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1934-1935 Report of the Committee on Glaciers

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Chairman of the Committee on Glaciers

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
ROCKY MOUNTAIN NATIONAL PARK
COLORADO

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MEMORANDUM FOR THE PRESS:
(For release upon receipt)

Glaciers in Rocky Mountain National Park are approaching extinction, if prevailing climatic conditions continue over the next few decades, park officials announced today. Measurements made on a recent glacier survey in the park have been analyzed and comparisions made for the period since 1932, indicating a marked shrinkage in these ice sheets during the five years of study.

During the two-year period of 1935-37, Tyndall Glacier apparently has receded more than 153 feet, while Andrews Glacier has retreated almost 31 feet during the same interval of time. Since 1932, total recession of Tyndall Glacier has amounted to more than 160 feet; Andrews Glacier has shrunk almost 50 feet. In every year except 1935, losses have been recorded for both sheets of ice. In that year, Andrews advanced 73 feet over 1934, while Tyndall made a gain of nearly 34 feet.

There are five named glaciers in Rocky Mountain National Park, but three have not been included in the study due to their inaccessibility or physical difficulties that make accurate measurements virtually impossible. However, observation of the unmeasured ice sheets indicates that they are being dissipated gradually in about the same rate as the two glaciers studied.

Observations of the glaciers of North America have been made over a long period of time by the National Research Council of the American Geophysical Union, and the general trend among our glaciers is toward dissolution. The purpose of these studies is to determine long-range climatic conditions and trends, with a view to the practical effects of temperature and precipitation upon agriculture and other fields.

Loss of volume in the glaciers may be due to increased average temperature or decrease in annual snowfall, or a combination of the two factors. Park officials indicated that decreased snowfall over the period covered by the glacier studies has been the principal cause of shrinkage. Unless the next few years bring a change toward greater accumulation in the snowfields, the glaciers of the park may become mere perpetual snowbanks, and eventually disappear altogether.

(Reprinted from Transactions of the American Geophysical Union,
Sixteenth Annual Meeting, 1935)

Mr. John C. Preston
with compliments of
François E. Matthes

REPORT OF THE COMMITTEE ON GLACIERS, 1934-35

François E. Matthes, Chairman

The members of the Committee on Glaciers for 1935 are as given in the report of the Committee for 1933-34 in the Transactions of the Fifteenth Annual Meeting with the addition of Kenneth N. Phillips (The Mazamas, Pacific Building, Portland, Oregon).

The year 1934 witnessed a further expansion of the program of systematic annual observations on the variations of American glaciers which was inaugurated by the Committee in 1931. Several of the collaborators in the field-work of their own initiative enlarged the scope of their activities, and a new group joined the movement in the Pacific Northwest. These are the Mountaineers, of Seattle, Washington, who began observations on the glaciers of Mount Baker, which are the largest in the continental United States next to those on Mount Rainier. Under the leadership of H. V. Strandberg a base-line was laid out by the Mountaineers for measurement of the recession of the Easton Glacier, on the south side of the peak.

Park Naturalist C. Frank Brockman added a sixth to the list of glaciers on Mount Rainier on which he is making annual measurements. This is the Stevens Glacier, on the southeast side of the peak.

Richard M. Leonard, of the Glacier Study Committee of the Sierra Club, made a preliminary visit to the seven small glaciers that cling to the northeast flanks of Twin Peaks, Matterhorn Peak, and Sawtooth Ridge, and that constitute the northernmost group of glaciers in the Sierra Nevada. He has given the first detailed descriptions of these hitherto little-known ice-bodies.

warmest October since 1907; May, 1934, was the warmest May recorded except one; and August, 1934, was the warmest August since 1915. Precipitation was below normal in all months except three--October and December, 1933, and June, 1934. Precipitation in November was the lowest recorded for that month, except in two other years. December turned out very wet, but the heavy snowfall on the mountains was offset by the unusually high temperatures.

Glaciers of Mount Shasta

Oliver Kehrlein, Chairman of the Committee on Glacier Studies of the Sierra Club, revisited several of the glaciers on Mount Shasta early in September, 1934, and in his report furnishes further data and photographs of these little-known ice-bodies.

Wintun Glacier, on the east side of Mount Shasta (observations on which had to be suspended in 1933, owing to inclement weather), was given particular attention, and a base-line was established at its south lobe, which is the longest. Fortunately the position of the terminus of that lobe in 1927 is known with a fair degree of accuracy, and as a result the distance which that lobe has receded since that date could be determined as being approximately three-quarters of a mile. The terminus is now close to the 10,000-foot contour-line, whereas it lay at an altitude of 8300 feet in 1927.

Wintun Glacier now has four distinct lobes occupying broad, shallow channels in the mountain's side separated from each other by low rock ridges. Photographs taken in 1895 and 1920, however, show that in those years the three northerly lobes coalesced over the ridges so as to form a single continuous ice-mass one-half mile broad. It is thus evident that the Wintun Glacier has suffered a considerable reduction in extent and in volume during the last 14 years.

Mr. Kehrlein calls attention, further, to certain features which, though still somewhat puzzling, very probably are to be interpreted as indicating another much greater reduction in the extent of the Wintun Glacier which must have taken place in relatively recent times. These features consist of residual masses of ice cropping out here and there from beneath the great embankments of loose volcanic debris that flank the now empty glacier trough for more than a mile below the terminus of the Wintun Glacier. The most reasonable interpretation, for the present, seems to be that while the glacier lay in the trough the volcanic debris accumulated along its sides, being derived in part from the crumbling canyon walls and in part from the heavily loaded glacier itself. As the glacier's surface was finally lowered by excessive melting the loose debris slumped down upon its margins, burying considerable masses of ice and preserving them. At present the gradual retreat of the debris-slopes, by slumping and rain wash, brings these buried ice-masses again to light in spots. Just how far back in time this chapter in the glacier's history goes is still a matter of conjecture; but the exceeding steepness and the raw aspect of the flanking debris-slopes in any event strongly suggests that it is likely to be a matter of decades rather than centuries.

Hotlum Glacier, the largest glacier on Mount Shasta, situated on its northeast side, appears to have been reduced in size and split up into lobes during the last 14 years in much the same way as the Wintun Glacier. A photograph taken 1920 shows that it then was a single continuous ice-mass covering the slope of the mountain over a breadth of about 1.5 miles. Today it is composed of two lobes separated by a rocky ridge, and the southeast lobe has shrunk to a narrow tongue that reaches, by estimation, no lower than 12,500 feet. The northwest lobe still maintains a breadth of about one mile and has a length, from cirque wall to terminus, of somewhat more than one mile. Comparison with a photograph taken in 1920 shows that its broad, strongly lobate front has receded considerably and that the lower portion of the mass has melted down appreciably since that date.

If all the other glaciers on Mount Shasta have been reduced proportionately as much as Hotlum and Wintun since 1920, the ice-mantle of Mount Shasta as a whole may have suffered greater losses in proportion to its mass than the ice-mantle of Mount Rainier has suffered in the same interval.

Mud Creek Glacier receded about 40 feet in 1934. Its terminus actually overhangs the caving wall of volcanic ash at the head of Mud Creek Gorge, and it is therefore evident that in its case recession is due not merely to melting but also in large measure to undermining of the terminus by the headward erosion of the streamlet in the gorge.

Konwakiton Glacier, which lies at a much higher level than Mud Creek Glacier, had changed but little since last year, so far as could be determined from a comparison of photographs.

Glaciers of Sierra Nevada

From the beautifully illustrated report of Park Naturalist C. A. Harwell it is evident that the glaciers in and adjacent to Yosemite National Park continued to recede in 1934, some of them more rapidly than in preceding years, others less rapidly. The recession of their fronts, however, is hardly expressive of the losses sustained by ablation at their surfaces, which again this year were stripped of snow up to high levels. Deficiency of snowfall during the winter of 1933-34 chiefly accounts for this condition.

East Lyell Glacier showed a recession at the central part of its broad front of 21 feet, as compared with a recession of 18 feet in 1933, and of 2 feet in 1932.

Comparison with a photograph taken by I. C. Russell in 1883 shows that the East Lyell Glacier has receded a net total of about 300 feet and has lost appreciably in thickness since that early date. Another photograph, taken by Lloyd Hennig, in the early 1890's, likewise reveals that in those years the glacier had considerably greater volume.

West Lyell Glacier in 1934 receded 14 feet as compared with 7 feet in 1933 and with an advance of 6 feet in 1932. A photograph taken by Lloyd Hennig in the early 1890's shows that at that time the upper portion of the Glacier was so much thicker than it now is that one could reach the rocky crest of Mount Lyell by a simple climb up a continuous snow-slope.

Maclure Glacier in 1934 had receded 15 feet as compared with 22 feet in 1933.

Dana Glacier, as in previous years, was measured at four points on its broad and irregular front. At station 4, which is not far from the center, the ice had receded 46 feet, as compared with 30 feet in 1933, and with an advance of 31 feet in 1932.

From a photograph taken by I. C. Russell in 1883 it would appear that the Dana Glacier has receded a net total of about 100 feet since that year. This may seem a trifling distance as compared with that of three-quarters of a mile through which the Wintun Glacier on Mount Shasta has receded within the last 14 years; however, it is evident from Professor Russell's photograph that the Dana Glacier has lost considerably in thickness and volume also. Assistant Park Naturalist M. E. Beatty estimates that the loss in volume may amount to fully one-third.

Conness Glacier on October 10, 1934, was found covered with 2 feet of fresh snow, and no accurate measurement therefore could be made to its, at best, indefinite frontal margin. The estimated recession is about 25 feet.

North Palisade Glacier, the largest glacier in the southern part of the Sierra Nevada, was not measured in 1934, but from photographs received from Oliver Kehrlein, Chairman of the Committee on Glacier Studies of the Sierra Club, it is apparent that this glacier in 1934 suffered further reduction in volume, its surface having again been lowered by strong ablation.

Glaciers in Glacier National Park

The following data were received from Park Naturalist Geo. C. Ruhle:

Blackfoot Glacier (west lobe) at the end of the summer of 1934 had receded 10 feet from the position it occupied in 1933.

Grinnell Glacier showed a recession of 54 feet as compared with none in 1933.

Agassiz Glacier, which owing to stormy weather could not be reached in 1933, was found to have receded 75 feet during the period 1932-34.

Glaciers in Rocky Mountain National Park

John C. Preston, Assistant Superintendent, reports that the recession of the glaciers in Rocky Mountain National Park was greatly accelerated in 1934 as a result of warm weather and scanty precipitation.

Tyndall Glacier in 1934 receded 42 feet, as compared with 33 feet in 1933.

Andrews Glacier in 1934 receded fully 80 feet, as compared with 9 feet in 1933.