

Beyond Granite: The Geology of Adventure

By Sarah Garlick

We go outside to become connected. We run, swim, and ride. We paddle, climb, hike, and ski. When we engage with our full selves in the mountains, when our bodies are active, our attention focused and present—and perhaps with a little luck—we break through the barriers that separate us from what is wild.

But what is it we are connecting to? The textured surface of the handhold beneath our fingertips. The weight of the ledge beneath our boots. The pitch of the snow slope we roll onto as our skis pick up speed. These points of contact reach into the stories the mountains hold themselves: stories of how the schists, gneisses, and granites came to be; stories of mountain uplift and mountain erosion; stories of a glaciated past and of a future heading toward warming.

The fundamental Earth processes that have shaped these mountains we love have also shaped us, through our experiences and our adventures. This is our shared geology, a science embedded both in our landscapes and our spirits.



JIM SURETTE

Franconia Ridge: one of the most scenic hikes of the entire 2,180-mile-long Appalachian Trail.

I. AN INTIMATE RELATIONSHIP: CLIMBERS AND BEDROCK

Perhaps no group knows the nature of bedrock in the White Mountains as intimately as rock climbers. They log hundreds of hours on vertical outcrops, observing the features and subtleties of the stone as closely as a geologist. They seek out natural fissures and pockets for their protective gear, linking together crack systems, ledges, and divots in the rock faces—even individual crystals—into carefully scouted routes.

For climbers, granite is among the most beloved of all the world's rock types. Its texture is ideal for smearing with rubber climbing shoes; its cracks and crevices perfect for hand or finger jamming and for securing their gear. From the sheer walls of Yosemite to the icy needles of Patagonia, climbers test their skills on this favorite stone. The White Mountains, too, are home to striking exposures of granite: the slabs and knobs revealed on the summits and shoulders of the range's rounded peaks, and the steep-faced ledges that crop out above the forest.

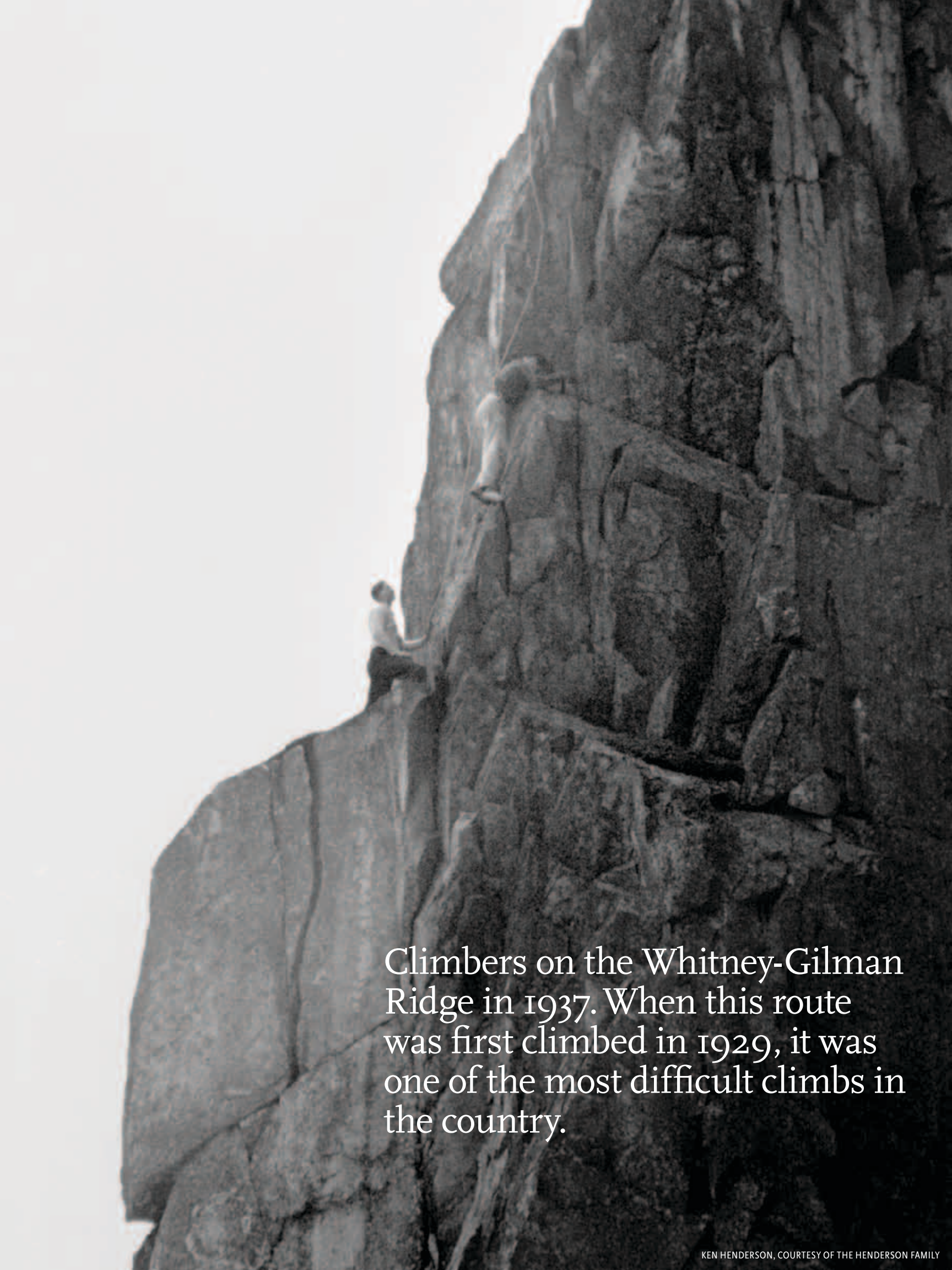
The granite terrain of the White Mountains has inspired generations of adventurers, and set the stage for some of the most important advancements in technical rock climbing in North America. The first ascent of Cannon Cliff, the tallest rock face in the Eastern US, was made in 1928 by Boston climbers Robert Underhill and Lincoln O'Brien, following a route known as Old Cannon toward the north end of the cliff. Underhill and O'Brien were part of a tight-knit group of Bostonian climbers who brought skills and techniques to the White Mountains honed from summers in the Alps, where technical mountaineering has been practiced since the eighteenth century. In 1929, Connecticut cousins Hassler Whitney and Bradley Gilman climbed the blocky narrow buttress on the south end of Cannon's mile-long cliff face, a route now known as the Whitney-Gilman Ridge. In difficulty and daring, this feat stood as a breakthrough in climbing and was one of the most difficult routes in the country at the time. The Whitney-Gilman Ridge remains today a popular test piece for New England's granite climbers.

Cannon, along with Cathedral and Whitehorse ledges, North Conway's sister granite cliffs, have served as focal points for New England climbing through the decades, witnesses to progressions in climbing style and difficulty. While the extent of unexplored terrain on these cliffs is far less now than during Underhill's era, today's climbers continue to find new challenges. In June 2013, Cathedral Ledge saw its first route with a rating of 5.14—near the top of the scale climbers use to judge difficulty—with Jason Conway's ascent of a climb he called Difficulties Be Damned, on an area of the cliff known as the Mordor Wall.

Franconia Notch's Cannon Cliff and North Conway's Cathedral and Whitehorse ledges were carved by glaciers out of the Conway Granite, a widespread rock formation that originated about 180 million years ago when pools of molten rock cooled and solidified into stone, thousands of feet beneath a cluster of volcanoes. The granite has been uplifted and exposed over millions of years of erosion of the land's surface.

Despite being carved out of the same geologic unit, the granite cliffs of the White Mountains each have their own unique characters. Cathedral is steep and blocky, with a number of vertical, thin cracks and corner systems. Much of Whitehorse is a broad expanse of smooth, low-angle slab, occasionally broken by open pockets, some of which contain beautiful large crystals of quartz and feldspar. And Cannon is perhaps best known for its enormous overlapping arches and numerous crack systems—and its propensity to shed unstable slabs and

THE FIRST ASCENT OF CANNON CLIFF, THE TALLEST ROCK FACE IN THE EASTERN US, WAS MADE IN 1928 BY BOSTON CLIMBERS ROBERT UNDERHILL AND LINCOLN O'BRIEN, FOLLOWING A ROUTE KNOWN AS OLD CANNON TOWARD THE NORTH END OF THE CLIFF.



Climbers on the Whitney-Gilman Ridge in 1937. When this route was first climbed in 1929, it was one of the most difficult climbs in the country.

KEN HENDERSON, COURTESY OF THE HENDERSON FAMILY

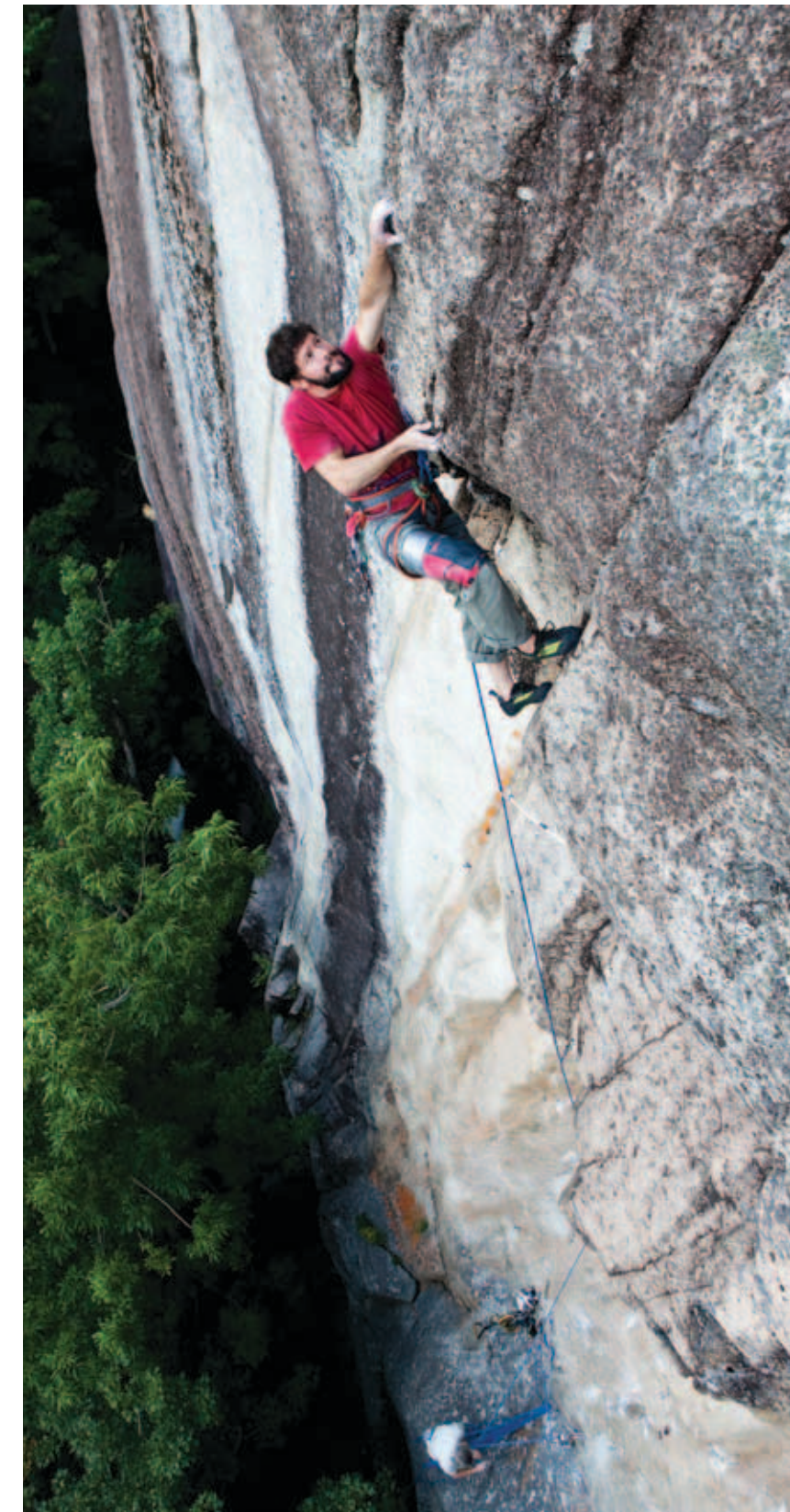
blocks along these cracks, leading to the apron of talus found along the cliff's base.

The differences in these cliffs are the result of a number of disparate factors at work over the last 180 million years or so since the granite crystallized. Some, like changes in texture of the rock, have to do with local variations in the chemistry and cooling conditions of the original magma. Other differences, like the number and orientation of the cliff's fractures, have to do with variations in the stresses the different rock bodies have experienced as the Earth's plates have jostled and moved through time.

Many of the steeply oriented cracks on these cliffs formed during extensional forces at work during the breakup of a supercontinent named Pangea. This single enormous landmass split apart into the continents we know today. Another set of cracks, those that separate concentric rounded shells of granite, especially evident on Cannon Cliff, formed from the release of pressure on the stone. These are known as exfoliation joints and they are related to the expansion that occurs when the weight of overlying rocks are removed due to erosion. On Cannon Cliff, some of these joints may have also developed after the last ice age when the continental ice sheet retreated, removing thousands of feet of ice from on top of the mountains.

A major shift in the world of rock climbing occurred in the late 1980s when climbers began installing permanent bolts into cliffs to provide improvements in safety. This innovation, referred to as sport climbing, opened new ground for an entire new generation of climbers. The heart of sport climbing in New England is undoubtedly the stacked cliff bands running along the Baker River Valley above the small village of Rumney. Known as Rumney Rocks, or simply Rumney, these cliffs see hundreds of visitors a day during peak season.

The Rumney cliffs are vertical to overhanging exposures of rocks known as the Littleton Formation. These are sedimentary rocks that were heated and squeezed during the uplift of the mountains so much so that they transformed into metamorphic rocks. Rumney's cliffs are made of schist and quartzites that are over 400 million years old. Schists have a fine layering, called



ANNE SKIDMORE

Jason Conway makes the first ascent of Cathedral Ledge's most difficult climb; a new route he named Difficulties be Damned.



RICK WILCOX

In 1970, Rick Wilcox was part of a revolutionary ascent of Pinnacle Gully without chopping steps into the ice. Pinnacle Gully is an eroded basaltic dike—a sheet of volcanic rock that weathers more easily than the surrounding schist.

foliation, formed by the alignment of minerals like micas that have a platy or book-like structure. Climbers crimp their fingertips onto small holds made by tiny ledges of this foliation and ridges of folds in the rock. The result of this geology is a gymnastic style of climbing that emphasizes difficult, athletic movements. Some of the hardest single routes in North America are found at Rumney.

As climbing has grown in popularity, fueled in part by the construction of indoor climbing gyms in urban centers, the terrain explored by climbers has also expanded. The White Mountains are unique in the number of small crags that are tucked away in various corners of the region. Most of these are cliffs exposed by the work of glaciers. They come in a range of different rock types: granites, syenite, and volcanic rocks that developed during the same period of volcanic activity that produced the Conway Granite; and also schists, gneisses, and granites that are older, related to the initial uplift of the range.



RICK WILCOX

John Bouchard climbing Pinnacle Gully in the early 1970s. Pinnacle Gully was considered one of the most difficult winter routes in the northeast for many decades.

The different geologies of the White Mountains crags lead to different climbing styles. Finer-grained rocks like the syenite at Sundown, a cliff near the Boulder Loop Trail off the Kancamagus Highway, are commonly brittle and break into sharp-edged blocks and flakes. Farther east, along the border between New Hampshire and western Maine, there are a number of crags carved out of a beautiful rock geologists call migmatite. The prefix migma means mixture. Migmatites are a mixture of metamorphic rocks like gneisses or schists and igneous rocks like granites. Migmatites form when a metamorphic rock is heated and squeezed to such a degree that it begins to melt. This produces a swirly texture in the rock made by bands, wisps, and pods of the melted zones that are commonly light in color and full of large quartz and feldspar crystals. Moving into Maine, a popular climbing area is Jockey Cap in the town of Fryeburg. Jockey Cap is a glacially exposed chunk of granite pegmatite, which is essentially a granite made of exceptionally large mineral grains.



JIM SURETTE

The eastern flank of Mt. Washington, 6,288 ft., showing Tuckerman and Huntington ravines.

II. UNDERFOOT: HIKING WHITE MOUNTAIN GEOLOGY

Rock climbers may experience the close-up features of bedrock, but it is through hiking the hills and valleys that one begins to perceive the larger geologic architecture of the White Mountains.

There are thousands of miles of hiking trails in the Whites, ranging in length and difficulty from short loops close to the road to extended treks deep into the wilderness. The footpaths in the White Mountains are among the oldest in the nation. Some, like the Crawford Path that leads from the height of Crawford Notch to the summit of Mt. Washington, date back to the early 1800s and mark a transition in broad cultural perception of the mountains from being inhospitable places one should avoid to places of interest meant to be explored.

The Appalachian Trail is a 2,180-mile continuous footpath that extends from the hills of north Georgia to the summit of Katahdin in Maine. The Appalachian Trail passes through the heart of New Hampshire's White Mountains, linking together pieces of pre-existing paths—including a section of the old Crawford Path—into a route that traverses the spectacular Presidential Range in the north, across the Pemigewasset, Franconia, and Kinsman ranges, to Mt. Moosilauke and other lower summits in the south.

The Appalachian Trail was the brainchild of Benton MacKaye, an avid hiker from Shirley, Massachusetts, who first visited the White Mountains in 1897 as a freshman at Harvard. MacKaye spent the height of his career in Washington, DC, working for the Forest Service and the Department of Labor; he published his vision of an "Appalachian Skyline" in an architectural journal in 1921. The Appalachian Trail was completed in 1937 after 15 years of trail scouting and building, primarily in sections outside of the Whites. The AT was not originally intended as a path people might thru-hike, but today, over 500 people each year continuously walk from one end to the other, most starting in Georgia and walking north to Maine. For these travelers, the 170-odd miles through the White Mountains are regarded as some of the most exposed and challenging of the entire journey.

To hike the Appalachian Trail is to hike along the seam where an ancient ocean once closed, bringing together all the world's continents into a single landmass, Pangea. The configuration of this supercontinent held the eastern margin of ancient North America against the coasts of Africa and Europe. The closing of the ocean and the construction of Pangea was a slow, yet violent process, as chains of volcanic islands and small continental fragments were swept into the collision zone between continents. When the Earth's landmasses collide, it is analogous in ways to a head-on collision of automobiles: rocks caught up in the wreckage are broken and crumpled into jagged mountains like the metal of a car's front end. By the time North America landed against Africa and the suturing of Pangea was complete, the Appalachian Mountains stood as the planet's grandest range, a belt of peaks stretching from Alabama to Newfoundland and even beyond, into mountains across Great Britain and Scandinavia.

The Appalachian Trail stretches across the eroded core of this range, traversing sections of rock that have remained since the building of Pangea—slivers of ground that were once volcanic islands like Hawaii, and pieces of the African continent that are now incorporated into the North American crust. The trail also crosses rocks that tell a later story of the Appalachians' slow demise and the eventual breakup of the supercontinent.



APPALACHIAN MOUNTAIN CLUB LIBRARY AND ARCHIVES

Hikers on the Crawford Path in the 1930s. The Crawford Path is one of the oldest footpaths in the country and a section of it overlaps with the Appalachian Trail.

In the White Mountains, nearly all the rocks you find are either related to the assembly of Pangea and the uplift of the Appalachians, or to this later period of Pangea's breakup. The layered metamorphic rocks—the schists, quartzites, and gneisses of the Littleton, Rangeley, Smalls Falls, and other formations—are rocks that were caught up in the collisions that built the Appalachian chain. These rocks, once sediments on the floor of an ocean, were deeply buried and heated during mountain formation until they became malleable like warm play-dough, and then they were folded several times. As you are hiking along the trails in the White Mountains, you can see the shapes of these folds in some of the rocks, frozen in time for over 400 million years. The ground beneath the Appalachian Trail through the Presidential Range, across Mt. Jefferson and Mt. Adams, passes enormous folds, some the size of the mountains themselves.

Following south and west from Mt. Washington, the Appalachian Trail reaches the Franconia Ridge, one of the most scenic features of all its 2,000 miles. The Franconia Ridge encompasses the summits of Lafayette, Truman, Lincoln, and Little Haystack and stretches over two miles above the tree line along a single unbroken track. The rocks holding up this striking feature are 200 million years younger than the folded metamorphic rocks of the northern Presidentials. Franconia Ridge is a piece of what geologists call a ring dike, a circular feature of hard, resistant rock that rings the collapsed summit of an ancient volcano. As Pangea was cracking and breaking apart into the continents we see today, the White Mountains were inundated with volcanic activity. In addition to Franconia Ridge, the Conway Granite and the volcanic rock of the Moat Mountains all developed during this period.

TO HIKE THE APPALACHIAN TRAIL IS TO HIKE ALONG THE SEAM WHERE AN ANCIENT OCEAN ONCE CLOSED, BRINGING TOGETHER ALL THE WORLD'S CONTINENTS INTO A SINGLE LANDMASS, PANGAEA.

III. THE FACE OF WINTER: ICE CLIMBING, SKIING, AND SNOWBOARDING

Adventure in the White Mountains takes on a different character during the winter months. The mountains may no longer reach the heights they did at their peak, but their steep terrain, combined with climate factors of northern latitudes, relief, and proximity to the ocean, produce conditions here that are comparable to those in the planet's greatest ranges. Our winter adventures in the White Mountains—whether it's snowshoeing, ice fishing, snowmobiling, cross-country skiing, alpine skiing, snowboarding, or ice climbing—are inextricably linked to aspects of global and regional climate. These include the conditions produced by our current climate system: the weather, snow, and ice conditions we anticipate and track (sometimes obsessively) throughout the season. And also the deeper ties between climate and the landscape itself—the sculpting of the land by the hands of glaciers and landslides, and by the more subtle workings of groundwater and frost.

From the ravines of Mt. Washington to the scenic notches and valleys across the range, many of the iconic landscape features of the White Mountains are the work of glaciers. Glaciers are thick packages of ice that flow like frozen rivers under the force of their own weight. Small glaciers form in high elevations on the flanks of mountains around the world. Large glaciers, known as continental ice sheets, develop around the polar regions and can cover vast areas of the Earth's surface. Glaciers are the bulldozers of the geologic realm—they pluck and transport large chunks of rock out of the ground, and scour and grind the bedrock beneath the ice.

The glacial terrain of the White Mountains formed during multiple intervals of cold climate that persisted on Earth between 2.6 million years ago and 11,700 years ago, a time known the Pleistocene epoch. These glacial periods are linked to subtle, periodic changes in the Earth's orbit that affect how much sunlight reaches the northern and southern hemispheres. During the last glacial maximum—also known as the last ice age—the continental ice sheet extended from arctic Canada as far south as Long Island, with ice thick enough to override even the highest summits in the White Mountains.

Many of the glacial features of the White Mountains are best explored in winter. Snowshoe hikers and cross-country skiers traverse the broad, rounded bases of the glacially carved u-shaped valleys of Crawford and Franconia notches. These are distinguished from the younger and sharper v-shaped valleys carved by rivers. Ice climbers take advantage of the asymmetric profiles of glacially sculpted landforms like Mt. Willard in Crawford Notch and Cathedral and Whitehorse ledges in North Conway. These mountains have gentle slopes on one side, in the direction the ice originated, and steep slopes on their leeward sides, where glacier ice rode over the top, plucking the bedrock off the front into sheer cliffs.

Perhaps the most popular of all the glacial terrain in the Whites are the cirques that flank Mt. Washington and its neighboring Presidential Range summits. Cirques are bowl-shaped depressions that form at the head of mountain glaciers. On Mt. Washington, these include Tuckerman and Huntington ravines, the Great Gulf, and Oakes Gulf; on the north side of Mt. Adams lies Kings Ravine, another classic cirque.

Tuckerman Ravine is renowned by backcountry skiers and snowboarders for its precipitous headwall and deep snowfields. Throughout the winter, the famously high winds of Mt. Washington sweep snow off the summit and alpine gardens, depositing drift after drift into the bowl of Tuckerman Ravine. These snowfields tend to persist in the warmer months long after the lower-elevation ski areas have melted off. Since the 1920s, spring weekends have seen hundreds to even thousands of skiers flocking to Pinkham Notch, making the three-mile trek on backcountry trails to the bottom of the ravine. Over time, skiers have pioneered descents into Tuckerman's steepest and narrowest chutes. This terrain has inspired generations of skiers who would go on to pursue the sport of extreme skiing on a global stage.

Tuckerman Ravine was also the site of some of the country's earliest ski races, including the US Olympic Trials in 1935. An annual competition dubbed the American Inferno clocked skiers from the summit of Mt. Washington to the mountain's base, with the finish line near the Crystal Cascade on the Tuckerman Ravine Trail. The first Inferno race, held in 1933, was enabled by Appalachian Mountain Club hut manager Joe Dodge—future co-founder of the Mt. Washington Observatory—and his shortwave radio experience from World War I. Via radio, Dodge could communicate with race organizers at the



ROGER COREY, COURTESY OF THE NEW ENGLAND SKI MUSEUM

Ski racer on the Wildcat Trail in the 1930s. The popularity of skiing surged during this time and the snow-filled terrain of the White Mountains lay at the heart of the craze.

summit and accurately time skiers crossing the race finish. A skier named Hollis Phillips won 1933's inaugural Inferno with a time of 14 minutes, 41 seconds. But it was the third American Inferno in 1939 that has become the source of legend. Austrian skier Toni Matt pointed his skis off the summit, bombing over the headwall and into the bowl with barely a single turn. He finished with a time of 6 minutes, 29.2 seconds. This record still stands today, over 80 years since Matt's famous schuss.

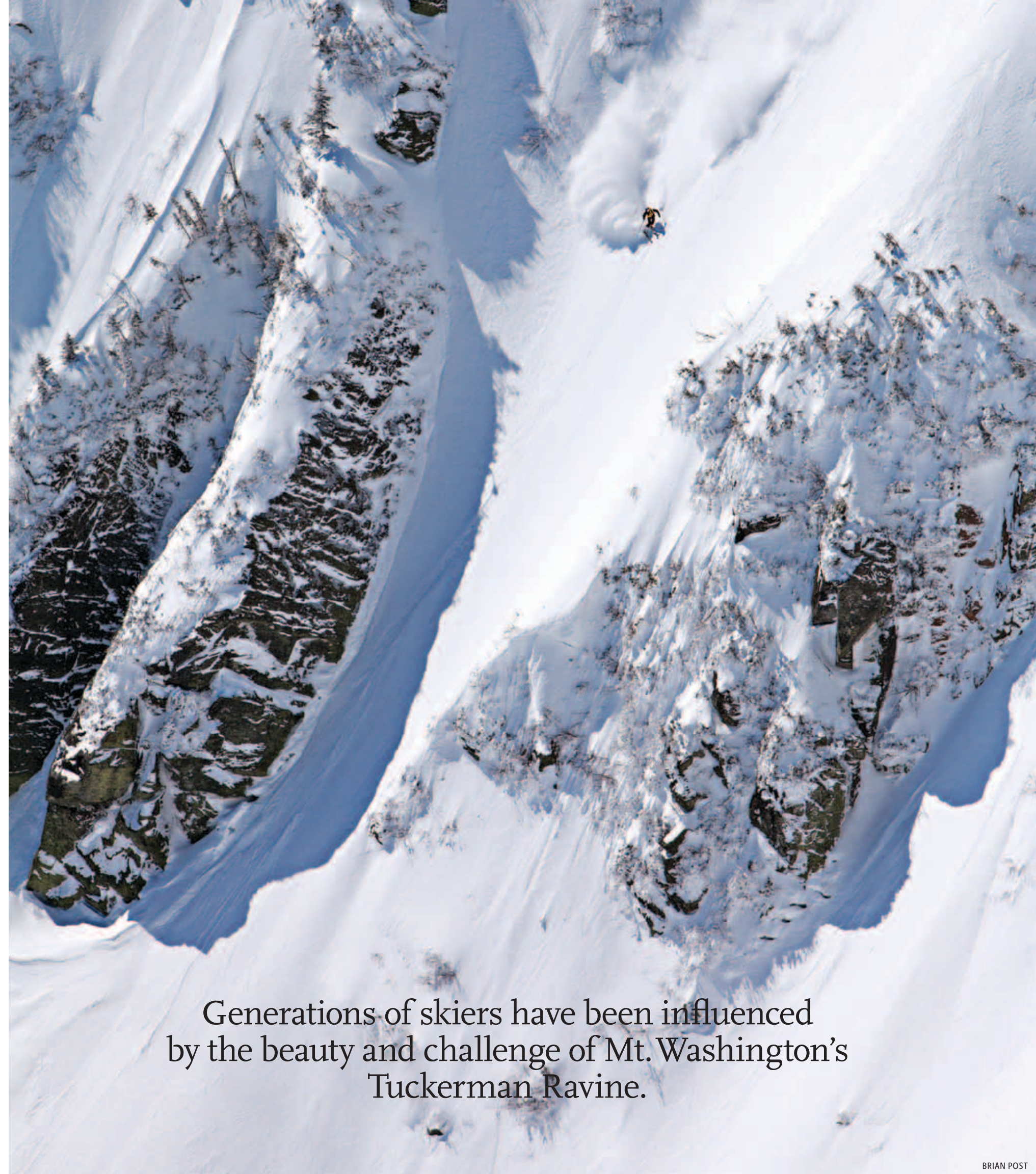
Farther north along Mt. Washington's eastern slope is Huntington Ravine, a rockier and steeper cirque than Tuckerman. Also unlike Tuckerman Ravine, Huntington sees only modest traffic, even in the spring, and is known more for its climbing objectives than its descents. The cirque walls of Huntington are streaked with narrow chutes that fill with ice and snow in the winter months. Some of the world's best alpine climbers have learned their craft and trained in these gullies, climbing the frozen waterfalls and navigating the variable, often harsh conditions of Mt. Washington's alpine zones.

Pinnacle Gully is the premier line in Huntington Ravine: an angling shaft of waterfall ice buttressed by formidable crags. The first ascent of Pinnacle Gully was seen as a major prize in the climbing world in the late 1920s. Nearly all the climbing luminaries in the Northeast at the time had their sights on Pinnacle Gully, including Robert Underhill and Lincoln O'Brien—who made an unsuccessful early attempt—as well as Charles Houston, Bradford Washburn, and others. Yet in February 1930 it was two novice climbers from Yale, Julian Whittlesey and Sam Scoville, who succeeded where no one had before. Climbers at the time and climber historians today have debated the relative influence of beginner's luck versus skill in Whittlesey and Scoville's accomplishment, but regardless of what fueled its first ascent, Pinnacle Gully stood for decades as one of the most difficult winter routes in the Northeast and remains today a committing objective for ice climbers.

The geology of Pinnacle Gully is perhaps another sort of adventure story. The waterfall ice choking the gully in winter is backed by a basaltic dike: a wall of dark volcanic rock that intruded the bedrock of Mt. Washington long after the White Mountains had risen. There are numerous basaltic dikes that cut across the White Mountains, as well as other regions of New England. Many of these are oriented roughly northeast-southwest and they mark the initial fractures along which the supercontinent Pangea began to break apart about 200 million years ago. Basalt is a relatively weak rock, often more susceptible to erosion than the rocks around it, so basaltic dikes commonly form deeply eroded gullies like Pinnacle. In fact, geologists have traced the dike of Pinnacle Gully across Huntington Ravine to North Gully, another ice route. The cirque glacier that scooped out Huntington Ravine effectively cut this geologic feature in two.

Many of the other gullies explored and revered by ice climbers in the White Mountains are not eroded dikes, but are instead the result of landslides. Landslide activity is an indication of ongoing erosion in the White Mountains today. Major storm events and unconsolidated groundcover can trigger these massive debris flows. Several famous landslides in this region have occurred in modern recorded history, including the Willey Slide in 1826 that killed nine residents in Crawford Notch, and the more recent slides during Tropical Storm Irene in 2011, which included movement along Hillmans Highway in Tuckerman Ravine.

TUCKERMAN RAVINE WAS ALSO THE SITE OF SOME OF THE COUNTRY'S EARLIEST SKI RACES, INCLUDING THE US OLYMPIC TRIALS IN 1935.



Generations of skiers have been influenced by the beauty and challenge of Mt. Washington's Tuckerman Ravine.



ANNE SKIDMORE

Peter Doucette climbs Way in the Wilderness on the cliffs above the Kancamagus Highway.

LOOKING FORWARD: CHANGING CLIMATE, CHANGING ADVENTURES

The influence of climate continues to play a pivotal role in our experience of outdoor recreation in the White Mountains, particularly in winter when most activities depend on particular snow and ice conditions. The region's climate is influenced by a complex set of geographic factors, including latitude, mountainous topography, and proximity to both oceanic and continental weather patterns. These, in turn, are affected by trends in global climate. The result is often dramatic variability in winter conditions, experienced both within single seasons and from year to year.

Scientists working in the Hubbard Brook Experimental Forest, a Forest Service research site near West Thornton, have been measuring climate indicators like temperature, snowfall, and ice-out dates in the White Mountains for over 50 years. What they've found is that despite this variability that many of us have become accustomed to, two longer-term trends are still clear: winters in the White Mountains are getting warmer and they are producing less snow.

What does the future hold for adventure in the White Mountains? The effects of climate change have already influenced the ski industry, with a transition from small ski areas widespread across New England to large resorts concentrated in the northern mountains. These resorts now rely on substantial artificial snowmaking operations to stay in business. Similarly, members of other winter recreation communities—backcountry skiers, snowmobilers, winter hikers, mountaineers, and climbing guides—have also noted the impact of changing winter conditions on their activities. Some of these changes involve characteristics that are central to not only recreation, but also to businesses and culture in the White Mountains.

From a geologic perspective, the ties linking climate, landscape, and human beings are tightly bound. We tap into these connections when we go into the mountains, through our experiences and observations. The mountains are witness to a deep time, but it is a narrative in which we also participate: the passing of minutes as our heart races during a hike or climb, the passage of generations as our sports and communities evolve, and the advance of eons as the ground is altered and shaped.



NEW ENGLAND SKI MUSEUM

The first giant slalom race in the US was held on April 4, 1937 in Tuckerman Ravine.

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ACKNOWLEDGMENTS

With this second exhibition in the Museum of the White Mountains at Plymouth State University, we are furthering our goal of presenting educational and entertaining transdisciplinary exhibitions.

Curator Sarah Garlick conceived the premise of the exhibition. A geologist and author of *Flakes, Jugs and Splitters: A Rock Climber's Guide to Geology* and *National Geographic Pocket Guide to Rocks and Minerals*, Sarah's passion for the White Mountains and her skills in informal science education are what bring the concept to life in a way that engages audiences. Her interest in technology as a learning tool and the relationship she built with the University of Pittsburgh and Carnegie Mellon University added high-resolution contemporary images and interactive technology to the exhibition, features that are still in an experimental phase as museum education tools and that allow us to directly address the museum's goal of creating high-quality actual and virtual exhibitions and related educational programming.

Guidance and contributions from geologists J. Dykstra Eusden Jr., Brian K. Fowler, P. Thom Davis, Woodrow B. Thompson, Wallace A. Bothner, Richard A. Boisvert, and John W. Creasy have been invaluable. Their volunteer efforts, a peer-review process, guarantee that the exhibition meets the highest academic standards.

Jim Surette of Granite Films created the video and Gigapan photography that bring the content to life through new media. His rigor in learning the new Gigapan technology and his patience in standing for hours at a time for a single shot of a ledge or a ridge made it possible for us to integrate this new technology into the exhibition.

I would like to thank Bea and Woolsey Conover, John Small and Philip Marcus, the Museum of the White Mountains Membership, and the Capital Mineral Club for their generous support of the project.

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Additional images, objects, stories, and assistance from Henry Barber, Scott Barber, Seth Campbell, Alan Cattabriga, Don Dalliare, Robert J. Girouard, Jo Henderson-Frost and Harold Frost, Katie Ives and Mike Lorenz from *Alpinist* magazine, Gordon Jackson, Joe Klementovich, Doug Millen, Jack Newton, Jim Niver, Austin Orth, Paul Ross, Jon Sykes, Jimmy Voorhis, Laura Waterman, Ed Webster, Rick and Celia Wilcox, Freddie Wilkinson, and Geoff and Jackie Wilson ensured the exhibition resonated with regional adventurers.

The Gigapan touch-screen kiosk was built in partnership with Marti Louw from the University of Pittsburgh's Center for Learning in Out-of-School Environments and Chris Bartley from the CREATE Lab at Carnegie Mellon University.

As with all of our projects, this exhibition would not have been possible without support from devoted Museum Advisory Council members, University administration, and staff from across campus.

Dr. Catherine S. Amidon
Director, Museum of the White Mountains