BLACK BUTTES

The Black Buttes are the eroded remnants of an ancient volcano on the western flank of Mt. Baker (Figs. 16-25). They consist of two peaks, Lincoln Peak (9,096 ft.) (Figs. 19,20,22) and Colfax Peak (9,443 ft.) (Figs. 18,20), which have been deeply eroded by glaciers on their slopes. Remnants of lava flows exposed in the rock walls of the Buttes dip in opposite directions away from a former summit cone now long eroded (Fig. 16). Lava flows and volcanic breccia making up Colfax Peak dip eastward toward the present cone of Mt. Baker, whereas flows and volcanic breccia near Lincoln Peak dip in the opposite direction, indicating that the peaks are the remains of a volcanic cone whose central vent was between the two peaks. The lower part of the Black Buttes cone north of the Buttes has been eroded away, and to the east, lavas of the buttes disappear beneath the younger cone of Mt. Baker. Similar deep erosion characterizes lava flows hundreds of feet thick capping ridges high above present stream valleys between the Buttes and the Nooksack River.

Glacial erosion has played a significant role in the destruction of the Black Buttes cone, especially erosion in cirques at the heads of the Deming and Thunder glaciers. Exposed in the walls of the 2000–foot high cirque headwall of the Deming glacier are about 60 stratified volcanic breccia layers and thin lava flows, dipping 25°–30° away from the former central vent now occupied by the Deming glacier (Fig. 24). The total number of eruptive events is several hundred. Most are thin, brecciated lava flows. About 30–35 lava flows are exposed on Heliotrope Ridge, the north wall of Thunder glacier cirque. The base of the west flank of the Black Buttes cone is exposed in the canyon of Wallace Creek, on Heliotrope Ridge, and at the snout of Deming Glacier. At Meadow Point on the south wall of the Nooksack Middle Fork above the Deming glacier, the base of a 1,300–foot–thick pile of Black Buttes lavas and breccias lies on metamorphic rocks.

At Bastille Ridge above the north wall of the Roosevelt glacier, 10–14 lava flows, each 30 to 200 feet thick, dip 15°–25° westward down the crest of the ridge and on the north side of Smith Creek. They apparently filled an ancient valley that once extended down Glacier Creek. The basal lava flow in Smith Creek basin was dated at 322,000 ± 12,000 years, and one of the uppermost flows capping Bastille Ridge was dated at 322,000 ± 9,000 years, within the general time frame of eruptions from the Black Buttes.

Remnants of lava flows at Cathedral Crag and Baker Pass above Schreibers Meadow on the south flank of Mt. Baker were contemporaneous with Black Buttes lavas. Each flow appears to be a single lava flow, about 400 feet thick. The flow at Cathedral Crag was dated at 331,000 ± 18,000 years and the flow at Baker Pass was dated at 333,000 ± 12,000 years.

Seven miles east of Nooksack Falls, a ridge–capping lava stands 700 feet above the floor of the modern canyon, making a cliff visible from the Mt. Baker Highway across the Nooksack River. The lava flow is about 300 feet thick with prominent columnar jointing (fractures) that formed during cooling and contraction of the lava. It flowed down an
ancient valley but now caps a ridge because the lava was more resistant to erosion than the ancient valley sides, which have been eroded away, leaving the more resistant lava as a ridge top. Its topographic position suggests a possible correlation with the Table Mt. flows, but the isotope age of the flow is only 202,000 ± 9,000 years, 100,000 years younger than the Table Mt. flows. Near the junction of Wells Creek and the Nooksack River, a 1,300–foot long, 250–foot–thick lava flow remnant caps a ridge now 800 feet above river level. The flow was isotope dated in 1975 as 400,000 ± 100,000 years, but an isotope age of 149,000 ± 5,000 years was obtained more recently. A third flow remnant near Nooksack Falls 650 feet above the floor of Wells Creek has been isotope dated at 114,000 ± 9,000. The rate of erosion needed to invert these valley–filling lava flows to what are now ridge crests is extraordinary.

Figure 17. Topographic map of the Black Buttes, remnants of a former volcanic cone largely destroyed by glacial erosion.
Figure 18. Mt. Baker (left) and the eroded flanks of the older Black Butts volcanic cone (right). The dashed line show the portion of the cone that has been eroded away.

Figure 19. The Black Buttes. Lavas making Mt. Colfax dip to the left and lavas making Mt. Lincoln dip to the right.
Figure 20. The Black Buttes. Colfax Peak is on the left and Lincoln Peak is on the right.

Figure 21. Lincoln Peak, the western remnant of the former Black Buttes volcanic cone.
Figure 22. Lincoln Peak, the western Black Butte. Lava flows and volcanic deposits of volcanic fragments are inclined 25-30° to the west (right) on the sides of the breached Black Buttes volcano.

Figure 23. Colfax Peak, Black Buttes.
Figure 24. [left] Colfax Peak, Black Buttes. [right] Lava flows and breccias making up Black Buttes above the Deming glacier.

TABLE MOUNTAIN

Table Mt. (Figs. 26, 27) is a high, flat–topped ridge of lava between Artist Point and Ptarmigan Ridge, standing about 1,500 feet above Bagley Lakes. A 300–400–foot–thick, ridge–capping flow rests on three lava flows at Heather Meadows and Panorama Dome. Two lava flows make up Kulshan Ridge, the lower of which is 500 feet thick and has slender, glassy, curving columns. South of Table Mt., the lowest lava flow is glassy, highly jointed, and its composition is different from lava at Coleman Pinnacle that caps much of Ptarmigan Ridge.

The 300-400–foot–thick lava flow capping the ridge at Table Mt. is a remnant of lava that originally flowed down an ancient stream valley whose sides have been completely eroded away (Fig. 25), leaving only the more resistant lava that once rested on the valley floor. The lava was probably erupted from the Black Buttes volcano on the west flank of the main summit cone of Mt. Baker. The summit of Table Mountain is about 1500 feet above Bagley Lakes, so the total amount of erosion must be 1,500 feet plus the height of the original valley side. The inverted topography at Table Mt. remains as testimony that a great deal
of erosion has occurred during the past 300,000 years. The original valley sides, probably composed of ashy material having much less resistance to erosion than the lava flows in the valleys, eroded much faster than the lava, resulting in inversion of topography so that the flow originally occupying a valley, now makes up a resistant ridge (Fig. 27-29).

Figure 25  Topographic inversion of Table Mt. lava flow. (A) Emplacement of Table Mt. lava. (B) Erosion of less resistant valley sides, leaving the lava flow as a ridge crest.

The first isotope dates of lava flows in the Mt. Baker region came from lava near the base of Table Mt, which was dated at 400,000 ± 200,000 years, based on the average of three analyses (Easterbrook, 1975). In 2003, the U.S. Geological Survey dated the top flow on Table Mt. at 309,000± 13,000 years and a basal lava flow at Heather Meadows at 301,000 ± 8,000 years. Lava beneath Coleman Pinnacle has been dated at 306,000 ± 13,000 years.

Figure 26. Topographic map of Table Mt.
Figure 27. Table Mt. looking west. The linear ridge of Table Mt. marks the floor of a former stream valley whose sides have been eroded away. The trail across the middle of Table Mt. is the Ptarmigan Ridge–Chain Lakes trail from Artist Point.
Figure 28. Table Mt. viewed from Austin Pass.

Figure 29. Looking over Table Mt. to Mt. Shuksan.

Figure 30. Bagley Lake at the head of the cirque below Table Mt.