

Recent Survey of Coe and Eliot Glaciers

MAZAMA RESEARCH COMMITTEE, *By* RALPH S. MASON

THE RESEARCH COMMITTEE has been conducting annual glacier measurements since 1925 on Eliot Glacier, the largest ice stream on Mt. Hood, the highest peak in the Cascade Range in Oregon. Annual measurements have also been conducted on Coe Glacier since 1946. In the fall of 1946 large painted crosses were placed on the moraines or nearby solid rocks to mark the termini of the various glaciers now active on Mt. Hood. Subsequent aerial photographs failed to show the markings with sufficient clarity to be of use, however.

On Eliot Glacier two survey lines have been established and checked each year since 1940. The lower, or "A" line, crosses the ice stream at an approximate elevation of 6410' measured at the east end of the line on the right moraine. The line is 1028' long and terminates on the left lateral moraine at an elevation of 6389'. The "B" line, located 2700' up glacier from the "A" line, has its east end on the right moraine at an elevation of 6854'. The line is 1568' long, ending on the west side moraine at an elevation of 6850'. At the present time neither line crosses any bare ice. Some exposures of ice have been observed from year to year and these are duly recorded in the survey notes.

Coe Glacier is checked by means of a survey line crossing the ice stream from the east or right moraine at a point 6038' in elevation to the west side at an elevation of 6015'. The line is 944' long and lies approximately 550' in the trough up glacier from the terminus of the glacier as measured in 1947, or about 200' up glacier from the terminus in 1954. The Coe Glacier survey line is designated the "C" line. As in the case of the Eliot Glacier survey lines, no ice is presently exposed.

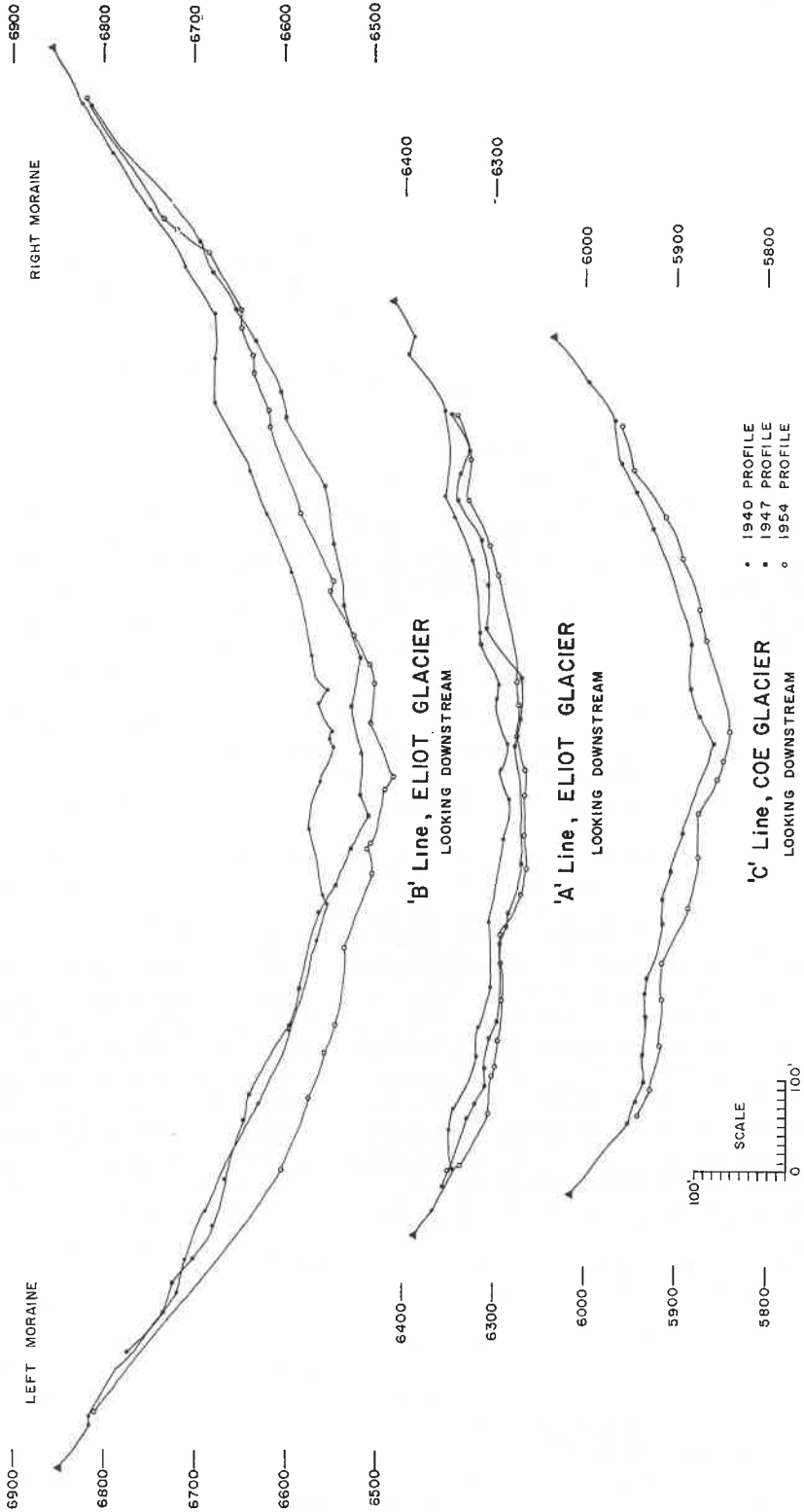
Measurements are made with a standard transit and either a level rod or stadia board. In recent years it has been the practice to use the stadia board in preference to the level rod since greater visibility is obtained with the larger stadia board. The use of the stadia board also permits taking longer shots and eliminates taking the transit down the precipitous moraine slopes. A survey party of at least four is required to perform the work efficiently. In addition to rerunning the sur-

vey lines to determine the amount of vertical change caused by wasting away of the ice, a search is made for boulders marked with paint in earlier years. The movement of these markers is measured and recorded. Identity of the various painted boulders becomes a problem after a period of years and soon they disappear altogether; others may be moved by snowslides or rockslides. In 1954 a new set of boulders was marked with red lead paint. These markers were further identified with a number and a "54." Paint seems to last well on most of the stones.

Vandals destroyed the marker at the east end of the "B" line during the 1953 season, requiring a resurvey of the line and establishing of another survey point. The other line markers on Eliot Glacier are substantial boulders and will probably maintain their position for years.

Like nearly all of the glaciers on the mountains of the northern hemisphere, the ice streams on Hood are receding at a rapid rate. The cross-sections of the three survey lines on the accompanying drawing show the vertical losses sustained over a period of years. The Eliot Glacier profiles show the condition of the glacier in 1940, 1947, and 1954. The survey lines for the intervening years were not included for the sake of clarity.

Some apparent anomalies, where a later survey shows the glacier surface at a higher elevation at a certain point than shown in the earlier survey are due to the uneven, hummocky surface of the ice stream which slowly moves down glacier. As mentioned above, the glacier surface reveals little bare ice. The surface is characterized by a heterogeneous mass of boulders of all shapes, ranging from room-size down to pebbles and the finest sand and silt. Minor plant life manages to survive, and near the "A" line small evergreens have established themselves. Surface wasting, or ablation, of the ice on Eliot Glacier during the past fourteen years amounts to an average of 26' over a width of 800' on the "A" line and 49.4' for a width of 1000' on the "B" line. Vertical shrinkage on Coe Glacier amounted to 19.4' over a width of 600' in the period from 1947 to 1954. On an average yearly basis the



Profiles of Eliot and Coe Glaciers of 1940, 1947, 1954, showing progress and variations for a period of 17 years.

Eliot "A" line shows a change of 1.85', the "B" line 3.53' and the Coe "C" line 2.77'.

All glacier measurements on Mt. Hood are usually taken over Labor Day weekend. This date has been selected partly because it affords available time for committee members to do the voluntary work which usually requires two full days, and partly because all of the snow pack has disappeared which would otherwise obscure the ice. Weather is an important factor to be considered in making the surveys since it is manifestly impossible to use a transit and stadia board when visibility is impaired by fog or when it is raining or snowing. From a purely scientific standpoint it would be better if the surveys could be made a little later in the season when glacier wasting was complete or nearly so for the year. The added value to be gained by making the later measurements is felt to be offset by the difficulty in securing personnel and the vagaries of the weather later in the season. The important thing is that the surveys are made

at the same or nearly the same date each year and that the ice is not hidden by last year's snow.

At intervals of a few years the motion of the ice at the terminus of Eliot Glacier is measured with a clockwork mechanism. A wire, attached firmly to a pin in the ice, passes through a device called a cryocinometer which multiplies the slight movement of the ice and records it on a dial. A period of eight hours or more is usually required to give valid results.

Movement of ice on Eliot Glacier in the vicinity of the "A" line, as indicated by the position of painted boulders, amounted to 4.3' per year during the period 1946-1952. On the "B" line maximum displacement for the same period was 4.56' per year. On the "C" line on Coe Glacier movement averaged 2.97' per year for the period 1947-1954. These figures tend to be misleading since it is doubtful whether the displacement of the stones measured represents the maximum movement of the ice.

'Round the Mountain—Almost

By MARY LOU GREENE

"Well," commented Ray Davis to his assembled group of 'Round the Mountain hikers the morning we set out, "this is the first time this trip has ever been attempted in winter!" And sure enough, although the calendar read August 25, the first snow had fallen at Timberline, and paintbrush and lupine showed scarlet and purple against patches of white. So we set off on our 35-mile hike with mittens on our hands and a heightened sense of adventure in our hearts. The person ahead of me in line muttered through chattering teeth, "I've been waiting for this trip for weeks and now I'm going to enjoy it or bust!"

By the time we had descended into the depths of Zigzag Canyon and climbed back out again, it had started to rain, and as I stepped out of line to puff a bit I marvelled at the passing style show of unique raingear. It was a mighty chilly Paradise Park where we stopped for lunch before making a side trip to the Hardesty Memorial Rock to pay homage to the man whose generosity had made this trip possible.

We began to question the accuracy of the log on our trail map, which kept insisting on such falsehoods as "excellent view of mountain from this point" and "superb view of Sandy Glacier here." (It wasn't until two days later that the weather cleared and the rumor that there was a mountain nearby was verified.) The pack train, coming in from a spur road, passed us early in the afternoon, assuring us of sleeping bags, dry sox in camp, and food. And never was a hot dinner so delectable—our hats are off to the cooks, Martha and Alice Jean.

Ramona Falls was fairylike and beautiful, but it was a little hard to tell just where the waterfall ended and the steady downpour began. Several retreated to sleep in the log shelter, but the more hardy souls pitched their tents. Edna Sinclair boasted next morning that Ed had ditched theirs just right so as to catch all the water and not waste any!

The next day's trail led up and up through deep forest 'til we had gained the summit of Bald Mountain ridge, where we could look