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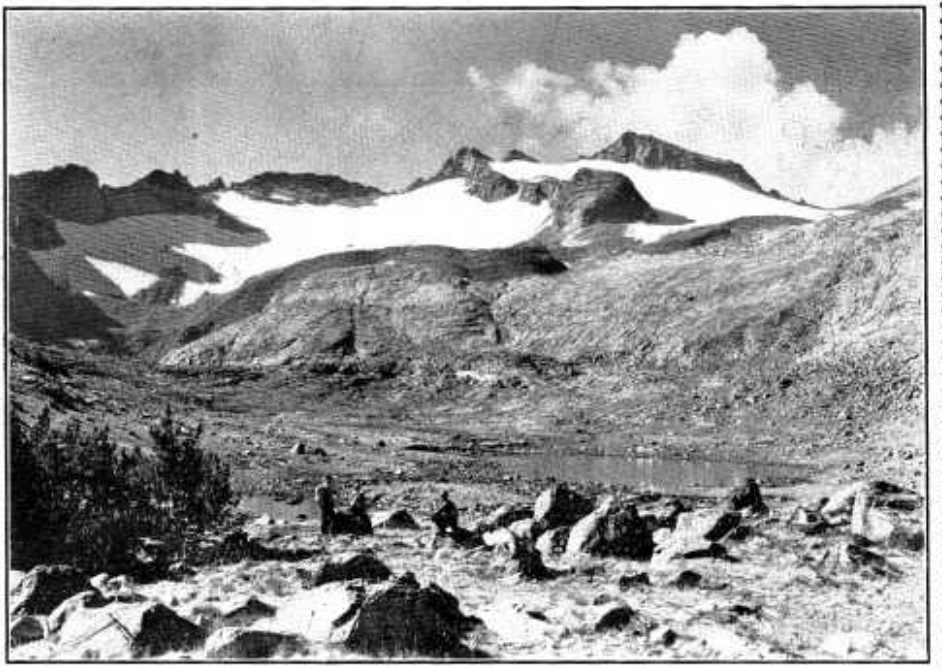

Lyell Glacier - September 22, 1939

Glacier Measuring Number

Yosemite Nature Notes

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MEASURING YOSEMITE'S GLACIERS

By M. E. Beatty, Assistant Park Naturalist

On September 24, the Naturalist Department completed the ninth annual measurement of the principal Yosemite glaciers. This year's party consisted of J. E. Cole, Jr. Park Naturalist; R. H. Anderson, Park Photographer; J. A. Howard, Ranger-Naturalist; Edward Dennison, CCC enrollee; and the writer. The first measurements were taken on September 18, which was several weeks earlier than usual. Ordinarily, studies are made during the first week of October but the light winter of 1938-39 made earlier measurements possible.

Photographic and statistical reports are sent each year to Mr. F. E. Matthes of the United States Geological Survey who, as Chairman of the Committee on Glaciers, has the responsibility of correlating ours and all similar studies carried on throughout North America. Results indicate that all these glaciers are now in a period of recession.

Since our last article on glacier measuring in Yosemite Nature Notes (Dec. 1935), an important change in technique has been made. For that reason it is considered advisable to summarize the work of the past nine years and to bring to our readers an idea as to the change of methods involved.

Starting in 1931, it was decided to make yearly studies of at least four of the principal Yosemite glaciers, namely: Lyell, Maclure, Dana and Conness. From a study of methods used elsewhere, it was thought sufficient to measure the advance or recession of each lobe front and to take photographs from the same vantage points each year for comparative purposes. Short base lines were established on the frontal moraines of each ice lobe paralleling the ice front from which measurements could be taken to the ice front. In most cases large morainal boulders were painted to mark the base line and a central point established. Wherever possible, bedrock was used in preference to loose boulders.

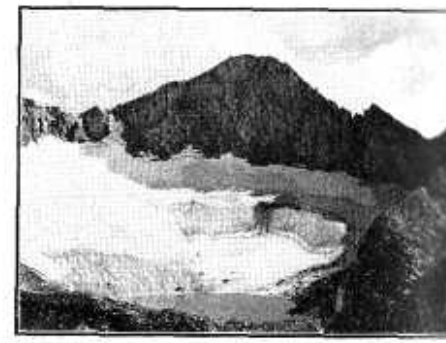
In the years following, it was found necessary to abandon some of these measuring stations as not being suitable. This was due in most cases to a shifting of the morainal rocks destroying the base line. We

soon discovered that the majority of moraines were underlain by shade ice which under certain conditions melted sufficiently to cause a shifting of even the larger boulders. In some instances, the entire moraine apparently caved in, causing a major shift of the ice front.

Another problem encountered was the difficulty in determining the actual ice front. The Sierran glaciers, for the most part, are small and have thin-edged ice fronts that terminate abruptly against the frontal moraines. Unless measurements are taken as late in the year as possible before winter storms are expected, the ice edge is not exposed. Snow from the previous winter commonly remains at high elevations throughout the following summer and often covers the glacier surface and shaded fronts until early October. Until the ice edge is exposed, measurements are impossible.

Furthermore, the shifting, or particularly the caving-in, of a moraine naturally affects the position of the ice front causing an apparent advance of the lobe for the year whereas other lobes may all show a recession. This was particularly well demonstrated this year on the west lobe of the Conness Glacier.

On July 31, 1939 members of the Yosemite School of Field Natural History saw and photographed from a distance the basin occupied by the west lobe of Conness Glacier. The picture when called to our attention showed a huge lake occupying the lower part of the basin, hemmed in by the terminal moraines. This was the first time to our knowledge that such a large lake had ever been observed at this point.



When Ranger-Naturalist Bryant conducted a hike to the glacier on August 10, the lake had entirely disappeared. On September 19, when we had completed our regular measurements of Conness Glacier, we explored the basin formerly occupied by the lake in an effort to discover the reason for its existence and rapid disappearance.

The shore-line was quite evident on the east side of the basin against the moraine. This enabled us to determine that the lake had been at least 800 feet long, 400 feet wide and 70 or 80 feet deep. A deep channel had been cut into the moraine through which the lake had drained. This channel, however, did not extend through the entire series of frontal moraines, so evidently the lake water percolated through the outer series in previously developed subterranean channels.

It is believed that formerly the run-off from the glacier and from melting snows was entirely carried away through an underground tube

or subterranean channel in the ice underlying the moraine. This was gradually enlarged from year to

year until finally it caved in, effectively blocking the outlet and causing the lake to form. As the lake increased in size, its waters were slowly able to melt the morainal ice and form a new channel, eventually cutting from the surface down to bed-rock. This example ably demonstrates the caving action that destroys our measuring stations.

Fortunately, our file of comparative photographs gives us a perfect record of these annual changes and in years to come will prove even more valuable than the figures of advance and recession. Other types of study have been undertaken in order to check the recession or advance of the ice fronts. Beginning in 1933, iron stakes were placed in the central portion of the ice surface of the Lyell Glacier and the stake locations were tied in by transit and stadia to a permanent base line. This experiment did not prove entirely satisfactory due to our inability to drill deeper than three feet into the ice. We found that after one year's interval that our stakes had melted out, indicating a considerable loss of volume for the ice mass. Through short period studies the glacier was found to move from a fourth to a half ince per day or about seven feet per year. More reliable figures can be obtained after we find a suitable auger to drill holes in the ice to ten or twenty foot depths and then use longer stakes.

Although further stake experiments have been postponed temporarily, the work already accomplished has made it possible to carry on an even more important piece of research. By means of the base lines established in order to set stakes and by our ability to relocate the original stake positions, we are now in a position to determine the variation of surface level from year to year at definite points.

By shooting vertical angles with a transit set up on one end of the base line to these points, we can determine the amount of lowering or raising of the ice surface. For example, on the East Lobe of Lyell Glacier, the central portion shows a thirty-two foot lowering of surface level in the six-year period from 1933 to 1939. With an estimated maximum thickness of 300 feet at this point this indicates a loss of approximately ten per cent in six years. Considering results from various locations on both the East and West Lobes of Lyell Glacier there has been an average yearly loss of about four feet in surface level.

In contrast, the front of the East Lobe of Lyell Glacier shows a re-

cession of sixty-seven feet for the same six-year period. Maclure, on the other hand, shows a frontal recession of seventy-six feet while Dana Glacier shows a still greater loss—eighty-one feet. The East Lobe of Conness Glacier records the greatest loss of any of the Yosemite Glaciers with a loss in the last six years of 156 feet.

From the foregoing data, it is evident that the Conness Glacier will be the first to disappear, provided this period of recession continues. However, according to past history, the cycle will again change and our glaciers may show an increase in size. Glacier measuring is a long term project and our present data is only the ground work for studies of the future.

FIGHTING HUMMERS

By Ranger-Naturalist Enid Michael

In the brown meadow the thistles were at the height of their flowering period early in August. The thistles were densely massed and probably covered a quarter of an acre; there were thousands of blossoms and yet two Allen Hummingbirds (Selasphorus alleni) that had discovered the garden were battling for complete possession. I had never before seen such fighting. The two Hummers would meet breast to breast, fly straight up, stabbing at one another as they climbed, until finally they would clinch, bill to bill and claw to claw then they would come pin-wheeling down until they struck the ground. Sometimes after wrestling on the ground a moment they would rise again to continue the battle. More often after an engagement the birds would separate on the ground and go to perch to rest awhile. But, no sooner would one leave the perch and go toward the thistle blossoms than the battle would be on again.

I watched the Hummers for an hour by the clock, many times during this hour I saw the belligerents engage in combat. However, the battle for possession of the thistle patch was still undecided when I left the scene.

DEER FAMILY OF THREE FAWNS

By Ranger-Naturalist V. G. Baysinger

Near the bank of the Merced River on the morning of July 7, 1939 I saw a sleek looking doe with a fawn. A second look and I saw two more fawns. There were three fawns with the doe. In this exceptional valley of Yosemite I had seen another unusual. Further attention revealed that the doe was seemingly in good condition. The three fawns also were of good size and quite similar in their stature. Each fawn seemed to be the pattern of the other.

I think that this observation is interesting not only from the standpoint that the family consisted of three fawns but also because of the apparent good condition of each of the deer.

NOTES ON THE DANA GLACIER

By Ranger-Naturalist M. D. Bryant

The Dana Glacier is one of the most accessible glaciers in the Sierra Nevada. It lies in a typical cirque at the upper end of Glacier Canyon, on the northeast side of Mt. Dana, about three miles from Tioga Pass. The trip up Glacier Canyon to the glacier is one of great interest to photographer, botanist, zoologist and geologist but perhaps has more to offer the latter.

At the present time the Dana Glacier is small as compared with its former extent. Evidences of glaciation are everywhere present in the canyon and four prominent recessional moraines form dams across it. Lakes varying in color from emerald to deep blue have formed back of the three lower moraines. The moraine at the end of the glacier is the largest, indicating that the glacier has been approximately in its present form for a great length of time. In years of normal snowfall much of the glacier is covered so that the actual condition of the ice and the amount of debris being transported is obscured. The light snowfall of the past winter (1938-39) and the high temperatures of the summer have resulted in the exposure of a large part of the ice, thus permitting a better study of the glacier than has been possible in many years.

While taking a hiking party to the Dana Glacier on August 15, I traversed the ice and had a fine opportunity to observe the glacier. These are my findings. The snow feeders had almost melted and the rocks which they had been holding in place were falling onto the glacier proper. At least one rock per minute was coming from the main chute.

The bergschrund to the southeast of the peak was about fifteen feet across and varied from ten feet in depth, where ice had caved into it, to about fifty feet. At the base of the peak a mass of ice about 300 feet wide and 125 feet long had dropped ten feet below the level of the body of the glacier but the bergschrund was represented in this area only by a few small cracks. Numerous crevasses were present which varied in size from small cracks to ones about 100 feet long and fifteen feet across. The ice near the center of the moraine consisted of large hummocks through which small streams of water were flowing. The water carried large amounts of glacial flour, which in places accumulated as a fine film. The amount of debris exposed on the ice indicates the Dana Glacier to be less active than the Conness Glacier

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HIGH LIGHTS IN YOSEMITE BIRD REPORTS FOR THE SUMMER OF 1939

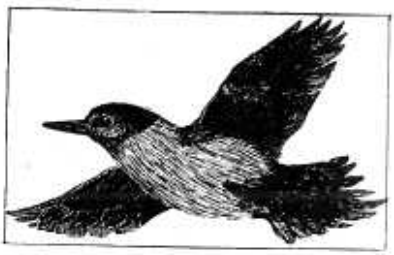
By Ranger-Naturalist Enid Michael

Mountain Quail. On September 19, a full two weeks ahead of the normal schedule, a flock of Mountain Quail passed through Camp 19, walking their way out of the mountains to winter quarters in the foothills.

Northern Phalarope. On September 4 a Northern Phalarope was seen foraging on the scummy waters of what remained of Mirror Lake. The only previous record of this species in the Yosemite Bird Reports appeared in the monthly report for October 1925.

California Gull. For the fifth time in twenty years a California Gull was noted in Yosemite Valley. For some reason unknown gulls apparently avoid Yosemite Valley. Flocks of California Gulls cross the Sierra every year and during the summer months they are not uncommon on some of the high mountain lakes. Why are they not more often seen in Yosemite Valley?

Lewis Woodpecker. For the first time Lewis Woodpecker appeared on the July Bird Report. The Lewis has been seen in late August, but do not usually appear in the valley before September.



Lewis Woodpecker

Ash-throated Flycatcher. A lone bird was seen May 15. The three previous records for Yosemite Valley were, August 1924, August 1934, and June 1927.

Pine Siskin. Usually to be seen during the month of May, but this year entirely missing, but stranger still four birds were seen on three different occasions during the first week of June.

Cedar Waxwing. Three birds seen on August 29. They were feeding on the fruit of the Choke-cherry. May, June and October are the months when Cedar Waxwings are most likely to be seen in the valley.

Western Mockingbird. On July 29 a lone bird was seen in the swamp district beyond Mirror Lake. Previous record, each occasion a lone bird, September 21, 1924 and March 21, 1931.

Marsh Wren. Second record for the valley. Birds seen on five different dates during September. On two occasions in the tangles of saw grass in the Sentinel Meadow five individuals were seen. On three other occasions lone birds were seen.

GROUSE AND WREN-TIT SHOW LIFE ZONE OVERLAPPING

By Lloyd M. Smith, Field School '39

On July 26 the Field School was climbing up the zig-zags of the Snow Creek-Tenaya Lake trail and paused to rest near the top of the crest at about 7000 feet altitude. On the dusty trail lay a feather from a Sierra Grouse (Dendragapus obscurur sierrae), easily distinguishable by the short filoplume. While examining this find, we were surprised to hear the distinctive song of the Pallid Wren-tit (Chamaea fasciata henshawi). According to the life zone theory, if accepted in the strict sense, the possibility of finding two such birds as the wren-tit and grouse in the same locality would be almost impossible, and yet here the two species were side by side. The wren-tit is typically a Sonoran form, and finding it at the 7000 foot level at the upper limit of Arctostaphylos mariposae growth is rather unusual. The grouse is typically a bird of the Canadian and Hudsonian zones, although it will wander down into the Transition zone while foraging.

It must be pointed out that the life zone theory must not be accepted verbatim. It is a flexible theory and the principles are the important part. The fact that the wren-tit and grouse may be found together in no way detracts from the life zone hypothesis. There are exceptions to every rule, and normally the grouse would be found at a higher altitude and the wren-tit at a much lower one. That they overlap in distribution is unusual.

NATURE NOTELET

Ranger-Naturalist Walter G. Heil.

Chief Le-mee, well known for his demonstration of Indian lore at the Museum, has reported an observation of from twenty to twenty five Valley Quail (Lophortyx californica vallicola) crossing the road near the Pohono Bridge in the valley. He says they were coming up from the river and crossing up into the old quarry at this point. As the Valley Quail has never been found nesting in the park and is listed as only a casual visitor to the park or valley, this is an important observation.

NON-SURVIVAL OF THE FATTEST

By Ranger-Naturalist Lowell Adams

When the biologist contemplates the problems of evolution, "survival of the fittest," "struggle for existence", and corollary topics, he usually pictures such adversities as over-predation, population crowding, lack of safe breeding and hiding places, inadequate food supply, etc. Seldom does the biologist think of an over-supply of food as an adverse factor for a species. But the fact that such a situation can exist seemed to be illustrated on August 18 and 19 this summer (1939). On the 18th, Mr. B. C. Cain, Naturalist, Oakland Council of Boy Scouts, brought to the Museum a Black Swift which he had found on the ground unable to rise. There was no apparent injury so the bird was released from a second-story window of the museum. It flew out of sight over the Post Office. Its flight seemed normal except that it did not rise above the tree-tops as we had expected it might. The next morning a Black Swift was brought to the Museum by Mr. William E. Becker, Custodian of the Museum. Mr. Becker had picked up the swift in the vicinity of the Post Office where the one released the day before was last seen. Possibly this was the same bird that had been brought in the first day. Instead of releasing it a second time Junior Park Naturalist Cole and I prepared a study skin of the swift. In the process of preparing the skin we found that the bird was surprisingly fat. There was a layer of subcutaneous fat about 3/16 inch thick on the back and abdominal region. Two pieces of fat about 3/8 inch in diameter were taken from the peritoneal cavity, and the viscera were laden with more fat. Around the heart was a ring of fatty tissue. Apparently the bird was in good health and had been grounded by the excessive fat which possibly had interferred with the heart and muscular activity. The obese condition may have been brought about by an abundance of insects in Yosemite which furnish a good food supply for the swifts. Each year a number of Black and White-throated Swifts are brought into the Museum. In many cases their incapacity may have been due to too much fat. It is suggested that when an apparently normal swift is brought in, it be kept without food for a few days before it is released. This treatment may serve to reduce the excess fat. Of course, water should be available for the birds during the period of captivity.