shines through the foam at its surface.

The irregular form of Nevada Fall strikes a decided contrast. At the top the water issues in wild turmoil from a narrow, constraining channel, and fairly flings itself out in a confused mass of downward shooting rockets of spray. These, as they strike the sloping lower part of the cliff, are flattened out and reunited into a broad, resplendent apron.

The iridescent clouds of mist rising from the base of Vernal are greater in volume than at the base of Nevada Fall. As the vegetation at the base of Vernal Fall is kept green and fresh by these mists, it inspired the name, Vernal, meaning spring, to Dr. L. H. Bunnell of the Mariposa Battalion discovery party of March, 1851. Scarcely less appropriate, however, was the Indian name Yan-o-pah ("cloud of water"). The dazzling whiteness of Nevada Fall suggested the name Nevada to Dr. Bunnell, which in Spanish means "snowy." By the Indians it was called Yo-wy-we ("twisted water").



**FLYCATCHER TRAINING**

By M. D. BRYANT  
Ranger-Naturalist

Many intimate observations of the habits of animals are made on our nature talks about the floor of Yosemite Valley, but seldom do the animals perform so interestingly as did two flycatchers, probably the Least Flycatcher, on August 29, 1936. A group of fifteen nature lovers had joined me at the Camp 14 stage at 9 o'clock in the morning. We had strolled leisurely along the bank of the Merced River for a distance of some three hundreds yards, when I noticed a young flycatcher perched beside an older bird on a telephone wire about fifteen feet overhead. The young bird, with a small beetle in its mouth, sidled along the wire and placed the insect in the mouth of the older bird. The latter, after making several sidewise movements of the head, dropped the beetle. To our surprise the young one, seemingly having awaited such a happening, dropped from its perch, caught the beetle about four feet from the ground, returned quickly to the wire, and gave the insect back to the parent. This interesting ritual was repeated three times, after which the young one alighted on the wire, hesitated for a few seconds, and swallowed the beetle.

The above incident caused me to wonder and to try to find some reason for this unusual procedure. Was the parent teaching the young bird the art of catching insects? Or were the birds having a game and taking

part for the sheer joy of play? Certainly there is no way to be sure whether the birds were at work or at play, but I feel that we had seen a fond parent teaching one of the younger generation how to meet the great problem of making a livelihood in a world crowded with competitors for food. After watching this youngster, I am sure that it will make its place in the bird-world and at the same time aid man by destroying numerous insects.

**WILD DOG**

By Ranger Lon Garrison

An animal that was seriously reported to Ranger Duane Jacobson at Tuolumne Meadows during the course of the summer as a "Black Panther," a "Black Wolf," a "Black Mountain Lion," and a "Black Cougar," was finally identified late this fall as a large dark dog running with a pack of coyotes. Two years ago, the hotel company sent a young dog—half Husky and half Newfoundland—to Tuolumne Meadows to keep the bears away from their store supply room. Tied inside the supply tent the dog broke loose when a bear tore the tent open, and the dog disappeared completely. Now it would appear that he went wild and has taken up coyote ways. According to Ranger Jacobs, the few times he has seen the animal, on moonlight nights, there were coyotes along with him. Quarter-breed wolf, he seems to have fit right in with coyote life.



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Dan Anderson