

# EVER WILD

*A Lifetime on Mount Adams*

DARRYL LLOYD

*Foreword by Robert Michael Pyle*

# PART ONE

## *People of the Mountain*



# Overlooked Giant of the Cascades

*A great mountain is like a great poem. At first acquaintance our minds have not the power to grasp its full magnificence. But as we know it day by day and year by year new beauties unfold, new grandeurs appear, as our senses develop new powers to understand and to measure, until, at last if our minds be great enough to comprehend, it finally stands forth in all its sublimity.*

—C. E. Rusk

With a few notable exceptions in early literature, Mount Adams was never given the stature it deserved. In 1919, Claude Ewing Rusk wrote a booklet titled *Mount Adams, Towering Sentinel of the Lower Columbia Basin*, offering supporting reasons for national park status. His popular book, *Tales of a Western Mountaineer*, released in 1924 and reprinted in 1978, championed the mountain's greatness, echoing Theodore Winthrop's mid-nineteenth century claim that Mount Adams was "noble enough to be the pride of a continent." But Rusk also lamented the neglect that the mountain had received for so many years.

The stage for two centuries of indifference may have been set on October 19, 1805, when Lewis and Clark mistook Mount Adams for Mount St. Helens. Looking west from a cliff above the Columbia River near present-day Umatilla, Captain William Clark noted in his journal (original spelling): "I discovered a high mountain of emence hight covered with Snow . . . I take it to be Mt. St. Helens . . ." On the expedition's return the following spring, both

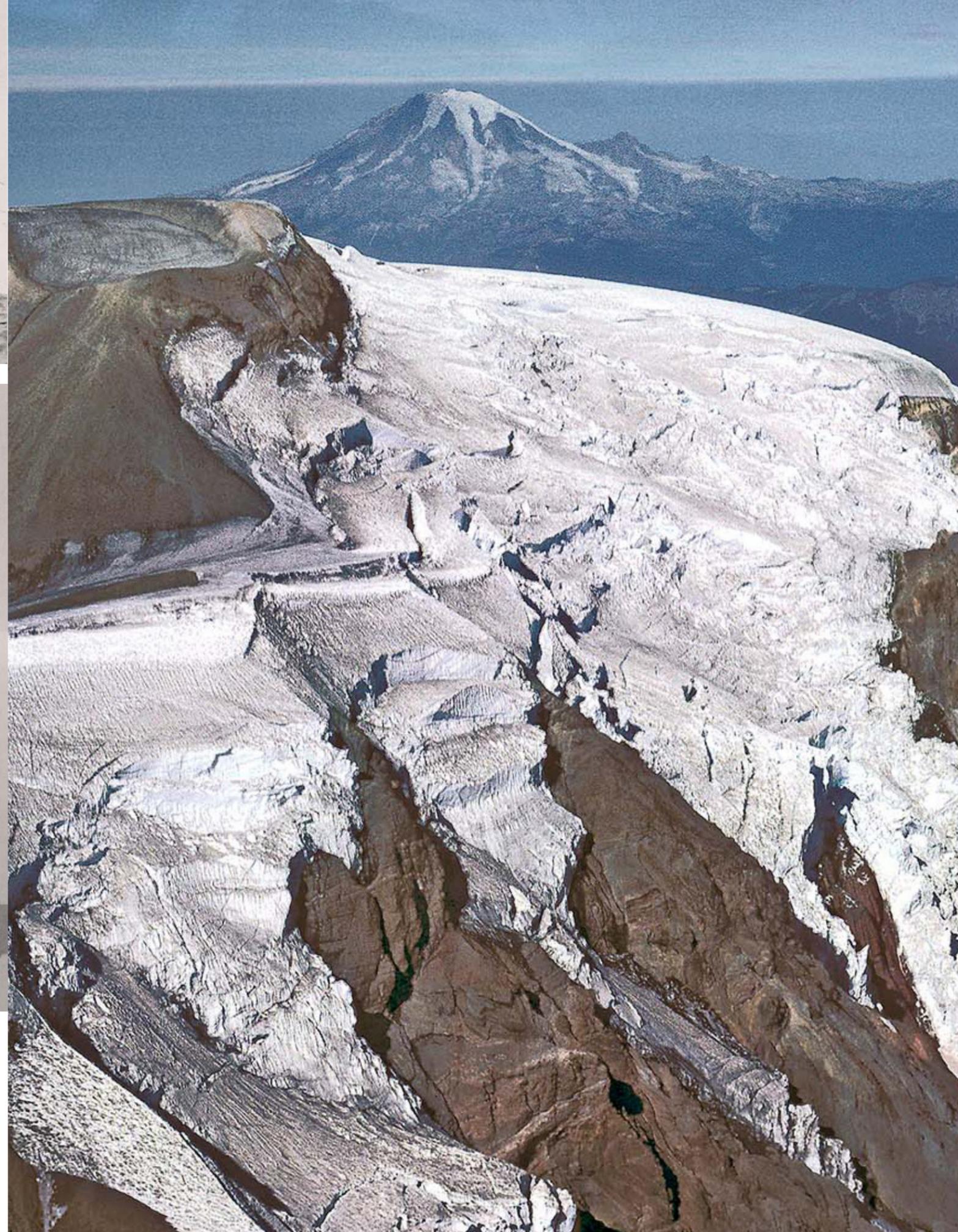
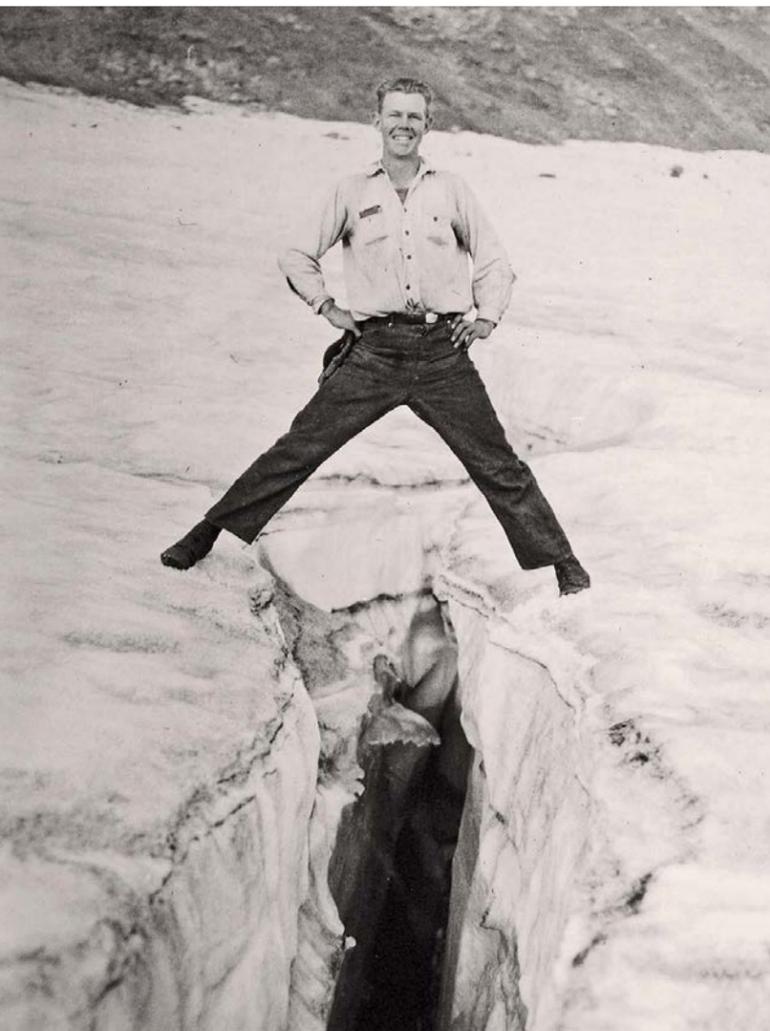
Adams and St. Helens were visible from a closer vantage point. Camping near the mouth of the Willamette River on April 2, 1806, Clark noted ". . . a high humped Mountain to the East of Mt St Helians."

It wasn't only Lewis and Clark who mistook the two mountains. Topographers continued to confuse the identities of the two volcanoes throughout the first half of the nineteenth century, though it's hard to believe how anyone could mistake the Fuji-like cone of Mount St. Helens with the sprawling, multi-summit Mount Adams thirty-four miles to the east. Adams exceeds St. Helens in elevation by more than 2,700 feet and is vastly larger in bulk.

In the early 1800s, Hudson's Bay Company trappers and traders, accompanied by Indian guides, penetrated the forested wilderness of lesser mountains between Adams and St. Helens. From ridges and hilltops, the two highest peaks in southern Washington dominated the horizon and played a prominent role in Native cultures. Yet Mount Adams remained a mystery to non-indigenous



Previous page: At 12,276 feet, Mount Adams, or Pahto, rises as a noble sentinel to the south of Goat Rocks Wilderness. Above: The sprawling, multi-summit Mount Adams dominates the eastern horizon from Mount St. Helens.



Top: A flag flies on the new U.S. Forest Service lookout building in 1922. Between 1913 and 1921, similar lookouts were built on Mounts Lassen, Hood, and St. Helens. Bottom Left: Straddling a small crevasse, Chaffin Johnson took over Adolph Schmid's lookout job in 1923. He was Jones's partner for only that season. Bottom Right: Art Jones examines hailstones following the frightful lightning storm of August 21, 1923. Opposite: The summit cone and remains of the lookout building are shown in this aerial photo, taken from the southwest.

a feat that no one else had ever done: ride his horse with a pack string to the summit of Mount Adams. But before mineral ore could be hauled down the mountain, a horse trail had to be built on the steep section of Suksdorf Ridge below Pikers Peak. Little is known about its construction, but to this day sections of the trail are visible in late summer, when the rocky slopes become snow-free.

The mining crew consisted of up to eight strong young men recruited from local communities. They were offered \$7.50 per day, plus room and board, an attractive wage during the Great Depression. Yet no job in the country would be tougher or more dangerous, or offer more cramped living quarters. The fourteen-foot-square former lookout building had room for only four bunks on the ground level, plus the cook's quarters in the six-foot-square cupola. The crew rotated twelve-hour shifts with four men working outside day and night, while the other four got some sleep and did various chores. Bob Knoll spent three seasons on the summit and worked nights out on the icecap. Knoll told me, "I jumped across crevasses at night in order to get to work!" During stormy periods, four of the men would also have to sleep on the floor. Yet even in the cramped space, cook Ollie Hensley somehow managed to feed every crew member who worked on the summit during the seven seasons of operation.

In the first year of mining, 1931, miners began digging a series of test pits in ice and mineral deposits on the edges of the icecap, as far as a half-mile north of the cabin. The crew boss was a geology graduate student, Claude S. Fowler, whose job was to survey and determine the extent and quality of

the sulfur deposits. Miners used hand axes, picks, and extra-long shovels, and the man at the bottom of the pit would get soaked by the constant trickle of ice water. They rotated frequently, especially when they hit pockets of hydrogen sulfide gas. Gas masks were standard equipment, but not always used, causing a near fatality on one occasion. The deeper pits, up to five feet wide, required a tripod with a pulley and rope attached to a five-gallon pail for ore samples and ice debris. The deepest pit went down ninety feet in solid ice before reaching a sulfur deposit. "The ice at almost every depth held perfectly preserved specimens of butterflies," McCoy remembered.

A fumarole about a quarter-mile north of the cabin emitted 150°F hydrogen-sulfide gas and steam in 1934. The gas vent was located on what the miners called South Island, which was a low ridge about 385 feet long and 100 feet wide. The rise marked the northeastern rim of a 1,600-foot-wide summit crater (unofficially named West Crater), which lies northwest of a smaller and more recent crater on the summit cone. A test pit that the miners had dug on South Island exposed a twenty-seven-foot thick bed described as "sulphur ore," with 79 percent sulfur at a depth of four feet. By 1941, Mazamas climber Kenneth Phillips found that the fumarole had been reduced to a small, foot-wide "slightly warm cavern with choking gas," which held four small birds killed by the gas. On the same day, other members of his party saw a flock of similar birds flying over the summit. The fumarole has long since cooled, and South

Island has been covered by permanent snow and ice, probably since the late 1940s.

In 1998, when I interviewed Dick Mansfield, he was a wiry and amazingly fit eighty-five-year-old man living on the bluff in White Salmon with his younger wife, Adele. Mansfield had worked four seasons on Mount Adams from 1934 through 1937. He recalled a frightening incident that occurred at the bottom of a pit where the richest sulfur ore had been discovered.

Earl Hines and I had been trading off with the digging. It smelled like rotten eggs down there. The hole was about 28 feet deep when Earl passed out from the sulfur gasses. Andy Roth took off on a run to get gas masks that were left in the lookout building. The others lowered me down the hole using the tripod and pulley, but the rope was two feet short for me to reach Earl. I got gassed too, but was OK. They pulled Earl to the top, but his face scraped the sides of the pit all the way up. He came to eventually and then went down the mountain on a horse. Earl never returned to the job.

It's interesting how Keith McCoy's account of the same incident differs from Mansfield's. On a summer day in 1990, McCoy told me: "I, being the smallest of the crew, went down the safety rope to sit on the disabled man's shoulders and protect his head and face from jagged ice that jutted from the sides of the hole, while the other pulled us to the top." McCoy went on to relate that Russell Niblock (not Roth, as Mansfield asserted) ran off to get the masks, only to pass out after unwisely running a

half-mile at 12,000 feet. He ended his account by relating that gas masks were used for the rest of the season. As well they should: according to the federal Agency for Toxic Substances, just a few breaths of air containing high levels of hydrogen sulfide gas can cause death.

In all, nine prospecting pits were dug. The ore sampled consisted of various proportions of native sulfur, sulfate minerals (mainly gypsum and alunite), kaolinite, silica, and residual andesite. The thickest mineral deposit measured was twenty-six feet deep. One ten-foot-deep pit at the upper edge of Adams Glacier yielded 44 percent sulfur at both top and bottom. Not far to the northwest, on the crest of the North Cleaver, sulfur averaged 50 percent. The purest was 79 percent, four feet from the top of the pit where Earl Hines nearly died. The miners also climbed into five different bergschrund crevasses to sample sulfur ore. Hydrogen-sulfide gas issued from nearly every crevasse bounding the sulfur field. The largest crevasse explored was at the head of Adams Glacier, in which ice overhung a fifty-foot vertical wall of rock. Blocks of ice were blasted with dynamite to expose a mineral deposit.

Because of the constant danger in the pits, Wade Dean came up with another system to locate and sample ore. In 1933, two drillers and a diamond-core drill rig were transported all the way from Alaska to the base of Mount Adams. Getting the twenty-two-hundred-pound gasoline-powered rig to the summit took four days of hard work. Mounted on a sled with a Ford engine, the rig winched its way up the long snow slopes in many

*Jack Perry led more than four hundred summit trips, or about twelve hundred packhorse loads of fuel, tools, food, and other supplies. (Dick Mansfield Collection)*



*In 1937, when the crew abandoned the building, they dragged a seven-hundred-pound bag of mineral ore off the mountain. (Dick Mansfield Collection)*



Descending the narrow spine of the ridge, Pfeifer taught us the Dulfersitz rappel and how to belay another climber with a rope. After reaching Little Mount Adams, we dropped down to Hellroaring Meadow, had a break at Heart Lake, and hiked back to Bird Creek Meadows on an old shepherd's trail through old-growth mountain hemlock. We had accomplished a rugged, off-trail scramble loop that's seldom done, even today. On this trip, too, I got hooked on photography and have rarely been without a camera ever since.

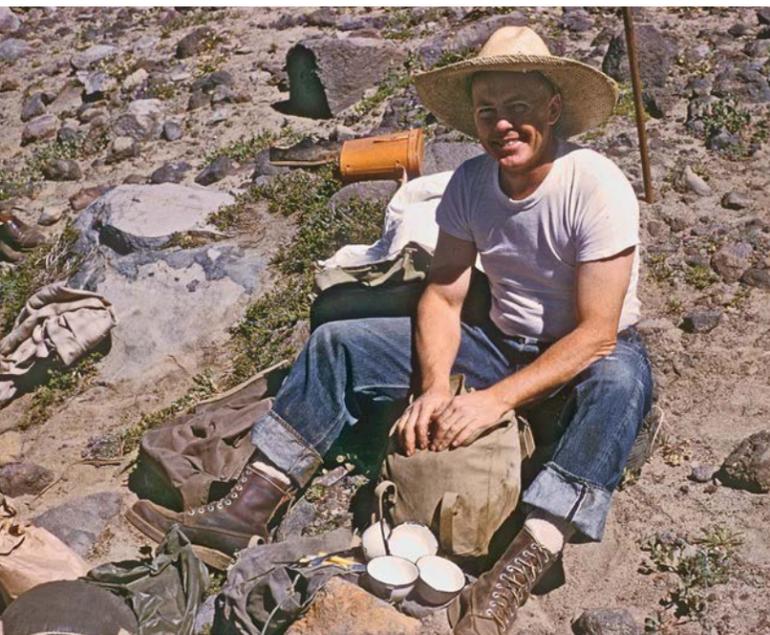
After these adventures Darvel and I poured through pages of our parents' books, especially *Tales of a Western Mountaineer* by C. E. Rusk, *Annapurna* by Maurice Herzog, *Book of Marvels* by Richard Halliburton, and *The Guardians of the Columbia*, by John H. Williams.

Published in 1912, *The Guardians* book is filled with photos showing Adams, Hood, and St. Helens draped by glaciers far thicker and longer than they are today. Women climbers wore mid-calf black skirts for climbing, horses provided access to the climbs' base, and giant trees ruled the forests. Early in the book, Williams describes the trio of volcanoes from the vantage of the heights above Portland: "Dominating all are the snow-peaks, august sentinels upon the horizon. Spirit-like, they loom above the soft Oregon haze, their glaciers signaling from peak to peak, and their shining summits bidding the sordid world below to look upward."

We were lured mostly to the three Guardian volcanoes because of their proximity, but from 1956 to 1965 our glacier climbs on Mount Adams and a number of other Cascade peaks had to be squeezed in between periods of living and traveling in other parts of the world. Darvel and I lived in Taiwan for two years (our father was part of the Aid for International Development program), went to high school together in Portland, and then ended up attending colleges on opposite sides of the country.

Meantime, in 1957, U.S. Supreme Court Justice William O. Douglas and his wife Mercedes purchased

Top: Justice William O. Douglas visits with Dad, Mercedes Douglas, Darvel, and other friends in the big kitchen of the Flying L in 1959. Middle: On another climb of Adams in 1958, Dad prepares our gear at timberline. An international forester by profession, he had "seat of the pants" climbing experience. Bottom: The big living room at the Flying L hasn't changed much—from the time we were kids, to this early 1980s photo, to the present day.



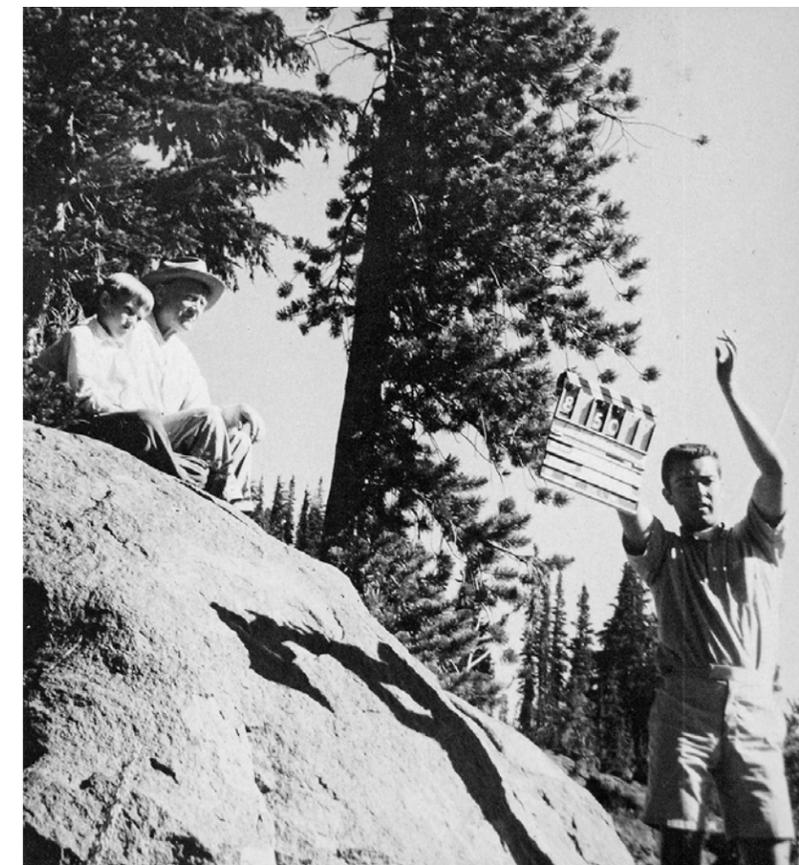
a summer home near Glenwood, just a mile up the road from our family's Flying L Ranch. "Justice Bill" (as we called him) and "Mercy" became close family friends. He frequently used our airstrip for chartered single-engine plane flights to different parts of Washington and Oregon. From his Glenwood home in 1960, Douglas wrote *My Wilderness: The Pacific West*, with a beautiful chapter about Mount Adams.

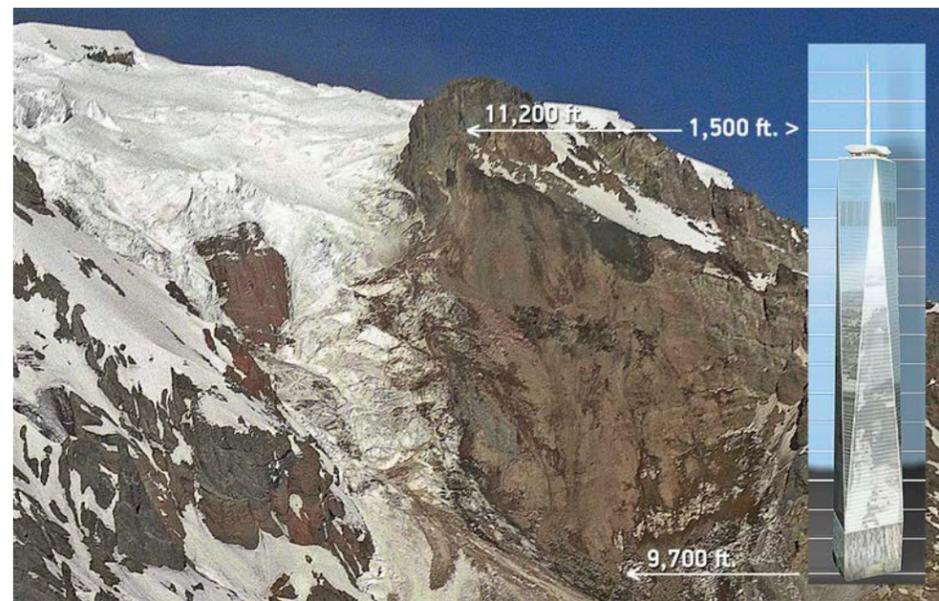
While serving as an associate justice of the U.S. Supreme Court, the longest tenure in history, Douglas wrote twelve hundred legal decisions and thirty-four books, plus countless articles in magazines. His true passion was the American wilderness, and as an activist to protect wild areas, he was one of the nation's all-time champions.

In summer 1960, Darvel and I had completed our junior year of high school living in Portland, and then spent the summer hitchhiking around Europe with two buddies on less than five dollars a day. The Douglasses, who hadn't left for Glenwood yet, invited us to spend a few nights at their beautiful Georgetown, D. C., home. We threw our sleeping bags on their lawn and woke up to a Washington Post reporter and photographer. The story and photo made the front pages of the Washington Post and Portland's Sunday Oregonian. We couldn't understand why it was such a big deal, since we had camped under the stars countless times on friends' lawns and, of course, in the wilds.

A day later on that trip, Dad's 1957 Ford had a major engine seizure while heading north toward Idlewild Airport in New York. After a phone call, Justice Bill offered his official Supreme Court car and driver to deliver us to the International airport in time to make our Icelandic Airlines flight. The driver was a wonderful, kind black man, and I regret not remembering his name. He arranged for a major repair of our Ford while we were gone. We could not have done our Europe trip without Mercedes and Justice Bill Douglas rescuing us from that untimely New Jersey Turnpike breakdown.

Top: Photographed at the Flying L front porch around 1957, Mom loved horses, was an accomplished artist, and a gentle, kind person. (Darryl Lloyd Collection) Bottom: We assisted an NBC-TV crew in 1961 as they filmed Justice Douglas with boy actor Richard Thomas. A buddy, Ken Pinnon, was holding the clapper. (Michael Davidson)





Top: My wife Nancy seems miniaturized in the midst of huge rocks and rubble at 7,800 feet on Klickitat Glacier, just one year after the historic 1997 avalanche. The boulder next to her is the size of a three-story house. Left: Crystals of gypsum are embedded in the crumbly, solfatarized rock. Right: Around six million cubic yards of altered rock fell off the upper part of Battlement Ridge and The Castle. The avalanche scar was about 1,500 feet high vertically. New York's Freedom Tower provides scale.

We flew eye-level near the huge, oblong scar on the south face of The Castle and upper Battlement Ridge. The scar was about 1,500 feet high between the elevations of about 9,700 feet and 11,200 feet. A year later, after analyzing my before-and-after photos from three different angles, I sketched (to scale) three-dimensional views of the rocky mass that had broken off.

A second, smaller rock avalanche occurred four days later. The scars of both measured about 1,900 feet long, 800 feet at its maximum width, and 250 feet at the thickest part. I roughly calculated the volume at upwards of six million cubic yards, closely matching the estimate of USGS avalanche expert Dick Iverson, who wrote a short analysis of the slide about a week afterward. The huge mass of falling rock exploded onto the glacier and plowed through icefalls before spreading out more than a half-mile wide.

Seismic stations from central Oregon to northwest Washington recorded the event at twelve-thirty in the morning of October 20, 1997, the same morning of our flight. USGS seismologist Bob Norris, at the University of Washington in Seattle, said the signals lasted about six minutes. He recognized the signals as similar to large rock avalanches on Mount Rainier. Triangulation pointed to the east side of Mount Adams. Norris called me from his office that morning, asking if I'd seen anything unusual on the mountain. But by then, I was already flying over the avalanche with Woodruff and Cole. It was a mind-blowing experience to see the immense transformation of the southeast face.

To say that the Mount Adams Volcano is rotten to the core is not a figure of speech or an exaggeration. Centered beneath the broad summit dome is a mass of over 2.7 billion cubic yards of hydrothermally altered rock. That's almost a half of a cubic mile. Alteration of the 1.25-mile-wide fragmental lava core results from thousands of years of exposure to sulfur-bearing gases, hot water, and steam. Rising hydrogen sulfide gas from magma becomes oxidized near the surface to form sulfuric acid and elemental sulfur (mined in the 1930s). Over many thousands of years, acid, warm water, and steam reacted chemically with the hard andesite lava, converting it to soft minerals—including kaolinite, alunite, gypsum, and silica. Exposures of the crumbly, multi-colored ("solfatarized") rock are found on the near-vertical cliffs high on the southwest,



A large clast near a home in the Trout Lake Valley is a mute reminder of the event. The Trout Lake Mudflow, a lahar, buried almost six square miles of the valley up to sixty-five feet deep.

east and northwest faces and on the summit cone. Colors range from light gray to hues of yellow, orange, pink, and red. Darvel and I found the stuff easy to pick apart with an ice axe when we climbed the White Salmon Glacier headwall.

Structural collapses of parts of hydrothermally altered volcanic cones typically produce enormous landslides, called debris avalanches. These can transform into lahars (volcanic mudflows), which are rapidly flowing mixtures of water-saturated mud, rock, and other debris. The "other debris" may also include blocks of glacier ice, rafts of frozen snow, and whole trees. With the consistency of wet concrete, lahars can flow at speeds up to 50 mph and travel tens of miles down rivers that drain the volcano.

Mount Adams may have the largest volume of altered rock of all the stratovolcanoes in the Cascade Range, including Mount Rainier. Shaped somewhat like a bowl, the permeable mass extends downward more than 3,000 feet below the summit cone and almost 5,000 feet below the surface of White Salmon Glacier on the southwest face. Three-dimensional mapping of rock alteration and water content was the result of an important 2007 study led by USGS scientist Carol Finn of the Denver office. Airborne magnetic and electromagnetic data was obtained by a helicopter flying a hair-raising, three-mile-square grid pattern over the upper part of the mountain. The chopper skimmed back and forth twenty times or so at an average height of 150 to 200 feet above



Some of the happiest days of my life, beginning as a six-year-old, have been spent wandering and exploring Bird Creek Meadows on the south slope of Mount Adams. The meadows are “the brightest jewel in the wilderness tiara that encircles the mountain,” said the late Keith McCoy, historian and close family friend. I concur completely. No part of the mountain is closer to my heart.

As part of the Yakama Nation Mount Adams Recreation Area, the subalpine parkland forms a triangular area between 5,700 feet and 7,150 feet, extending from the rim of Hellroaring Canyon on the east to the national forest boundary on the west. There are more than a hundred glades and meadows, and only a few are traversed by trails. The highest meadow is an exposed, boggy terrace where Mount Adams is completely hidden by a huge Mazama Glacier moraine. Fanning out below and sloping southeast are countless terraces, sandy flats, glens, hollows, and moist, flower-filled meadows. Low, rocky ridges are capped with groves of stunted whitebark pine, subalpine fir, and mountain hemlock. The dwarfed trees run parallel to the meadows and provide shelter from southwesterly winds.

A dozen or so spring-fed streams—four with names—tumble down through the meadows. The largest and my favorite is Bird Creek, which starts from multiple springs near the 7,000-foot level. The sources are not shown correctly on any map of the area, except for the 1924 USGS 30-minute quadrangle. Bird Creek bisects the meadow complex as it captures smaller streams. Crooked Creek meanders through lovely meadows and has the largest waterfalls in the area. It flows into Bird Creek west of Bird Lake in the forested zone. Dry Creek, on the eastern edge, follows a different drainage and withers away by late summer. Near the western edge, Gotchen Creek begins as a vigorous spring about a half-mile above the Round-the-Mountain Trail. It soon splits and the larger unnamed branch flows into Bird Creek and eventually the Klickitat River. The

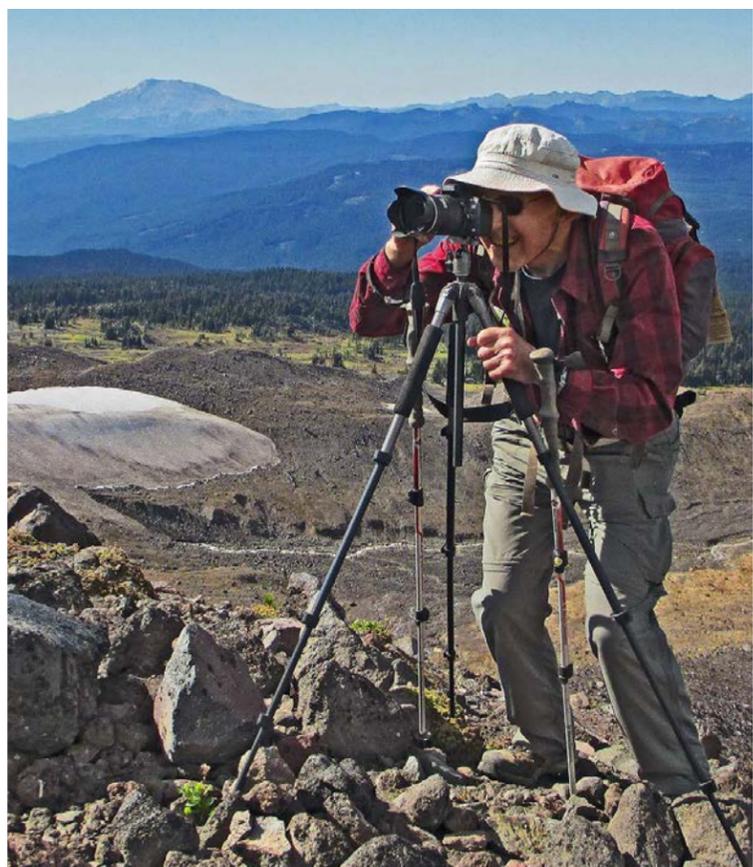
*Opposite Top: One of the largest meadows is filled with a variety of wildflower species. Middle Left: In a bold artistic style, pale agoseris pokes through a mat of spreading phlox. Bottom Left: In the upper meadows toward the west, the headwaters of Bird Creek flows through a memorable display of blooms. Opposite Right: The beautiful and interesting elephant’s head thrives in moist areas of the meadows.*

smaller branch, keeping the Gotchen Creek name, continues south across the Yakama Reservation boundary into Gifford Pinchot National Forest. It meanders through a series of meadows—informally called Gotchen Creek Meadows since the boundary change in 1972—and ultimately flows into the White Salmon River.

One might ask why the finest floral displays on Mount Adams are found at Bird Creek Meadows. The answer is a bit involved, but first the topography. It’s the result of an Ice Age piedmont glacier that, for thousands of years, spilled over and branched south from the great Hellroaring Valley glacier to scour and plane off much older dacite and andesite lava flows. Glacier scouring and polishing over the millennia made the smooth bedrock lavas impervious to water. Also, since the end of the Ice Age about 11,000 years ago, many hollows were made by nivation, a process of erosion beneath snow banks. Fertile soils built up in these hollows and along streams from a mix of organic material (including sheep dung) and layers of mineral-rich volcanic ash from Mount St. Helens and Mount Adams. Polished bedrock helped retain water and keep soils moist, unlike the dry porous soils and permeable lavas on other sides of the mountain. Subalpine wildflowers flourished because of constant soil moisture through dry seasons, combined with the south and southeasterly exposure to abundant sunlight. Furthermore, all of these beneficial factors likely helped the meadows recover so well (and they did) following decades of severe damage from sheep grazing.

German-born Wilhelm Suksdorf first botanized the profuse displays of wildflowers in Bird Creek Meadows in 1877. From a secluded cabin in Camas Prairie, which he called Falconthal, Suksdorf led his packhorse along Indian trails and spent solitary weeks in the high meadows collecting plant specimens. He loved Hellroaring Valley and called it Wodenthal (the valley of the god). He ventured as far east on Mount Adams as the canyon of Donnerthal (Big Muddy Creek). Bird Creek Meadows remained unnamed until the sheepherders arrived and named the lush meadows Happy Valley.

Because of Suksdorf’s quiet and gentle demeanor, area Indians befriended him. They led him on their trails, taught him their names of plants, and showed him locations of rare species. Suksdorf



*Opposite Top: A lovely lake on the west side of Adams lies hidden in the subalpine life zone. Opposite Left: Surrounded by burned forest in 2013, Grassy Hill emerges luxuriant with penstemon and fritillary butterflies. Opposite Right: I'm always shooting glaciers to record not only their beauty, but to document significant change on the mountain through the decades. (Hugh McMahan) Above: Morning is a great time to ramble leisurely above timberline, and to pursue photography before light becomes too harsh.*

In 2014, on the fiftieth anniversary of the 1964 Wilderness Act, a Tacoma reporter asked Darvel and me what the Mount Adams Wilderness meant to us. He wanted a short answer. And so, like the inspirational words of Justice Douglas, we stressed the significance of Mount Adams as a quiet, beautiful refuge that for so many years has sustained our physical, mental, and spiritual health.

My brother and I have found endless joy in rambling and climbing in the remotest parts of the present-day 47,122-acre Mount Adams Wilderness. We've always enjoyed the mountain's challenges, like climbing its icefalls, navigating with a compass in white-out storms, crossing big glacial streams with no bridges, and finding hidden tarns. Since

boyhood we've preferred to explore off-trail. Never with a GPS device. Even on our most recent backpacks, we've stumbled upon sublime, flower-filled meadows and viewpoints that we never knew existed. Occasionally we disagree mildly on which route to take, but it's an issue that hardly ever matters. We love the silence, the whispering breezes, the whistling marmot, the haunting, two-note trills of the varied thrush that always seem to be hidden in the upper layers of the montane forest.

The Forest Service trail system is excellent and allows many choices to traverse both forested areas and the subalpine zone. The latest Mount Adams Wilderness Map (2015), guidebooks, and online information provide readily available guidance and



rules for use. In the past few decades, the Pacific Crest Trail has become quite crowded during the high season, and trampling is killing more and more vegetation in places like Killen Creek and High Camp.

Darvel and I love the companionship of a few good friends to share our wilderness experience. Among my favorite memories, our dear friend (and birder) “HC” Tupper accompanied me for a late-season, off-trail backpack. During the three-day trip in September 2013, he identified eighteen bird species between the Divide Camp Trailhead and Red Butte on the northeast side. It would be HC’s last backpack on Mount Adams; he died of cancer two years later. His love for the mountain was profound, and I still have his bird list and notes from that September 11: “hairy woodpecker, Clark’s nutcracker, raven, crow, chipping sparrow, dark-eyed juncos, yellow-rumped warbler, Townsend’s solitaire, sharp-skinned hawk, red-tailed hawk, mountain chickadee, golden-crowned kinglet, northern flicker, Vaux’s swifts, red-breasted nuthatch, hermit warbler, ruffed grouse, gray-crowned rosy finch (good bird).”

I haven’t spotted the elusive white-tailed ptarmigan in the Mount Adams Wilderness for many years. It is the smallest member of the grouse family, and long ago we would hear its piercing calls at night in areas of alpine tundra. I’ll never forget the ptarmigan hen on her nest in a tundra meadow near Red Butte. It was in the late 1970s, and the hen was sitting on six eggs. That night we experienced a fearsome thunderstorm with lightning strikes too close for comfort. The next morning, the mother hen was tending five tiny ptarmigan chicks (one egg didn’t hatch). We spent only an amazing moment or two at the spot, allowing the new ptarmigan family to scurry to a better hiding place from raptors.

Our favorite off-trail rambles are in less-traveled alpine life zone—from timberline to the bases of the steep moraines. It’s a harsh environment and most vegetation in the alpine is reduced to dwarf status. Tree line averages around the 7,000-foot level, but

*Top: With a view of Mount Rainier, Darvel enjoys morning coffee at a beautiful camp. Middle: A battle-scarred whitebark pine has been clinging to life on the northeast side for centuries. I’ve photographed the same tree many times. Bottom: A young ruffed grouse remained unruffled on a limb of a whitebark pine.*



elevations vary depending on steep Little Ice Age moraines and blocky, young lava flows. The uppermost limit of trees is about 8,500 feet. Gnarled and twisted trees called krummholz (German for “crooked wood”), are pruned by the freezing gales of winter. Whitebark pine are the heartiest of the few stunted conifer species that grow in the alpine zone. They survive with the protection of boulders, drifted snow, and islands of other dwarf trees, mainly subalpine fir and mountain hemlock. Branches that poke up too high usually die. Toward the uppermost tree limit, ghostly skeletons of dead whitebarks dot the barren landscape, thus the appropriateness of their name. The whitebark krummholz sometimes migrate downwind in rows about as high as a grown man. The rows and islands of the dense trees have provided welcome shelter on cold, windy days.

Warming climate and reduced snowpacks are causing plants to colonize ever higher on the mountain. Botanist Paul Slichter saw sedges, alpine grasses and forbs as high as 9,500 feet between the large moraines of Adams Glacier. In 2004 on Suksdorf Ridge, I found a healthy patch of flowering short-fruited smelowskia at 11,000 feet. It was confirmed as the highest-growing plant in Washington State. Slichter discovered a two-foot-high, twenty-foot-wide black cottonwood at 7,000 feet, which must be a record. Alpine willows are numerous at that level and seem to be increasing in numbers.

Some of the most common ground-hugging flowers that I notice in the alpine zone are low mountain lupine, woolly pussytoes, partridgefoot, white and pink mountain heather, magenta paintbrush, Thompson’s paintbrush, sandwort, and spreading phlox. In 2010, Slichter documented sixty-one plant species in the alpine areas on the northwest north side of Mount Adams. Tundra plants are very fragile and are easily killed by foot traffic, so I advise people to step carefully and spread out, so as to not create human trails. Also, camping should always be avoided in a flowered meadow.

Among the alpine flowers are sedges and grasses that mountain goats depend on. I’ve seen herds of

*Top: Always on the move, a herd of mountain goats browses the grasses and sedges of alpine tundra. Middle: Susan Saul ascends alpine tundra on a typical August morning in 2007. Bottom: Alpine tundra flowers in this photo includes low mountain lupine, woolly pussytoes, Thompson’s paintbrush, sandwort, and small-flowered penstemon.*

