Yosemite Nature Notes

Vol. XIV March 1935 No. 3

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THE PUBLICATION OF
THE YOSEMITE NATURALIST DEPARTMENT
AND THE YOSEMITE NATURAL HISTORY ASSOCIATION
Published Monthly

Volume XIV March 1935 Number 3

Plant Life and Glaciers

By Carl and Helen Sharsmith

The visitor's appreciation of the Yosemite Valley in which he vacations is greatly enhanced by some information to the geologic history of the entire Park, some knowledge of the formation of the tremendous gorge which is Yosemite Valley. Many opportunities are presented for learning this unique story of Yosemite's geologic history through museum geology talks, trail trips with ranger-naturalists, at campfire programs, etc. Just as his acquaintance with the geologic history of Yosemite is of value, so will the visitor's appreciation of Yosemite plant life be enchanced by learning something of the history of plant populations in Yosemite. It is the purpose of this article to present some of the simple facts regarding that part of the history of plant development in Yosemite which runs parallel with the glacial and post-glacial history of Yosemite. To thus consider the plant populations in relation only to the glacial epoch will give us, of course, but a small piece of the full story of Yosemite's plant history. But to adequately survey the entire topic of the history of plant populations in so topographically varied an area as Yosemite, even in outline, would present too vast and complex a problem to be developed here.

The entire Yosemite valley forms a vast natural workshop in which it is comparatively simple for the trained eye to piece together the history of yesteryears by the study of the present. The unmistakable evidences of successive glaciations, the remnants of previous ancient landscapes, many other fragramentary but easily interpreted features all form for the geologist a clear and lucid story, the pages of which may be turned back many thousands, even millions of years. It is with the aid of this geologic story, together with direct evidence from the plants themselves, that we are able to interpret the history of Yo-

semite's plant life.

Everyone has heard of the waves of glaciation which extended over almost the entire northern part of the continent. As the great northern sheets of ice were formed, the existing plant-life in these regions was, of course, annihilated. Many of the far-northern plants were saved, however, by migrating in front of the slowly-moving ice-masses. Under the influence of the adjacent ice, environmental conditions in the southern line of the glacial advance became arctic in character, allowing the northern plants to exist in regions where previously they would have perished. By this very gradual process plants characteristic of the arctic climate were pushed forward, in advance of the glaciers, to the Sierra Nevada.

Then came the time when the vast glacial seas covered most of the Sierra Nevada and Yosemite carving and deepening the V-shaped canyons and the U-shaped troughs, plucking, crunching, pushing, polishing the underlying granites and other rocks. These waves of glaciation in the Sierra Nevada were much more localized, however, than the vastly extensive ice-sheets of the north. It is apparent to the inquisitive-minded that plant-life in the Sierra Nevada, during these long periods of glaciation, must have been extremely curtailed; plants existed only in regions not covered by ice. Around the borders of the glaciers, arctic and sub-arctic plants, hardy migrators far from the land of their origin, must have existed. The former plant-life of the region was either destroyed as a result of the climatic changes or crowded out, pushed far beyond the glacial influences.

About 20,000 year ago (toward the close of the Pleistocene period of geologic history) came the last gradual withdrawal of the great ice sheets from the Sierra Nevada and from much of the northern part of the continent as well and temperate conditions were once more restored in these regions. Coincident with the northern recession of the glaciers was the recession of the arctic and sub-arctic plants, their gradual withwdrawal necessitated by the gradual tempering of the climate as the glaciers melted back. In their places returned the temperate-dwelling plants which had been driven out by the glacial advances.

Withdrawal of the ice probably was not complete, however, and the small but active glaciers now found on Yosemite's high peaks, and along other mountains of the Sierran crest, may represent vestiges of this last ice-age. Though most of the arctic plants receded northward in the wake of the main fields of ice, some of them migrated up the mountain slopes close to the diminishing remnants of ice. Cut off from a path of escape, living on climatic "islands," these plants still

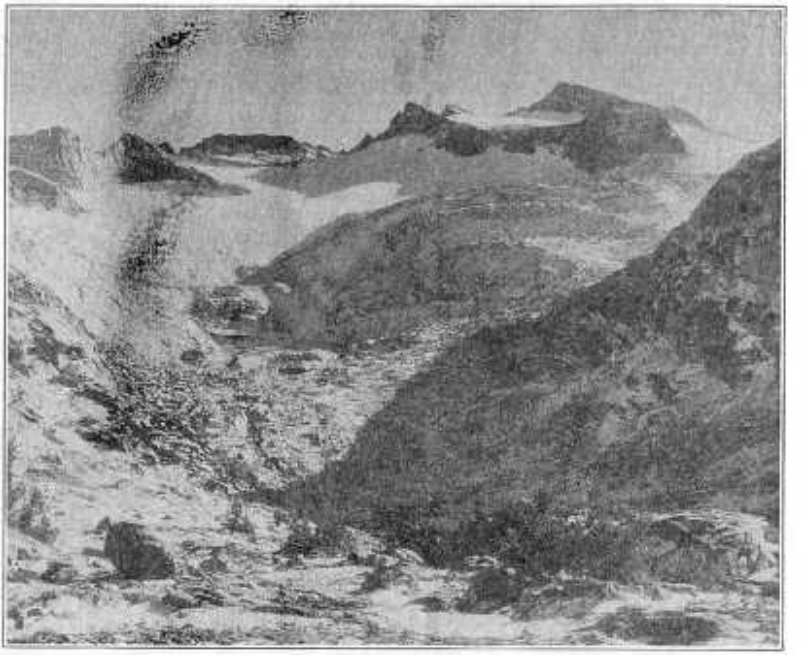
exist upon the summits of our highest peaks, even where the glaciers have entirely disappeared. Adaptable and plastic, they have fitted themselves into their new habitat, which at least simulates the environmental conditions of their original land. Today they form what we call our arctic-alpine group of plants.

With the melting of the glacial ice, lakes filled the valleys and rock basins carved by the glaciers The floor of Yosemite Valley became one enormous lake during this post-glacial period, its waters held behind the recessional moraines which had been dumped by the glaciers. For a long period of time this lake existed in Yosemite Valley but as the streams which drained into it slowly dumped their loads of silt, sand and rocks and the lake became filled up and the floor of Yosemite Valley was formed as we know it today.

New and rich territory for plant life thus being created, plant migrants from numerous sources were not long in taking hold. But the familiar plants we now have on the valley floor were not the first to take possession. The filled-in lake bottom did not lose its aquatic character all at once, but very gradually progressed from lake to marsh borders, sedges and rushes and water-loving grasses probably grew in rank profusion, and into the adjacent meadows gradually crept meadow grasses and other meadow plants. At one time the marsh plants must have dominated the landscape in Yosemite Valley, but finally their places were usurped by the meadow plants as progressive drying of soil came about. Not until very late in the post-glacial history of Yosemite Valley were conditions on the valley floor suitable for the establishment of forest-trees and shrubs around the borders of the meadows.

This succession of post-glacial plant forms is still going on in Yosemite Valley and other similar glacial "fills." Plant-life is not the static thing it seems at a glance. As the environmental factors which limit and determine plant communities change, so must the plant communities themselves change. In the span of human occupation in Yosemite Valley tangeable, visible changes have come about. Maria Labrado, last surviver of the Yosemites who lived in the Valley when the white man came, shortly before her death returned to the Valley, the Ahwahnee of her childhood. The cliffs stood out to her as familiar landscapes, but at the valley floor she looked with unrecognizing eyes. Forest trees were growing where in childhood she walked waist-high in lush meadow grass. Photographs taken in the 70's and 80's show long stretches of meadow-land where today yellow pine, incense cedar, and white fir have crept in with their accompanying undergrowth. With the

continued progressive drying of the old lake "fill," the forest invasion has reached the point where even the remaining vestiges of meadow-land are threatened, and the Park Service is faced with the problem of deciding whether to let natural forces carry on the plant succession unhindered, or to intervene by removing the young growth of trees as it encroaches farther upon the meadows.



LYELL GLACIER

GOLDEN EAGLE FLIGHT

By C. A. Harwell, Park Naturalist

Eagles must know their air currents. January 11, 1934, a Golden Eagle was observed near the base of Yosemite Point rapidly gaining altitude by soaring in narrow circles keeping so close to the granite wall that at times it was hard to tell which was eagle and which was shadow of the eagle. The bird had evidently been down foraging among the canyon Live Oaks on the talus and lower ledges and on its way home to the heights had chosen a short cut well known to eagles—the rising afternoon air currents against canyon walls of the Valley.

Bird Banding Notes

By M. E. BEATTY
Assistant Park Naturalist

Bird banding in Yosemite was started on May 5, 1933, by Naturalist A. E. Borell. In about two weeks' time nearly seventy-five birds were banded. An article by Mr. Borell entitled "New Method of Bird Study in Yosemite" appeared in the August, 1933, issue of Yosemite Nature Notes dealing with the method of banding and the benefits expected.

The purpose of this article is to give a resume of banding activities for the period from May 5, 1933, to November 5, 1934, a year and a half. The writer started banding two months after Mr. Borell and the statistics cover the work of both banders. In this period, 1184 birds were banded representing twenty-three different species. The list is as follows:

California Spotted Owl (nestling)	1
Red-shafted Flicker	3
California Woodpecker	15
Blue-fronted Jay	66
Short tailed Mt. Chickadee	7
Red-breasted Nuthatch	1
Sierra Creeper (nestlings)	4
Western Robin	145
Northern Varied Thrush	2
Western Ruby-crowned Kinglet	1
Cassin Vireo (nestlings)	4
Red-winged Blackbird	12
Brewer Blackbird	27
Western Tanager	43
Black-headed Grosbeak	457
Green-tailed Towhee	1
Sacramento Spotted Towhee	7
Thurber Junco	295
Western Chipping Sparrow	6
Gambel Sparrow	69
Golden-crowned Sparrow	16
Rufous-crowned Sparrow	1
Lincoln Sparrow	1
	1184

Returns (birds retaken after three months) numbered 110 or about nine percent of all birds banded.

The results obtained so far are very encouraging although it is a little early to make definite statements regarding the habits of our birds. It seems from our returns to date, that the Sierra Juncos present in Yosemite Valley in winter are not the same individuals present during the other seasons.

This is borne out by the fact, that our returns are in practically all cases close to a year apart and so far no Junco taken in winter has been retaken at any other season. We imagine that Juncos which nest on the floor of Yosemite Valley move down to the foothills for the winter, while the individuals nesting at higher elevations in the Park move down to winter in the Valley. The establishment of a banding station at a much higher elevation, such as Tuolumne Meadows, during the summer months, will enable us to learn more about this species.

It seems that of all species taken to date, the Juncos, Black-headed Grosbeaks, Gambel Sparrows and Golden-crowned Sparrows are the best repeaters. One Golden-crowned Sparrow, known as "751," returned 32 times within a period of three weeks.

Several oddities have occurred in banding such as the return of a Red-shafted Flicker for the first time, exactly a year to the day from the time banded. A pair of Juncos, male and female, banded at the same time on January 2, 1934, returned together on October 21, 1934. This might be a coincidence but does throw some light on mating.

So far, no birds banded in Camp 19 on the south side of the Merced River and Valley have been retaken on the north side and none banded on the north side has shown up on the south side. From this we assume that our birds stay close within a half mile radius and return to the same situation year after year.

As time goes on, continued banding will undoubtedly produce some very valuable information regarding Yosemite Bird life.

HARRIS SPARROW, NEW BIRD FOR YOSEMITE

By ASSISTANT PARK NATURALIST M. E. BEATTY

Through bird banding activities several new species have been added to the Yosemite Check List. The latest addition, a Harris Sparrow (Zonotrichia querula) was taken at the Beatty residence on December 1, 1934, in company with other Zonotrichias, notably coronata and gambeli. The Museum staff could not positively indentify the individual, so it was sent to Dr. Joesph Grinnell, Director of the Museum of Vertebrate Zoology, University of California. It proved to be a young male of the year and a rare bird for the state of California.

Dawson in his "Birds of California" lists only three records for the entire State and says it does not breed in California. The Harris Sparrow summers in British Columbia, east of the Rockies and occasionally strays make their way south with the Gambels and may be considered accidental.

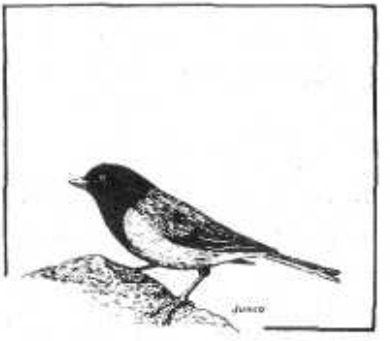
Bird Bander's Griefs

By M. E. Beatty,
Assistant Park Naturalist.

Bird banders have their griefs in the form of cats, dogs, ground squirrels and hawks which prey upon the trapped birds. Under ordinary circumstances these offenders can be disposed of by shooting or poisoning but in our National Parks the situation is different. Here all forms of native fauna are protected hence extra caution must be used in protecting the caged birds.

The worst offenders in Yosemite are the California Ground Squirrels which enter the traps for food and on finding themselves imprisoned take their spite out on the birds which happen to be in the traps with them. Fortunately these ground squirrels hibernate during the winter and the problem can thus be solved by using only single capture traps during the summer months.

The latest offenders are a pair of Sparrow Hawks (Falco sparverius) which were first seen at the banding station on January 5. Ordinarily the birds are removed from the traps hourly, as it is not possible to keep a continual watch over them. Attracted by the alarm calls of the birds, Mrs. Beatty was just in time to see one of the sparrow hawks dive for a trap which contained two juncos successfully catching one by the leg through the wire bars. By the time the hawk was driven away the junco was mortally injured. The hawks continued to harass the birds for several days without casualty until January 8 when the female Sparrow Hawk through similar tactics made another kill and devoured most of the junco before being observed.



Ordinarily, food for Sparrow Hawks consists of small rodents and grasshoppers and they seldom attack other birds. Only two of the Yosemite hawks make up their main diet from birds; the Sharp-shinned Hawk and the Cooper Hawk, belonging to the accipiter or bullet hawks. Evidently the heavy snow in Yosemite caused a food shortage in mice and insects and the Sparrow Hawks were forced to seek any available food supply, hence their attacks on the caged juncos.

Mud-hens at Lake Eleanor

Charles W. Michael

In the late summer of 1909 it so happened that I spent a couple of days and nights on the shores of Lake Eleanor in Yosemite National Park. At this time Lake Eleanor was a perfect gem, lying peacefully in its granite basin among pine-clad hills. During this visit not a single water bird was present to wrinkle the placid surface of the lake, not even the proverbial lonely one.

In the course of years subsequent to 1909 many weeks were spent in the higher sections of Yosemite National Park and almost all of the lakes within the park boundary were visited at one time or another. It was not, however, until October 10, 1934, that I again visited Lake Eleanor. No longer was Lake Eleanor a perfect beauty. A dam at the lower end of the lake had changed it into reservoir. The reservoir was at a low ebb and the surface of the lake at about its original level and as a result there were acres of stump-covered mud-flats lying exposed. And too, the scene was changed by the presence of great numbers of water fowl. A survey disclosed the fact that there were at least 1200 mud-hens (Fulica americana) present on the lake. Naturally the presence of the mud-hens came as a big surprise as my previous ramblings about the park resulted in only one record of these birds above the floor of the Yosemite Valley. On September 20, 1923, three mud-hens were seen on a shallow lake in Tilden canyon at an elevation of 8800 feet.

The answer to the problem of mud-hens is probably to be found in the changed conditions brought about by the reservoir—a change which produced a new source of food supply. An investigation disclosed the fact that the mud-hens were feeding on a low form of plant life which had become established here since the lake turned into a reservoir with a mud-covered bottom. The mud-hens diving to the bottom in shallow portions of the lake brought up stringy masses of this weed then fought with one another for the privilege of devouring the prize. It appeared that among mud-hens it is more desirable to rob one's neighbor than to forage for one's self.

Beside's the mud-hens there were also three eared grebes, four pied-billed grebes, nine ruddy ducks and three American mergansers. The ruddy ducks feed in the manner of the mud-hens. The mergansers and the grebes are fish-eating birds that can swim down a fish in his own element, and here fish-eating birds should wax fat in the waters of Lake Eleanor.

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