YOSEMITE NATURE NOTES

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Fir branches and snow
—Ansel Adams

Unicorn and Echo Peaks, Tuolumne Meadows. By Ansel Adams from "Yosemite and the Sierra Nevada." Reproduction by permission of Houghton Mifflin Company.

Cover Photo: Fir branches and snow, by Ansel Adams.

Yosemite Nature Notes

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SNOW SURVEYING

By Duane D. Jacobs, Assistant Chief Ranger

Each January as the snows begin building up in depth in the high country, Yosemite rangers look to their skis and other winter gear and begin their speculation as to what they will find in snow depths and water content on the widely distributed snow-survey courses located in the park.

In the fall months just passed, they have busied themselves preparing the patrol cabins to be used on these survey trips. Ample supplies of firewood have been cut and stored, food purchased and distributed, and the many last-minute preparations completed to the point that when the weary surveyors stumble into the cabins at night they must only see that the chimneys are free of snow before setting match to the fires already laid.

Four surveys are made each winter beginning at the end of January and extending through April. Data gathered from each survey is promptly mailed to the California Division of Water Resources in Sacramento where similar reports are being received from the length and breadth of the Sierra.

At this point one may well ask: Why the excitement over a little snow in the mountains, or the lack of it—who cares? What are these snow surveys anyway? The answer is simple and direct. Water stored in the snows that fall over California's mountains is the lifeblood of the State. Without it, there would be no irrigation for valley crops, no water to spin the great wheels of hydroelectric plants generating power to run our factories and light our homes —no, not even water to drink in many of the large cities. Acreages for crops that require heavy irrigation will be determined by forecasts, based on these surveys, of how much water will be available.

Power companies and irrigation people were early in recognizing the need for knowing what to expect in the way of run-off from mountain snows, but they were mainly dependent upon occasional reports from trappers and other mountaineers with whom they came in contact. It was the interest and experiments of a Nevada college professor that changed the picture from guesswork to one of sound scientific forecasting of available water stored in the mountains and expected run-off. In 1905 Dr. James Edward Church founded and served as director and meteorologist of the Mount Rose Observatory in Nevada, and it was there that he became interested in snow and water conservation and

began his experiments in measuring, weighing, and determining the density and water content of snow. Here, then, is the man who truly fathered the snow surveys and today is so recognized. From Dr. Church's experiments was born the accurate and widespread system of snow surveys which are carried on today throughout most of the United States and many foreign countries. He was adviser to the snow-survey programs of California and Nevada in their formative stages.

Dr. Church is widely recognized as an international authority on snow and ice. He wrote *Snow Surveying: Its Problems and Their Present Phases* which he presented at the proceedings of the Second Pan-American Scientific Congress, to which he was a delegate. He is the author of *Climate and Evaporation in Alpine and Arctic Zones, The Human Side of Snow, Saga of Mount Rose Observatory, Snow Perils and Avalanches,* and many other articles pertaining to snow conservation, streamflow forecasting, and related subjects. Some of his latest achievements were the organization of snow surveys for the Government of India in the Himalayas in 1946-47, honorary life member of the International Commission of Snow and Ice.

The first recorded snow surveys in the high country of Yosemite were made in the mid-twenties. These were not conducted on the systematic basis of today, but in connection with patrol trips by park rangers into the higher elevations. A system of fixed "snow poles" was set up at various strategic sites. Placed upright in the ground, these poles were 10 to 12 feet long, painted white and graduated in feet and fractions of a foot, making it possible to observe and readily record the snow depths. In the March 31, 1927, issue of *Yosemite Nature Notes*, Carl P. Russell, who was then park naturalist and who accompanied several of these early surveys, wrote:* "Park rangers observe and record the depth of snow in the high levels of Yosemite National Park for the purpose of foretelling roughly what the summer condition of the famous waterfalls of the park are to be and to gain advance information on the approximate dates of the opening of high trails, roads and camping spots. . . . cursory examinations of the compactness of the snow make it possible to compare roughly its density with that of preceding years." After more than a quarter of a century, some of these original snow poles or stakes are still to be seen on the survey courses of today, the same sites being selected for the later, organized surveys.

About the time of the early snow surveys in Yosemite the Merced Irrigation District became actively interested in obtaining data on potential run-off from its watersheds which for the most part headed in Yosemite National Park. Its officials entered into a local agreement with Yosemite authorities, furnishing money for construction of a cabin near Merced Lake (now the Merced Lake Ranger Station) and funds for hiring an additional man or two to assist Yosemite rangers in obtaining these snow measurements.

During the summer and fall of 1929, extensive preparations were made by California's Division of Water Resources to put snow surveys on a coordinated basis throughout the Sierra. Snow courses were laid out and mapped, and agreements made with irrigation districts,

*"Why are Snow Surveys Made?" *Yosemite Nature Notes* 6(3):18-19, March 31, 1927.

public utility companies, municipalities, national forests, national parks, and other public agencies throughout California. Thus began the organized California Cooperative Snow Surveys of today. In January 1930 the writer participated in the first survey to be made in Lassen Volcanic National Park resulting from this program.

So much for the background of snow surveying; by now the reader undoubtedly wants to know how these measurements are taken. Each permanent survey site is established by selecting an area that is open, protected from drifting winds, and representative of a large section of surrounding country. This site is known as a snow course, and here the measurements are taken at spaced intervals, usually 50 feet apart, along straight lines crossing the snow. Fifteen to 20 measurements are obtained, from which an average is computed to eliminate inaccuracies due to uneven terrain and drifts. This average then becomes the index of conditions in the surrounding country. The measurements are made with a hollow steel tube which is thrust downward into the snowpack until it strikes the ground beneath. When the tube is withdrawn it contains a sample or core of snow from the full depth of the pack. The loaded tube is then weighed on specially designed scales that convert the weight of the snow into water content, expressed in inches. The density of snow thus weighed may vary from about 10% water content in the case of newly fallen snow (i.e., only 1 inch of water could be produced by melting 10 inches of such snow) to as high as 57% water content, which is considered the saturation point of snow, the water then percolating downward through the snow to the

Ralph Anderson

Snow surveyors at Dana Meadows, near Tioga Pass, weighing tube containing core of snow.

ground, as it does in the beginning of the spring run-off.

At the end of each month, data from these far-flung snow courses are mailed to Sacramento where the Division of Water Resources compiles this information into a comprehensive bulletin form entitled *Water Conditions in California*. These bulletins, containing forecasts and general information on water conditions of the State, are mailed to cooperating agencies, water-controlling organizations, and the interested public. There are certain factors which tend to modify these forecasts of the run-off picture, so it follows that so much snow doesn't necessarily mean so much run-off in a given period. Most forecasts are within 10% of being accurate, however, and are considered entirely satisfactory. Many are much closer.

Much has been written about the drama, tragedy, pathos, and romance of the Snowy Range and those who live and travel in it. These writers are far more prolific than I, so no attempt will be made here to weave the human element into this article other than to sum up these few facts: In the 25 years or more that Yosemite rangers have been carrying on these surveys, they have traveled over 35,000 man-miles by skis and snowshoes in the rugged Yosemite region. Accidents, sudden sickness, parties lost in violent storms? Yes, all these things have happened and more. But always these men have completed the missions under their own power, for they are a stout-hearted and sturdy group. When the chips are down they settle their packs more firmly, take stock of the situation and their resources, and carry on. With darkness upon them and travel dangerous or no longer feasible, emergency camps are established in some sheltered nook to rest for the next day's struggle. This work is truly a fertile field for proving the old axiom about separating the men from the boys. It also separates the fancy Dans of the packed slopes from the

Ralph Anderson

Snow surveyors crossing Tenaya Lake on skis.

cross-country travelers. Honors to the old-timers who pioneered snow surveying in Yosemite during the mid-twenties. They did it the hard way, without the present-day know-how, modern equipment, waxes, etc.

What of the record snowfall of 1952? The final survey of the winter made last April confirmed an all-time record for snow depths and water content in the high country since these surveys were begun. Plenty of water available last summer—in fact, too much. Huge quantities had to be released beforehand from the storage reservoirs up and down the foothills of the Sierra in order to prevent disastrous floods later in the spring when the run-off really started. How did the officials know there was going to be so much water later on? From the snow surveys we conducted last winter, of course.

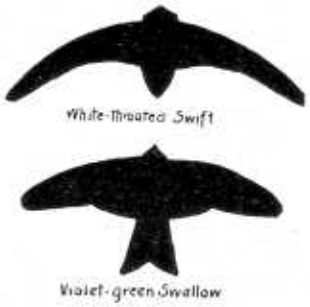
NATURE'S DARE-DEVILS

By Vaughn Critchlow, Ranger Naturalist

A visitor to Glacier Point in the early morning or evening is often startled by the sound of a hurtling object rushing past his head. The swish of the object is quite similar to some of the sounds produced in this modern age of rockets and jets, or it can be compared to the swishing of an arrow through the air. An alert observer may be able to make out the form of a bird, plunging headlong through thousands of feet of space toward the valley floor below.

What the observer is likely to see is a rather small bird, about two-thirds the size of a robin, dark in color throughout except for the conspicuously white throat, midbreast, and flank patches—all identifying the bird as a white-throated swift (*Aeronautes s. saxatalis*). Sometimes the general dark coloration of the swifts makes them difficult to see against the shadows of the granite cliffs, but often their presence can be detected by shrill, piercing calls consisting of a series of twittering, descending notes.

In flight these birds are often confused with the swallows, especially the violet-green swallows found in this same area, but close observation will disclose that the swifts have longer and more slender wings, giving them a resemblance to a crossbow in the air. The characteristics of



Comparison of body outlines.

the swifts' flight also set them apart from the swallows. Their travel through the air is marked by a twinkling appearance, producing the impression that one wing is being pushed down while the other is pulled up. Above all, it is the apparent recklessness of the flight of the swifts that makes them different from the swallows. Swallows fly fast but somewhat conservatively in comparison with the swifts, which are to be seen, from Glacier Point

or other high vantage points along the valley rim, hurtling, swooping, looping, and circling in amazingly erratic courses about the granite walls in seeming disregard for their safety or, sometimes, for that of the onlookers.

If the chance arises, it is quite interesting to examine a museum specimen of a white-throated swift. It can immediately be seen that these birds are not excellent flyers by accident. Their whole physical structure is based on flight as the sole means of travel; it is the essence of their existence. Their body lines are rounded and graceful and seem to make use of modern principles of streamlining. Especially interesting are the feet, which are extremely small and poorly developed, indicating that these birds are not at home on the ground, nor are their feet used for food-getting. The diet of the swift consists of insects that are snatched from the air. Undoubtedly it is the pursuit of these insects through the air that accounts for the swift's many wild, thrilling maneuvers.

These birds are almost never seen except in flight. One group of them was watched for approximately two hours, circling around two Jeffrey pines at Glacier Point. Occasionally they would extend their flight out over the valley, but would soon return to their course around the trees, and were never seen to land. Authorities bear out this observation and state that only rarely has a white-throated swift been seen to alight, and such landings are usually in the rocks along very high, sheer cliffs. These birds build their nests in such places, where they are afforded excellent protection because such sites are accessible only to birds.

Glacier Point has long been famous for the wonderful views offered from its heights, but few people make their visit in expectation of seeing the daring white-throated swifts in action. However, in order to get the most out of the trip to this point, a visitor should make every effort to observe these birds in flight, for they offer a thrilling performance not often seen in Nature.

A LAYMAN LOOKS AT THE NATURALIST

By Mary R. Hunt, Field School, 1950

It was in Washington, D. C., that I first began to realize the inherent quality of naturalists. I was in an office in the Interior Department building, speaking with Mr. John Doerr, chief naturalist of the National Park Service.

"Do you know Yosemite?" he asked me.

"No," I said, "I've never been there. In fact I know very few of our great national parks."

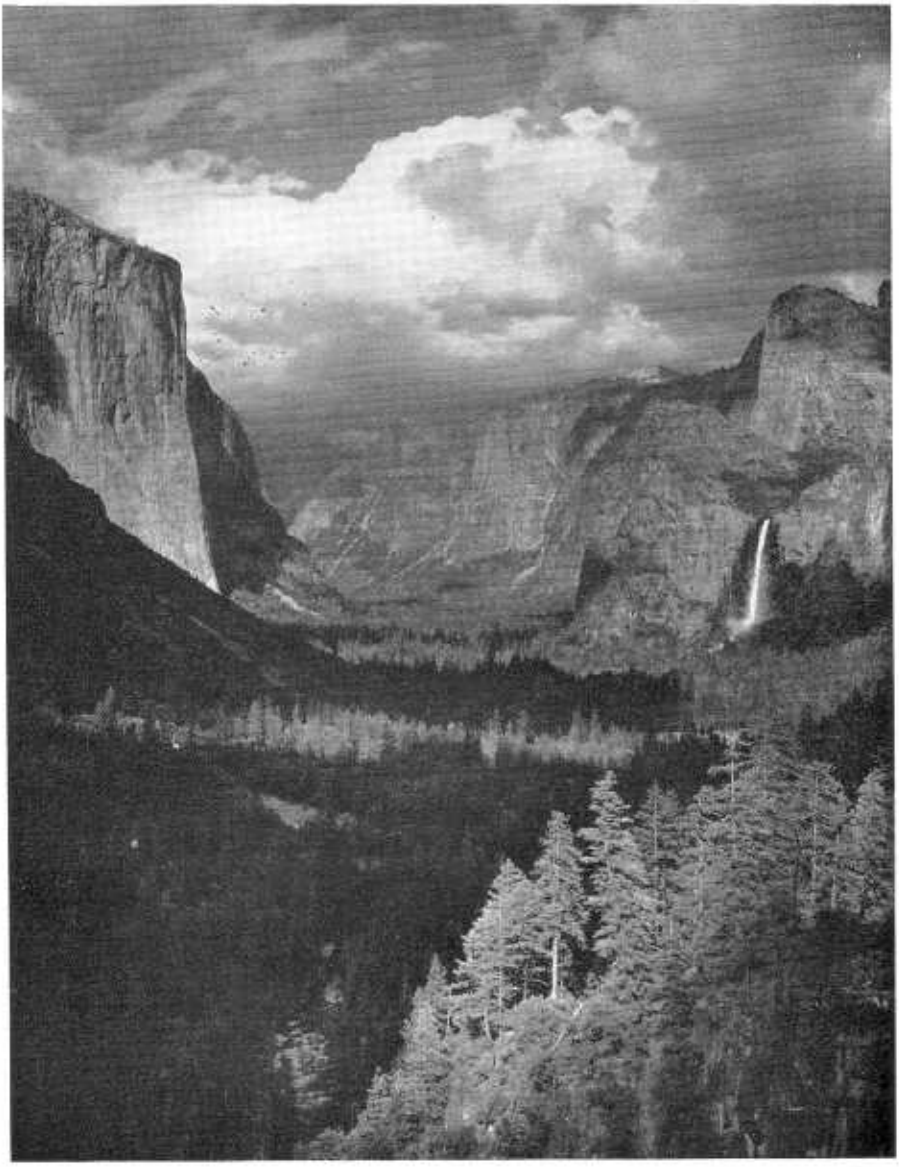
"Then, if you go, you have a great treat in store for you. It is magnificent. Rising above the narrow valley are sheer walls three thousand feet high. And as you look up at El Capitan, or across the meadow and up the valley to Half Dome, you'll come to know what John Merriam called 'massive grandeur rising above the lyric beauty of the valley.'"

His gestures toward a purple and gold painting on the wall as he mentioned El Capitan, and toward another breath-taking scene as he

thought of Half Dome, brought the beauty of which he spoke close to the surface. But he went on.

"What is it about a waterfall that fascinates people? Why do they stand awe-struck watching the torrent, or the slender cascade? What is there about a deer leaping across an open meadow that makes one stop to watch? We say it's beautiful. *Why* is it beautiful?" He paused. "I think I know—a little. At least, I have a theory. You might call it a philosophy of beauty, I suppose . . ."

This is a naturalist, I thought, as well as an administrator. I liked this



Yosemite Valley. By Ansel Adams from "Yosemite and the Sierra Nevada." Reproduction by permission of Houghton Mifflin Company.

unashamed love of natural surroundings.

Even now, 2½ years after my experience at the Yosemite Field School, impressions and recollections are pleasantly vivid. For me it was a source of insight into the appreciations, attitudes, and responses of naturalists themselves. There in Yosemite Valley, as a hybrid astronomer and college personnel counselor, I was not immediately identifiable with the naturalists who surrounded me. I eyed them all with delight, and with some awe, for in this setting I was a "layman."

In the course of our program I learned about earlier-generation naturalists. Dr. Lafayette Bunnell was one of those. A hundred years earlier Dr. Bunnell had been a member of the Mariposa Battalion, the party of men who made the effective discovery of Yosemite Valley while in pursuit of Indian marauders. Late in that wintry afternoon the party had come to a spot not far from Inspiration Point, above and behind the present tunnel on the Wawona Road. Other members of the weary band seemed unimpressed, but Bunnell was so moved by what he saw that he retired from the group to absorb the full beauty of the sight. The great U-shaped valley with its waterfalls and its cliffs, its evergreens and its snow-covered granite, inspired him to say later that if Heaven had called him at that moment he could have died happily. That evening at the campfire near the base of Bridalveil Fall—the first camp to be made in Yosemite Valley by white men—it was Bunnell who interrupted the suggestions for names for the valley ("Paradise" was one favorite) to say he thought it should most appropriately be named for the Indian tribe which dwelled there, and so the name Yosemite was born.

When I first saw the valley from the Wawona Tunnel entrance, I tried to imagine myself coming upon the view as Bunnell, the naturalist, had a century before.

One day during July of this memorable 1950 summer the Field School group climbed Sentinel Dome. It had been a busy day with many stops and we were scrambling hurriedly up the rounded granite surface, headed for the famous Jeffrey pine. Within a hundred feet or so of the top, one of our members stopped and sang out in delight for a discovery made by Carl Sharsmith, our ranger-naturalist guide. Carl is chiefly a botanist. He knelt in front of the tiny flower that was growing in a weathered crack in the granite. "*Lewisia*," he said softly, "the first I've ever seen up here." Delicately he examined the plant. Carefully he described its structural detail, avoiding damage to it in any way. My attention was drawn almost equally to the little knot of questioning botany students, excited and enthused by this rare occurrence. "Real naturalists," I thought.

It seems to me now that there are many ways to learn about natural history and about naturalists. One is to read about them, and the learning can be good. For example, John Muir's records of his observations are vivid and stimulating. A better way, I think, is to learn to see for yourself and to increase your own sensitivities by traveling in the company of a "naturalist"—who might be defined as a lover of Nature—and who has all five senses alive to the stimuli around him. I found that extensive knowledge is not an essential ingredient in the make-up of a "naturalist." An attitude of inquiry, a reverence for accuracy of detail in observation, and a humility of spirit *are* common ingredients. Personally, I *like* naturalists.

1952 CHRISTMAS BIRD COUNT IN YOSEMITE VALLEY

By Walter J. and Erma Fitzpatrick

The annual Christmas bird count taken in Yosemite Valley between Mirror Lake, elevation 4,000 feet, and El Portal, elevation 2,000 feet, was conducted on December 27. Unlike the amazingly mild conditions prevailing for last year's count, the weather this time was featured by heavy rains during the morning, with snow falling at the upper levels. During the afternoon there was partial clearing with occasional gusts of wind. It was during this latter period that most of the actual counts were obtained. Temperatures were seasonally mild, ranging from 36° to 49°. There was relatively little snow on the ground, this lying chiefly at the 4,000-foot level in the shady portions of Yosemite Valley. The lower levels were entirely open. Eleven participants, working in 5 parties, recorded 56 species and approximately 1,570 individuals, this being second only to the exceptional results achieved in 1951. In that year 59 species and approximately 2,078 individuals were tallied. The outstanding observations in 1952 were those of a red-winged blackbird, five Brewer's blackbirds, and one Townsend's warbler in the relatively open and warm area near Government Center in Yosemite Valley, all of these being December records for the valley.

The detailed count follows: Pied-billed grebe, 1; sharp-shinned hawk, 1; Cooper's hawk, 2; western red-tailed hawk, 3; golden eagle, 5; eastern sparrow hawk, 3; valley quail, 8; plumed quail, 4; California pygmy owl, 2; Pacific horned owl, 1; western belted kingfisher, 4; red-shafted flicker, 19; western pileated woodpecker, 5; California woodpecker, 13; Williamson's sapsucker, 1; Modoc woodpecker, 10; willow woodpecker, 1; Nuttall's woodpecker, 1; black phoebe, 7; blue-fronted jay, 61; long-tailed jay, 30; short-tailed chickadee, 57; plain titmouse, 12; California bush-tit, 40; red-breasted nuthatch, 4; Sierra creeper, 31; pallid wren-tit, 3; dipper, 13; western winter wren, 1; San Joaquin Bewick wren, 1; dotted wren, 8; western robin, 34; northern varied thrush, 3; Alaska hermit thrush, 7; western bluebird, 32; mountain bluebird, 1; western golden-crowned kinglet, 221; western ruby-crowned kinglet, 25; Hutton's vireo, 1; Audubon's warbler, 3; Townsend's warbler, 1; English sparrow, 24; red-winged blackbird, 1; Brewer's blackbird, 5; California purple finch, 100+; common house finch, 100+; northern pine siskin, 20; green-backed goldfinch, 2; Sacramento towhee, 78; Sacramento brown towhee, 178; western lark sparrow, 50+; slate-colored junco, 1; Thurber's junco, 265; golden-crowned sparrow, 62; fox sparrow, 2; Modoc song sparrow, 2.