

# OREGON'S SOUTHERNMOST GLACIER: A THREE YEAR REPORT

By Ralph H. Nafziger



SEPTEMBER 22, 1968 — EAST GLACIAL ICE MASS VIEWED FROM ITS TERMINAL MORaine | NOTE SHAPE OF UPPER PORTION | Photo by Ralph H. Nafziger

IN 1966, while standing on the summit of Mt. Thielsen, my uncle, Dr. Ted Lathrop, peered over the north side and sighted what appeared to be glacial cracks in a snowfield. Two years later, he, Jim Torrence and I had a chance to investigate the North Face from below and confirmed the presence of two glacial ice arms, each nestled in a steep chute. Dr. Lathrop wrote a detailed account of that trip and a subsequent aerial trip in the 1968 MAZAMA (Lathrop, 1968).

During the three succeeding years, I have returned with small parties to observe these ice masses. This article reports on changes which have occurred during this period.

First, I would like to outline a brief chronology of observations of Mt. Thielsen prior to 1968. Before 1965, either little or no ice was present, or minor attention was evidently paid to this aspect of Mt. Thielsen's North Face by the few parties which visited the area.

In 1883, a U.S. Geological Survey party, led by J. S. Diller, explored Mt. Thielsen, but their report made no mention of snow or ice (Diller,

1884). Later, Diller reported that "... Mt. Thielsen (sic) (was) found to be free from glacial ice. . ." (Russell, 1901).

In 1921, Ira A. Williams published a geologic account of Mt. Thielsen which included the depiction of a glacial moraine in one diagram. Mention was made of Mt. Thielsen's glacial erosion prior to Mt. Mazama's collapse, but no evidence for recent glaciers was presented (Williams, I., 1921).

Perhaps one of the most comprehensive geologic studies of Mt. Thielsen was conducted by Dr. Howel Williams. However, his report (Williams, H., 1933) mentioned only the deeply incised glacial cirques on the mountain, and he did not recall seeing any ice during his work in 1932 (Williams, H., 1969, personal communication).

During the summer of 1963, Dr. William Purdom of Southern Oregon College in Ashland conducted geologic field investigations in the Diamond Lake area, including Mt. Thielsen. His report (Purdom, 1963) made reference to Pleistocene glaciation. However, he recognized

no evidence of glacial movement of the snow-mass on the northeast side. Dr. Purdom attributed the morainal material to deposition by earlier glaciers, with subsequent freezing and thawing dumping material on the snow patches (Purdom, 1969, personal communication). Several of his photos taken in 1963 show considerable snow, which may have obscured any underlying ice.

In a photograph, evidently from a 1965 travel brochure supplied by Ed Cooper of Seattle, ice on one glacial arm is clearly visible. The ice is partially concealed by snow on the upper and eastern margins.

In 1965, Austin Post of the U.S. Geological Survey in Tacoma photographed the North Face of Mt. Thielsen from the air. The picture shows two ice masses extending downward to two terminal moraines which are capped by extensive snow. He also reported that the USGS lists this ice as a glacier in an International Hydrological Decade inventory (Post, 1969, personal communication to Dr. T. G. Lathrop).

In September 1965, Jim Torrence, then District Ranger of the Chemult District of Winema National Forest, photographed Mt. Thielsen's North Face from Sawtooth Ridge to the northeast. One photo shows these two extensive arms of ice.

Although a light skiff of new snow powdered the rocks on September 22, 1968, our party was fortunate to clearly see ice on the moraine and on both arms. Enough snow had melted during the summer to expose the ice. Sufficient rocks had not slid or fallen from above to obscure the ice, as I believe has occurred in subsequent years. Considerably more snow had melted by the following week (September 28) so that aerial photos clearly indicated the extent of the exposed ice on the two arms and provided a basis for our succeeding annual observations.

Throughout this article I will designate the longer left arm (approximately 400 feet long and 50 feet wide) as the east arm and the one to the right (approximately 300 feet long and 100 feet wide) as the west arm.

On September 20, 1969, Jim Torrence, Dick Moke and I traversed the west side of Mt. Thielsen via the newly built Pacific Crest trail. Instead of crossing the difficult northwest arête, as Jim and I had done the previous fall, we followed the trail down to Thielsen Creek. Then, leaving the trail, we scrambled over loose talus and boulders up a notch, formed by melt-water, to the top of the terminal moraine at the foot of the east arm. From here we continued upward and westward to the base of the west



SEPTEMBER 20, 1969 — EAST ICE MASS COVERED WITH SNOW | NOTE CRACK IN UPPER PORTION OF GLACIAL ARM | Photo by Ralph H. Nafziger

arm. Unfortunately, we encountered not only poor weather with fog presenting a constant nemesis, but a fine, powdery snow covered the talus rocks.

Considerable morainal movement had occurred in one year (perhaps caused by the underlying moving ice?). Several small snowfields were present on the morainal surface. There appeared to be less exposed thick snow on the moraines than we had noticed in 1968. Apparently, rocks and debris from above had covered the ice and snow observed here in 1968.

Both arms were covered with snow although two cracks suggesting ice movement were present on upper reaches of the east arm. A thin patch of ice with melting water was noted at the base of the east arm. Several miscellaneous animal bones were also discovered at the base of this arm.

We retraced our steps on our return, with fog and clouds parting momentarily to give a glimpse of the snowy summit spire from the west cirque before we concluded our journey in the rain.



SEPTEMBER 13, 1970 — NORTH FACE OF MT. THIELSEN FROM SAWTOOTH RIDGE TO NORTHEAST SHOWING BOTH GLACIAL ARMS | NOTE DIKE TO RIGHT OF WEST ARM | Photo by Ralph H. Nafziger

September 13, 1970 dawned crisp and clear for another visit to Mt. Thielsen. Bob Waller and I approached the North Face from Tipsoo and Thielsen Creek trails to the north. Several open areas near the Pacific Crest trail junction provided us with first views of a portion of ice on the east arm and the larger west arm.

Soon we found ourselves on the lower talus slopes of the terminal moraines; but when I looked up to observe the east arm, only bare rock greeted me! I thought I was probably looking at the wrong chute, and we continued upward. Talus, cobbles and boulders extended down to the Thielsen Creek drainage. Pumice and Mazama ash comprise the east bank of the creek.

As we climbed up toward the saddle on the northeast arête between Mt. Thielsen and Sawtooth Ridge, I thought my eyes were playing tricks. I was observing an ice patch on the east arm with a hole at its snout which looked much different from the patch we had seen from Thielsen Creek trail!

Above a small snowfield, several hundred feet below the saddle, we began to sidehill westward over loose and sharp platy andesite talus. Upon reaching the base of the east arm, we came upon an unexpected sight. The entire center half of the ice of the east arm had fallen. This probably occurred during August, judging from the fresh aspect of huge ice blocks\* at the base and the fact that no rocks or talus covered

these blocks. This ice fall must have produced tremendous noise and disruption, and we were surprised not to find more recent animal bones as we had the previous two years.

A small patch of ice, approximately 100 feet long, remained at the headwall of the east arm. This ice patch had been undercut by meltwater which had evidently flowed out of holes at the bottom of the patch. One crevasse was visible near the top of this patch, which was surrounded by a moat, resulting in a very unstable configuration. A small exposed portion of the ice arm remained at the base of the chute. This ice probably continued under the moraine.

On a clear September 19, 1971, Dr. Lathrop and I journeyed again via Tipsoo and Thielsen Creek trails to look at the North Face. Our first views of it revealed considerable snow not only in the two chutes containing the glacial arms, but also in numerous niches which normally do not contain snow at this time of the year, attesting to the previous harsh winter. Both terminal moraines, especially that of the west arm, contained much snow.

\* Ed Cooper observed Mt. Thielsen's North Face from the northwest arête on July 21, 1970. He stated that he did not remember having seen any large ice blocks (Cooper, 1971, personal communication). However, considerable snow did remain, as evidenced from a photograph taken then (Cooper, 1971). This would indicate melting had not progressed sufficiently to allow such an ice fall at that time.

The trip then followed our 1969 route from the junction of Thielsen Creek and Pacific Crest trail. A large snowfield at least 50 feet thick covered the top of the terminal moraine at the base of the east arm at an elevation of 7,600 feet.\* The top patch of ice at the east arm's headwall (estimated elevation, 8,100 feet) had fallen since 1970, leaving bare rock with a deep niche in the shape of the previously enclosed ice.

Snow at an estimated depth of 30 feet covered the bare rock of the center portion noted in 1970. This snow had pulled away from the rock at the edges and continued to the base where a large amount of talus was present, but not enough to completely obscure several large greenish ice blocks. Those probably were part of the headwall ice fall although they could also have been a portion of what was left exposed of the ice fall from the center of the east arm in 1970.

The talus and moraines are constantly changing, thus rendering topographic maps of the area of little use. All snowfields contained dark surficial bands, which probably represent successive snow falls. We believe we observed the minimum amount of snow present on Mt. Thielsen's North Face in 1971 as the first heavy

\* Elevations in 1971 were measured by an engineer's altimeter which was calibrated before our journey at the altitude of Diamond Lake.

snowfall of the new season occurred during the middle of the week following our visit.

It is evident that a number of changes have occurred in Mt. Thielsen's ice masses in the past few years. Perhaps if snow continues to accumulate for the next several years in the chutes, as it did during the winter of 1970-71, it will compact to form ice which will again appear in upper reaches of the east arm. This would replace ice lost during the past two years due chiefly to a combination of gravity and relatively mild seasons. The future of the upper exposed arms of Oregon's southernmost glacier will depend on the climate.

#### REFERENCES

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*SEPTEMBER 19, 1971 — EAST GLACIAL ARM ON MT. THIELSEN'S NORTH FACE / THICK SNOW HAS SPREAD ACROSS CHUTE COVERING MUCH WIDER AREA THAN ORIGINAL ICE MASS / NOTE ROCK CONTACTS AND OUTLINE OF SHAPE OF PREVIOUS HEADWALL ICE / Photo by Ralph H. Nafziger*

