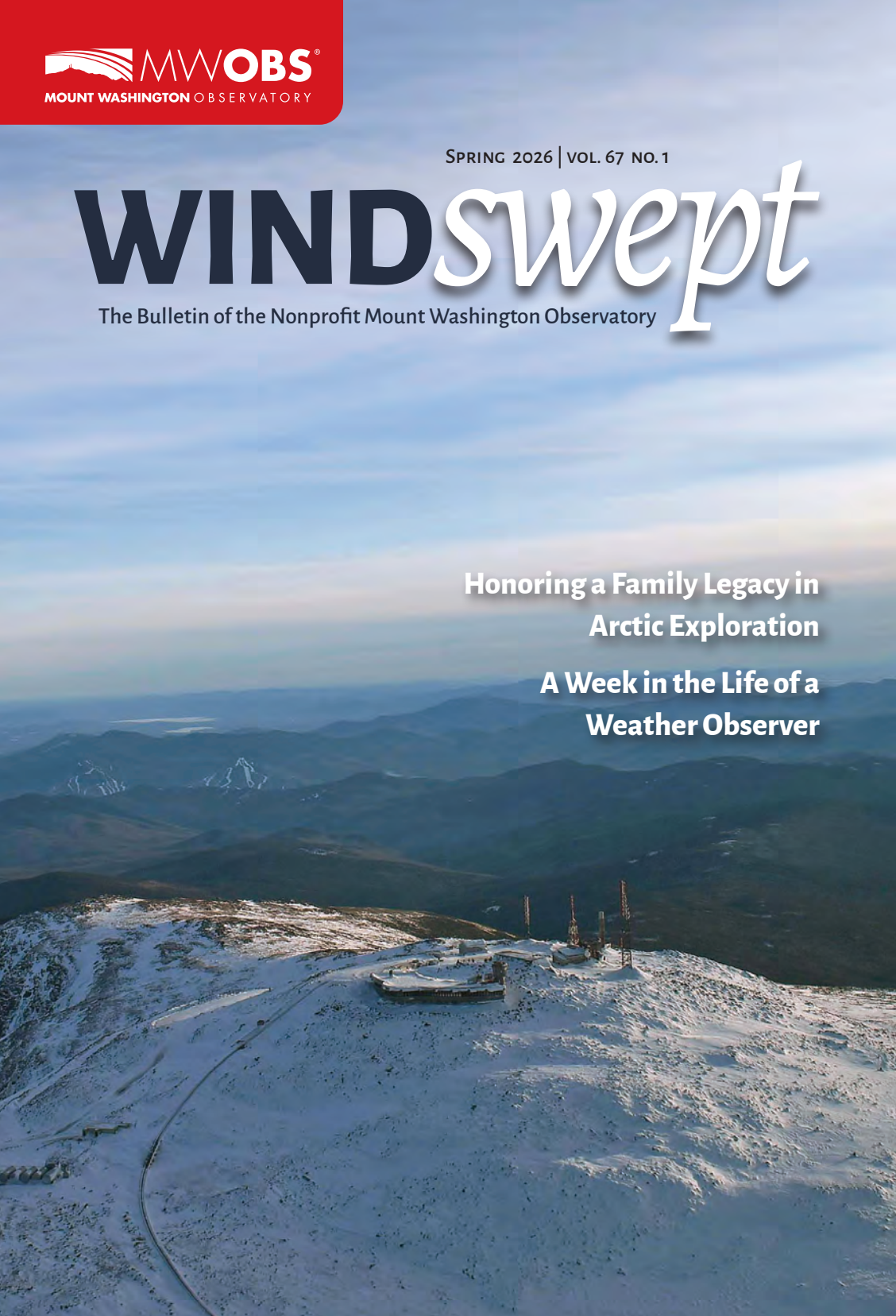
MWOBS®
MOUNT WASHINGTON OBSERVATORY

Spring 2026 | vol. 67 no. 1

WINDswept

The Bulletin of the Nonprofit Mount Washington Observatory



Honoring a Family Legacy in Arctic Exploration

A Week in the Life of a Weather Observer

APRÈS HIKE CELEBRATION • JULY 18

FOOD, BREWS & GEAR: Join us at Wildcat Mountain Resort!

- BBQ Feast
- Beer Garden with Tuckerman Brewing Company
- Live Music
- Rock-Climbing Wall
- Epic Gear Raffle

REGISTER AT SEEKTHEPEAK.ORG

Seek *your* peak.

Any hike. Any day.

WINDswept

Spring 2026 | vol. 67 no. 1

FEATURES

NEWS

WEATHER

DEPARTMENTS

Mount Washington Observatory® is a private, nonprofit, member-supported institution with a mission to advance understanding of the natural systems that create Earth's weather and climate. It serves this mission by maintaining a weather station on the summit of Mount Washington, performing weather and climate research, conducting innovative science education programs, and interpreting the heritage of the Mount Washington region.

Membership in the Observatory is open to all. Members who donate at least $60/year or $5/month receive: Tours of our famous mountaintop weather station (generally mid-May through mid-October); a one-year subscription to *Windswept™: The Bulletin of the Mount Washington Observatory*; meteorology and climate research news from the summit of Mount Washington, straight to your inbox; free admission to *Extreme Mount Washington*™ museum; advanced notice of special events; a 15% discount on all purchases in our museum and online shop; and free admission to more than 300 science centers through the ASTC Passport Program (restrictions apply, please see the ASTC website for details).

Members will receive the three issues of *Windswept* for the year following the quarter in which they join. Please make checks payable to the Mount Washington Observatory and send to: Mount Washington Observatory, PO Box 2310, North Conway, NH 03860-2310, or join at mountwashington.org.

Windswept: The Bulletin of the Mount Washington Observatory (ISSN 1098-7215, USPS 330-710) is published three times a year (spring, summer, fall/winter) by the Mount Washington Observatory. Periodical postage paid at North Conway, NH, and additional mailing offices. Editorial office to which all correspondence and address changes should be mailed is PO Box 2310, North Conway, NH 03860-2310 or submit via email to eestabrook@mountwashington.org

Mount Washington Observatory
2779 White Mountain Highway | PO Box 2310
North Conway, NH 03860-2310
603-356-2137 | email@mountwashington.org | MountWashington.org

Administrative Offices
2779 White Mountain Highway
North Conway, NH 03860-2310
603-356-2137 phone

Summit Facility
Mount Washington
603-356-2137 phone

WINDswept

Editor: Ellen Estabrook
Graphic Design: Brenda Court
Phone: 603-356-2137
Email: eestabrook@mountwashington.org

Contributors: Jackie Bellefontaine, Alex Branton, Bill Ofsiany
Cover Image: Aerial view of Mount Washington, December 2025 (Photo by Ines Boehnert)

A Summit in Season

Ellen Estabrook

BY **ELLEN ESTABROOK,** WINDSWEPT EDITOR

Wintertime for so many is a period for slowing down, but for weather observers on the summit of Mount Washington, the opposite rings true. Not only does their data collection depend on their hourly exposure to relentless sub-zero conditions, but so does the instrumentation on which the accuracy of this data relies. This means deicing, and sometimes detaching, tools like the wind-measuring anemometers as often as every 15 minutes to then troubleshoot and fix. On top of this rigorous physical pursuit that often includes a mallet, specialized knowledge, and as many helping hands that are available, weather observers also have the unique responsibility of safekeeping the seasonally closed summit building alongside our State Park partners while continuing critical long-term research, forecasting, and education programs.

Yet, when you ask our summit weather observation team what their favorite time of year is, you will undoubtedly receive a unanimous response. Despite the challenges that this time of year presents, it is winter that brings with it some of the most exciting meteorological conditions a weather observer could dream of— and it is this time of year where the importance of their year-round work is in plain view.

This same reply can be found on the smiles of the volunteers, interns, staff, and other partners of the Observatory that share about the time spent on an otherworldly alpine summit while enjoying some of the best sunrises and sunsets of their lives.

It is in these responses that we find the Observatory's reasons for being—to connect us to, and learn from, one of the most extreme and unique locations in the world.

Enclosed, you'll find news, stories and highlights from across the organization from this past fall and winter, as well as a moving piece by a staff member reflecting on her grandfather's legacy in polar exploration and its traces in her own career (pg. 27). You'll also find news on what's ahead as we turn our gaze to spring: Of course, we'd be remiss to exclude a nod to Big Wind Day, a landmark event in the Observatory's foundational days. For this we have longtime Observatory supporter Bill Ofsiany to thank, who helps bring the history and images of that fateful April day to the page through his illustrative poetry (pg. 38). We hope you enjoy this edition of *Windswept!*

Starting the New Year Strong with Partnerships and Investments in Real-Time Weather Data

Drew Bush

BY **DREW BUSH,** EXECUTIVE DIRECTOR

It's a brand-new year. Thank you for making this one filled with promise for Mount Washington Observatory. Your generosity, help, and advice never fail to inspire us to continue our work.

To start the year ahead, we are particularly thankful for the renewal of our partnership with the National Weather Service through the National Mesonet Program. Our congressional delegation—including United States Senators Jeanne Shaheen and Maggie Hassan and United States Representatives Chris Pappas and Maggie Goodlander—each helped advocate for our work and its future importance.

These funds will allow direct investment in our Mount Washington Regional Mesonet as it grows to serve the entire state of New Hampshire over the next few years. We aim to include another partner, Plymouth State University, in this expansion and effort to provide the best possible public service with data that can be used by communities to plan, businesses to invest, universities to research, and all of us to stay safe.

Just as the new year began this January, I joined members of our staff to install and learn how to operate the first ground-based doppler LiDAR in the Granite State that will be utilized for weather observation, research, and forecasting. This LiDAR's installation early in the year was symbolic of our investments in technology during 2026. This new device will allow us to map the atmosphere vertically in three dimensions, while our team also works with partners to design a new pitot static wind anemometer among many other projects.

Our LiDAR, too, was made possible by our partners at Bretton Woods / Omni Mount Washington Hotel. Without their help, we would have had much difficulty installing electricity, a concrete pad, and the unit, a Vaisala WindCube, itself. Words cannot adequately express our gratitude.

We look forward to working with everyone who reads these words (and more), to make wise decisions for the future stewardship of our Observatory in the years ahead. In coming days, we will be sharing a strategic vision to set the stage for our future work and a transformed Mount Washington.

I can't wait to share the year ahead with each of you. Please reach out if we can be of help in all that you have planned.

Fur-rosty Business on the Summit

TRANSLATED BY **MADELYNN SMITH, NIGHT OBSERVER**

Photo by Ryan Steinke, Winter Intern

Hey there fur-iends! Nimbus here, reporting live from the meow-tain! The winter season is still in full swing on the summit, and I'm absolutely *feline* fantastic about it. With the season comes a fresh litter of new observers and interns! I've been paws-on with their training, which is mostly just showing them where my food bowl is and making sure they remember which treats are my fav-fur-ite. I've been checking over their fur-casts and they keep meowing about how cold it is outside, but I don't know what they're pawing on about since its always warm in their laps! I've made some new purr-ty great fur-iends with all the climbers and Edutrips coming to stay with us on the meow-tain. They give me plenty of chin scratches, which are always my fav-fur-ite.

It's been paw-sitively foggy lately, so I haven't been able to gaze out the weather room windows like I typically like to do. So I spend my time taking plenty of cat naps and catching any mice that try to invade my domain. I tried lending a paw and cat-tempted to do an observation, but I realized my paws are too small to hold the sling psychrometer! So un-fur-tunate. Fur now I'll stick to laying on the observer's papers while they're working. They do such paw-some work.

I hope you liked my updates from Meowt Washington. Even though I think the winter is purr-fect and I'm enjoying every meow-ment, I am so ready for spring! Stay tuned for more paw-sitively claw-some updates from yours truly!

New Hampshire's First LiDAR Scanning Technology Installed in Bretton Woods

Director of Weather Operations Jay Broccolo with the Vaisala WindCube 200S Light Detection And Ranging (LiDAR) at Bretton Woods.

In early January, representatives from Mount Washington Observatory (MWOBS), Vaisala, and the Omni Mount Washington Resort installed New Hampshire's first ground-based scanning LiDAR. The Vaisala WindCube 200S Light Detection And Ranging (LiDAR) instrument, located at Bretton Woods Ski Area, kicks off an exciting new era of high-resolution wind and boundary layer analysis across complex terrain.

"This piece of technology will dramatically enhance our scientific work, enabling us to map a 3D profile of the atmosphere," Drew Bush, MWOBS Executive Director, said. "It can be used to improve forecasting, to be a platform for research for our partners, and we're thrilled to put it to use, better serving all of the communities with whom we work."

The instrument will enable reliable monitoring of atmospheric parameters such as wind, turbulence, clouds, and aerosols from a unit situated at ~1,600 feet in elevation. It features a range of scanning patterns, angles, speeds, and modes, making 360-degree data available for almost nine miles—including over the summit of Mount Washington. The WindCube will make it possible for the Observatory and its research partners to study how the height of the boundary layer changes with different weather patterns, and what the wind field looks like before it interacts with the Presidential Range terrain.

The expansion is made possible by a Congressionally Directed Spending request by U.S. Senator Jeanne Shaheen, with generous installation support by Bretton Woods Ski Area/Omni Mount Washington Resort.

Supporters Contribute Nearly $450,000 during Year-End Campaign

In early January, representatives from he Observatory's incredibly generous community donated $448,250 during MWOBS's 2025 Year-End Campaign, exceeding the fundraising goal by nearly $75,000. These vital funds sustain daily operations and enable growth in outreach and educational programs, innovation in research and technology, and new forecasting and weather communication services. Thank you for your support!

Observatory Named Citizens' Champion in Action

From left, Mt. Washington Cog Railway President/Owner Wayne Presby and General Manager Ryan Presby, MWOBS Director of Education Brian Fitzgerald, MWOBS Director of External Affairs Charlie Buterbaugh, President of Citizens New Hampshire Marc Lubelczyk, MWOBS Executive Director Drew Bush, New Hampshire Union Leader Publisher Brendan McQuaid. (Photo by Randall Armor, Mount Washington Cog Railway)

Citizens Bank and the New Hampshire Union Leader named Mount Washington Observatory (MWOBS) a 2026 "Champion in Action" in January, recognizing MWOBS's innovative approach to advancing financial empowerment and workforce development through STEM education, apprenticeships, and paid internships.

MWOBS will receive a $50,000 contribution from Citizens, media coverage and public service announcements from New Hampshire Union Leader, and volunteer support from Citizens colleagues.

The funding will be used to expand hands-on STEM education, apprenticeships, and broadcast meteorology internships—bringing more students and educators behind the scenes of its continuously staffed summit station and long running climate record.

"On the Northeast's most extreme peak, Mount Washington Observatory is turning science into public safety—training the next generation of meteorologists and climate communicators while delivering vital weather information to hikers, communities, and businesses," stated the Citizens Bank press release.

Bailey Nordin Joins Summit Team as Weather Observer & Education Specialist

We are excited to announce the arrival of Bailey Nordin to the summit team as a Weather Observer & Education Specialist. Bailey brings an affinity for the outdoors and Earth Sciences as well as an impressive background of polar exploration and research to the Observatory: Her passion for understanding polar and extreme climates brought her to Antarctica, Greenland, and the Northwest Territories in Arctic Canada, where she worked for NOAA, led workshops with international students on climate change, and researched permafrost degradation, respectively. You can learn more about Bailey in her Observer Blog at mountwashington.org/journal. Welcome, Bailey!

SUMMER/FALL 2025 WEATHER DATA

	AUG	SEPT	OCT	NOV
Temperature (°F)				
Average	48.9	44.8	33.8	18.3
Departure	+0.2	+1.7	+2.5	-2.5
Maximum	69	57	59	37
Date(s)	13th	17th, 18th	5th	26th
Minimum	34	27	15	2
Date(s)	30th	20th	9th	28th/29th
Precipitation (inches)				
Monthly	3.19	4.30	10.07	11.49
Departure	-4.53	-3.36	+0.08	+3.40
24-hour Maximum	2.10	2.13	3.03	1.90
Date(s)	8th	25th/26th	20th/21st	3rd/4th
Snowfall (inches)				
Monthly	T*	0.0	13.5	68.5
Departure	-0.1	-1.2	-5.5	+32.9
24-hour Maximum	T	0.0	3.9	13.4
Date(s)	30th**	N/A	26th	16th/17th
Season Total	T	T	13.5	82.0
Departure	-0.1	-1.3	-6.9	+26.0
Wind (mph)				
Average	17.7	23.2	31.9	45.0
Departure	-6.8	-4.4	-3.6	+5.6
Peak Gust/Direction	65 W	85 W	126 W	124 NW
Date(s)	26th	28th	31st	1st
Days 73+	0	6	8	19
Days 100+	0	0	1	9
Other				
% Sunshine	49	54	49	17
Clear Days	2	3	3	2
Partly Cloudy Days	11	9	9	2
Cloudy Days	18	18	19	26
Days with Fog	22	22	25	28
Days with Rain	12	12	9	5
Days with Snow	3*	0	14	26

*Some fell as hail **Last of several occurrences

Summer/Spring 2026 Overview

BY **RYAN KNAPP**

The end of summer and start of fall had a warm and dry pattern for the region. This led to drought conditions developing in several areas. Our first inch of snowfall typically occurs in September but in 2025, we had to wait until October to see our first measurable snowfall. However, while winter weather was slow to start, cold and snowy conditions returned dramatically in November making it a month to remember for the summit staff.

August 2025

The month started with a cold front shifting offshore and high pressure building providing cool but clear conditions. By the 2nd, mild conditions returned along with dense wildfire smoke from Canada which reduced visibility and affected air quality. The ridge weakened on the 4th and a boundary to the north provided intermittent fog and clouds. High pressure, along with haze, returned on the 5th and lingered through the 7th. Convective showers provided brief but heavy rain on the 8th then dry conditions returned overnight. High pressure then remained offshore through the 13th providing dry and hazy conditions as temperatures gradually rose. Temperatures peaked on the 13th at 69F which set a new daily record high and wound up being the warmest temperature we experienced for 2025.

A cold front late on the 13th provided light rain followed by more seasonal conditions for the 14th. High pressure returned on the 15th providing clearing before smoke and haze returned on the 16th. A cold front on the 17th provided fog, rain, and drizzle. Fair weather returned on the 18th. Low pressure skirted across southern New England providing cloudy skies and light rain on the 19th. Temperatures cooled on the 20th allowing for a morning sleet shower marking the first winter precipitation for the 2025/2026 season. High pressure returned clear and calm conditions on the 21st as the outer bands of Hurricane Erin were visible across the southern horizon by the 22nd. Fair weather lingered into the 23rd as the ridge shifted offshore. A weak cold front provided rain/drizzle for the 24th/25th. High pressure returned on the 26th. Upslope flow provided fog and rain on the 27th then clearing returned on the 28th. A cold front on the 29th/30th provided rain, drizzle, and sleet. Building high

pressure ended the month with cool but clearing conditions.

September 2025

High pressure started the month with fair weather then clouds returned on the 2nd as an upper-level low approached. As the low passed on the 3rd it provided rain along with thunderstorms with hail and high winds. A cold front approached on the 4th keeping summits foggy, then as the front passed, it provided rain and thunderstorms for the 5th/6th. A coastal low kept light rain around for the 7th. Temperatures dipped just shy of freezing on the 8th as high pressure built over the region. Clearing returned by the evening and then remained overhead for the 9th/10th. A cold front on the 11th provided fog and another round of cool weather. High pressure returned for the 12th. A weak low provided variable cloud cover and patchy fog for the 13th then fog and rain returned on the 14th. High pressure then built over the region late on the 14th and remained through the 18th keeping summits clear and dry and leading to regional drought conditions.

A cold front on the 19th returned fog, drizzle, and rain followed by temperatures dropping to below freezing on the summit as well in neighboring valleys. High pressure returned on the 20th providing clear conditions and improving temperatures. A warm front swung north on the 21st, which continued to improve temperatures. As the front passed on the 22nd it provided fog and drizzle. A cold front on the 23rd provided rain. Upslope flow continued fog and light rain on the 24th. A warm front lifted north on the 25th providing additional rain. A cold front continued the rainy weather on the 26th. Showers lingered overnight then tapered on the 27th but a moist flow continued foggy conditions. Foggy conditions continued on the 28th then high pressure provided a clearing pattern for the 29th. A weak cold front provided clouds overnight into early on the 29th before a clearing pattern returned with building high pressure at the end of the month.

October 2025

Canadian high pressure built down on the 1st/2nd providing clear and cool conditions but as it slid offshore, milder temperatures would return for the 3rd/4th. Temperatures continued to notch upward for the 5th and then crested on the 6th at 58F tying the daily record high. A trough and associated cold front returned fog, rain, and cooler conditions on the 7th and lingered into the 8th. Freezing fog returned overnight into the 9th providing the first rime ice of the season. Summits cleared under fair skies on the 10th as temperatures rebounded above freezing. High pressure shifted northeast on the 11th as a pair of lows approached from the west and south. The coastal low won out, spreading fog in on the 12th followed by rain, freezing rain, and sleet on the 13th. Upslope rain showers lingered on the 14th. A cold front on the 15th dropped temperatures and provided the first measurable snowfall of the season which lingered into the 16th before tapering overnight. By the 17th, fog thinned and a clearing pattern returned with building high pressure.

The high shifted offshore allowing for a milder return flow for the 18th. An upper-level trough returned fog for the 19th. A passing surface low on the 20th provided rain before transitioning to sleet overnight. A trough swung in on the 21st and then remained over the region through the 27th keeping a cold and snowy pattern in place. By the time things wound down, the summit picked up 11.3 inches of sleet and snow. Canadian high pressure finally cleared the summits on the 28th. As the ridge shifted east, a milder return flow rose temperatures above freezing on the 29th. A strong low approached from the west with fog and a wintry mix returning for the 30th/31st. As the low departed, winds climbed to 126 mph to end the month.

November 2025

The month started with snow and high winds that reached 124 mph. Winds wound down on the 2nd and high pressure briefly provided clearing. A trough from the west returned fog along with snow and sleet on the 3rd. Snow picked up on the 4th delivering 7.8 inches for the day before gusts over 100 mph swept it towards our eastern slopes. A Clipper continued snowfall on the 5th. A trailing cold front on the 6th provided additional snowfall as winds ramped back up to 109 mph. Another Clipper on the 7th resulted in a wintry mix. A trailing cold front provided light freezing rain before tapering as high pressure briefly built in on the 8th. A low from the Ohio River Valley swung a warm front north on the 9th providing a wintry mix. A coastal low on the 10th continued the wintry mix. A trailing cold front provided light snow on the 11th prior to tapering. High pressure then built boosting winds to 123 mph. An upper-level low settled overhead for the 12th-14th providing continued fog and snowfall. Snow tapered early on the 15th and high pressure briefly provided clearing.

The ridge shifted northeast and stalled over Greenland resulting in low pressure stalling over New England for the 16th-18th. This provided fog, cold, gusts frequently over 100 mph, and 17.3 inches of snow. High pressure over the mid-Atlantic allowed for a clearing and calming pattern to return for the 19th with fair conditions lingering into the 20th. A low to the north returned fog and snow for the 21st/22nd. Another low on the 23rd/24th brought another round of light snow. Clearing briefly returned overnight before a broad low approached from the southwest. A warm front on the 25th/26th provided a wintry mix and warm fog as temperatures crested above freezing. A cold front returned snow overnight which lingered into the 27th. As the low slowly shifted northeast, wraparound moisture provided continued fog and upslope snow for the 28th/29th. Winds boosted with gusts peaking at 108 mph. A passing low provided another round of snow at the conclusion of the month. By the end of November, the active winter pattern provided the summit with 68.5 inches of snow/sleet making it the fifth snowiest November in our dataset (1932-present).

Weather 101: The Making of Snowflakes

BY **FRANK VAZZANO, RYAN HAAS AND ELLEN ESTABROOK**

Although there are several factors that contribute to snow formation, the "sweet spot" to maximize snow amounts and fluffiness is when cloud temperatures are between 14°F and -4°F, which we call the dendritic growth zone.

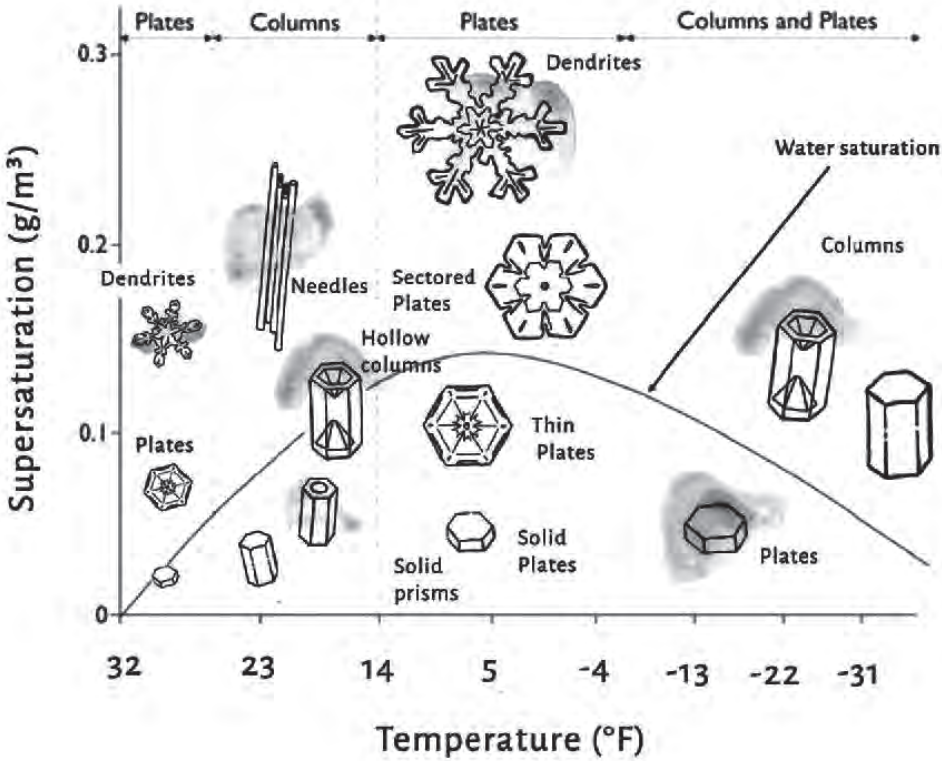
The reason for this seemingly arbitrary temperature range comes in two parts and involves a bit of science. First, snow crystals grow faster when the air is colder (Libbrecht, 2022). This is because water in the air will more readily freeze onto suspended snowflakes in the air when it's cold. So, why not just say the best snow falls at 0°F, or -50°F, or even colder? The reason is that cold air can hold less moisture (Libbrecht, 2022). So, the colder the air is, the less water could be available to form snowflakes. It turns out that these two variables are maximized from 14°F to -4°F (as shown in the diagram on pg. 14).

Within this temperature range (and assuming some other conditions are fulfilled), special types of fluffy snowflakes called stellar dendrites will form (hence the term "dendritic" growth zone) (Vazzano, 2025).

Former MWOBS intern Chloe Boehm explains, "[The] area of the atmosphere called the dendritic growth zone, or DGZ…was given this name because looking to see if the air is saturated in this zone will give a good sense of where snowflake development is occurring. Although snowflakes can form in temperatures above or below this temperature range, their shape will stray away from what most people would consider a traditional snowflake" (Boehm, 2018).

"The DGZ is high up in the atmosphere, usually at least 14,000 ft above sea level. That means that the recently formed snowflakes have a long way to travel before you see them. As these snowflakes are traveling towards the ground, they are picking up additional moisture to add to their structure. The path that each snowflake takes is unique with ever so slightly different atmospheric conditions. All it takes is the slightest change in temperature or humidity to alter the structure of a snowflake. Therefore, each snowflake tends to look unique!" (Boehm, 2018).

On the summit of Mount Washington, weather observers study snowflakes using a snow board, which is essentially black felt mounted on a square board to help with catching/viewing. In most places, all you need to do to determine if it's snowing is look out the window. However, on Mount Washington, this



Snowflakes come in different shapes and sizes depending on the air temperature and moisture, represented here by Supersaturation in g/m3, present in the air. (Diagram adapted from Libbrecht's "The Formation of Snow Crystals," originally created by Ukichiro Nakaya in the 1930's and termed "Nakaya snow crystal morphology diagram").

method doesn't usually work. This is because usually when it's snowing, we are dealing with thick fog and some variety of blowing snow, ice, or rime being whipped up into the air. The snow board is an amazing tool that weather observers use to determine if snow is falling from the sky or if it's just blowing snow.

During observations where snow is suspected, observers hold out the snow board to catch whatever flakes may be present in the air. If the snow grain or flake is whole and symmetrical, there is a great chance that it came from the sky. However, if the snow flake is missing branches, is sheared in half, or simply looks broken, that is a clear sign that it was damaged while it was blowing (Knapp, 2014).

Once we determine whether or not it is snowing, we can closely inspect the snow board to determine the type of snowflakes that are falling. When

snowfall amounts need to be estimated due to excessive blowing snow or rime ice chunks in the precipitation can, knowing the type of snow that fell can be a great tool for estimating the snow to liquid ratio. Stellar dendrites tend to accumulate very efficiently because their six pointed shape maximizes the amount of air trapped between the flakes, leading to a higher snow to liquid ratio or a fluffier snowfall (Collentine, 2025). Meanwhile, snow plates and columns accumulate less efficiently because their shape does not allow much air to be trapped between particles, resulting in more tightly packed, dense snow.

To identify the type of snowflakes observed, we use the "Snowflake Bentley" Thermometer poster, which contains over 400 unique snowflake images along with the temperature ranges in which each type typically forms. This poster was created using photographs from Vermont farmer William Bentley, who was born in 1865 and spent his life studying rain, dew, frost, and snowflakes. Bentley was the first person to photograph a single snow crystal and document that no two snow crystals are ever the same. Bentley went on to photograph over 5000 individual snow crystals and became a very influential figure in the area of photomicrography (Snowflake Bentley, n.d.). The Snowflake Thermometer Poster is a great investment if you are interested in identifying the types of snowflakes falling in your backyard. You can pick up a copy at: https://vermontsnowflakes.com/products/snowflake-thermometer-poster.

Resources

Allegretto, B. (2025, January 9). *Snow Ratios, Explained*. OpenSnow. https://opensnow.com/news/post/snow-ratios-explained

Boehm, C. (2018, December 1). *Why is every snowflake unique?* Mount Washington Observatory. https://mountwashington.org/why-is-every-snowflake-unique/

Collentine, S. (2025, December 23). *Snowflakes, explained.* OpenSnow. https://opensnow.com/news/post/snowflakes-explained

Knapp, R. (2014, January 19). *Is it snowing?* Mount Washington Observatory. https://mountwashington.org/is-it-snowing/

Libbrecht, K. (2022). *Snow crystals: A case study in spontaneous structure formation.* Princeton University Press. 2025.

Libbrecht, K. (n.d.). *The Formation of Snow Crystals.* https://www.americanscientist.org/article/the-formation-of-snow-crystals

Snowflake Bentley. (n.d.). *Biography*. Snowflake Bentley. https://snowflakebentley.com/biography

Vazzano, F. (2025). White Mountains Almanac 2025. Minuteman Press.

Summit Operations in Full Swing

BY **MIKE CARMON**

Mount Washington's summit really does revolve entirely around the winter season. No matter how warm temperatures might climb or how green the landscape becomes, winter is never far from our minds. We're either prepping for it, enduring it, or cleaning up after it (I may be overstating a bit—perhaps there's a week or two in July where we're insulated from the cold season).

The run up to wintertime this year brought the typical rapid decline in summit visitation and onset of chillier temperatures. Although it started a bit late, as October was atypically balmy for New England and Mount Washington's summit, with the summit maxing out over 50 degrees on six early-to-mid October days. That pattern quickly self-corrected in December, as we experienced our fifth windiest month on record at the summit.

Through this windier-than-average period, the quest for increased redundancy of wind data collection continued. The latest generation pitot-static anemometer, collectively designed by MWOBS and General Electric late last decade, was removed for maintenance and then re-deployed to the top of our instrumentation tower. The advantages of redundancy are innumerable: in such an extreme environment, occasional instrumentation failures are inevitable. So backups are always necessary. In fact, with increased redundancy, we can catch potential issues even earlier. Preventative maintenance becomes far more practical. And finally, the integrity of our overall *gold* dataset is solidified even further.

Expanded Forecasting Reach

Meanwhile, as the weather turned cold outside, the summit staff continued to increase their reach over the local airwaves. The Observatory is producing and disseminating more public-facing forecast products perhaps than ever before. If you listen to New Hampshire Public Radio, one of a variety of Radio Vermont Group Radio Stations, or WMWV Mount Washington Valley, you'll hear the voice of one of our meteorologists sharing their customized forecasts.

With the onset of notoriously more hazardous winter weather, there has been a big push to provide weekend recreational forecasts to the thousands of visitors that descend upon the White Mountains each weekend. Our weekend recreational forecasts highlight

The new PistenBully on the summit in late November after one if its first complete trips to the summit.

information relevant to skiers, hikers, campers, and other mountain activity-seekers.

To accommodate for this expanded reach, we continue to implement upgrades to our infrastructure and capacity. This includes enhanced technology, soundproofing of our radio room, and increased broadcast training for summit meteorologists. With an intentional push in this broadcast direction for the Observatory, we're also in the initial design phases of a broadcast meteorology internship program. These future broadcast meteorology interns will focus squarely on public-facing meteorological products, including some of our current forecast products. Our goal is to increase the overall quality and efficiency of these forecast products by hiring dedicated staff members—with pre-existing media backgrounds—to focus squarely on these forecasts. It is an exciting push of the Observatory's mission which simultaneously allows our full-time weather observers to refocus their roles a bit more.

Staff and Intern Update

With the first edition of *The White Mountains Almanac* successfully launched this fall, our search began for the scientists who will be instrumental in crafting the second edition through this upcoming year.

This is all in addition to our summit intern program, which continues to thrive. This fall we brought on four new interns, with projects ranging from fall foliage climatology to internal computer modeling utilizing MWOBS mesonet data. In the meantime, our two former

summer interns turned observers, Madelynn Smith and Ryan Haas, continue to grow and thrive in their roles.

Welcomed to the team of observers this winter was also Bailey Nordin, our newest Education Specialist. Bailey's earth science background from Dartmouth College, combined with her vast lab and field experiences across the country, make her an exciting addition to the summit team.

Summit Transportation

The final (non-living) addition to summit operations this season is our new "Snow Cat", which had its inaugural trips in November of 2025. The presence of this new PistenBully officially retires our old Bombardier after 17 winters of summit transportation. The machine has already been put to the test, punching through heavy drifts from early-mid winter snowstorms and fighting through whiteout conditions. The custom-built machine can push a tremendous amount of snow with its larger blade, and can even get us up and down from the summit a bit faster when weather and road conditions allow.

The PistenBully will be busy with our fully-packed winter schedule of EduTrips, VIP Trips, media trips, and our new undergraduate/graduate adventure programs. And of course, our weekly Wednesday shift changes. Here's to another 17 (at least) winters of trips!

A Closer Look at the Lower Atmosphere with New Light Scanning Technology

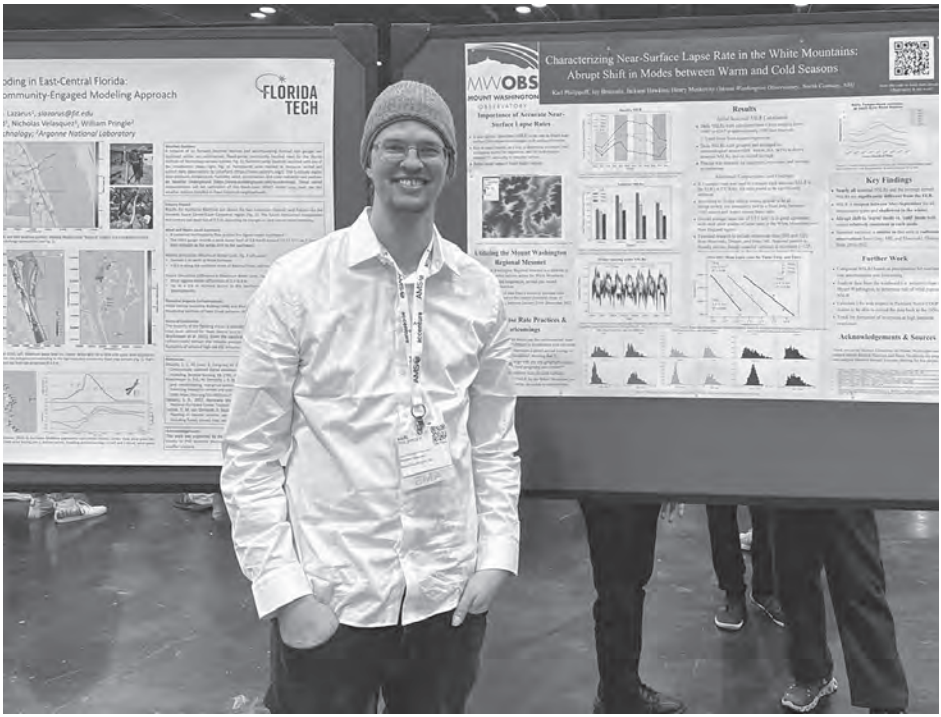
BY **JAY BROCCOLO**

Over the past four months, research and instrumentation efforts at Mount Washington Observatory have accelerated across multiple fronts, from scanning the lower atmosphere with our new Light Detection and Ranging system to expanding our mesonet and deepening its capabilities with snow monitoring and other environmental observations across New Hampshire. Each of these projects builds toward a shared goal: strengthening our ability to observe, understand, and interpret weather and climate in complex mountain terrain and throughout the region.

We are excited to share the successful installation of New Hampshire's first ground-based scanning Doppler LiDAR system. In collaboration with Vaisala and the Omni Mount Washington Resort, the Observatory installed a Vaisala WindCube 200S LiDAR system, marking an important step forward in high-resolution wind and boundary layer observation in complex terrain. Unlike traditional weather stations that measure conditions at a single point, the LiDAR allows us to profile wind speed and direction through the lower atmosphere. Under favorable conditions, we can observe wind structure thousands of feet above the surface, giving us insight into how airflow organizes before interacting with Mount Washington and the surrounding Presidential Range.

One of the early-stage research questions we are exploring is: Where does the atmospheric boundary layer typically reside during different synoptic weather patterns, and how does its structure evolve before interacting with complex terrain? This information has direct operational and research value. Improved understanding of wind structure and boundary layer height can enhance forecasting for high-elevation weather, support recreation safety, and contribute to national mesonet data streams. It also positions the Observatory to contribute more meaningfully to broader discussions about mountain meteorology and boundary layer dynamics.

At the same time, we have been working with regional partners to advance coordinated snow monitoring across the Northeast. In collaboration with the University of Vermont, University of New Hampshire, University of Maine,



Weather Observer and Research/IT Specialist Karl Philippoff at this year's AMS Annual Meeting.

and the Appalachian Mountain Club, we recently submitted a proposal to the National Science Foundation through the EPSCoR program to develop an expanded snow monitoring network throughout the region. The vision is to build a coordinated system that measures both snow depth and snow water equivalent across varied terrain, elevations, and climatic zones. Snow depth will be measured using a combination of laser-based and ultrasonic distance sensors mounted above the snow surface. These instruments continuously measure the distance to the snowpack below, allowing us to track accumulation, compaction, and melt in real time without disturbing the snow itself.

To measure snow water equivalent, the actual amount of water stored within the snowpack, we will deploy snow pillows. These fluid-filled bladders are installed at ground level and measure the weight of the overlying snow. As snow accumulates, the pressure increases, allowing us to determine how much water is contained within the snowpack. While snowfall totals are often reported, snow water equivalent is what ultimately drives spring runoff, reservoir recharge, and flood potential.

In mountain environments like the White Mountains, snow distribution is highly variable. Wind redistribution, rain-on-snow events, elevation gradi-

ents, and changing winter temperature regimes all influence how snow accumulates and persists. By pairing snow depth sensors with snow pillows across multiple elevations and exposures, we can better understand not just how much snow falls, but how much water is stored, where it is stored, and how quickly it is released. This regional effort has important applications for water resource monitoring for municipalities and downstream communities, recreation and safety planning for ski areas and backcountry users, and long-term climate trend analysis in a region where winters are evolving.

For the Observatory, this effort builds directly on our growing mesonet infrastructure and our expertise in operating instrumentation in harsh mountain conditions. It represents a meaningful step toward establishing a coordinated, research-grade mountain snow network in the Northeast.

In January, our team attended the Annual Meeting of the American Meteorological Society (AMS). Director of Technology Keith Garrett, Mesonet and Information Systems Technician Colby Morris, Weather Observer and Research Specialist Karl Philippoff, and I traveled to share our work and connect with colleagues across the field.

Karl presented his research on near-surface lapse rates using summit and mesonet data, work that continues to refine how we understand temperature structure in complex terrain and its influence on precipitation type and snowpack evolution. Beyond the poster session, the meeting provided an important opportunity to engage directly with other mesonet operators, instrument manufacturers, and operational meteorologists. We met with colleagues from the New York State Mesonet to discuss their experience operating Doppler LiDAR systems, including how they structure scan strategies, display and distribute their data products, and manage calibration and maintenance over time. As we integrate our own WindCube 200S into operations, these conversations are helping inform how we present and utilize the data most effectively.

We also continued strengthening relationships around instrument and product testing in extreme environments, reinforcing the Observatory's role as a real-world proving ground for weather technology. In addition, we supported our expanding internship program by participating in the AMS Career Fair and connecting with students interested in mountain meteorology, forecasting, and applied research.

Taken together, these efforts reflect an Observatory that is not only maintaining a historic summit station, but actively expanding the scope and sophistication of its observational capabilities. By combining new technologies such as Doppler LiDAR with expanded snow monitoring and a growing regional mesonet, we are strengthening our ability to serve the public today while building the scientific foundation needed for the decades ahead.

Well... It's Still Standing...

BY **COLBY MORRIS**

Some of you might remember a photo from May of last year showing what looked like a weather station that had been hit by a car. That's hard to imagine at 5,600 feet on Mount Washington. It wasn't a car; just Mother Nature exposing a mechanical weakness. We believe a clamp was overtightened, creating a stress concentration in the pole. Over time, that small weakness likely became a failure point, eventually causing the pole to fold over. This is Skyline Station, one of our most exposed mesonet stations (our network of automated weather stations). Skyline is located 5,600 feet up on the Cog Railway access road on Mount Washington. It acts as our second-highest station and is one of the highest fully automated stations in New England. Because it sits well above tree line, it's exposed to the west and northwest winds, especially during winter storms. The terrain around this station can also speed up the wind, since it's near ridges and the summit cone, forcing airflow up and over the terrain (orographic acceleration).

What happened this time? At least the station is still standing. On my last trip to this station with our Director of Technology, Keith, it was almost a complete station rebuild; everything but the solar panel and batteries needed to be replaced. Outfitted with some of our most durable sensors (wind speed, wind direction, two temperature sensors, barometric pressure, and solar radiation), the station was back to full operation. At that point, it became a test of how long it could last in one of the harshest environments in our network.

Not long after, we started getting observations and photos showing the station almost completely taken over by rime ice. Rime ice forms when supercooled fog or cloud droplets freeze on contact, building thick, wind-driven ice on the windward side of equipment. This was a problem because it was very early in the season, October in fact, which meant the station would be accumulating ice for months. This ice covers our instruments and makes getting accurate measurements difficult, to say the least.

In December, the station went offline. After looking at some photos of the station, we concluded that in this case, "offline" meant we stopped receiving data reliably, primarily because the communications link failed, not because every sensor suddenly died at once. For some of our stations, especially where direct connectivity is difficult or impossible, we beam data using a microwave link.

In simple terms, the station sends data to a relay point using a microwave dish, and that relay then sends it onward (ultimately back to the summit network). In Skyline's case, the microwave dish was shifted out of alignment by the ever-building rime ice. Even a small physical shift can be enough to break a directional microwave link.

Skyline Station weathering the elements.

In late January, I had the opportunity to see the station first-hand with help from our friends at the Cog Railway. They were heading to the summit, and I was able to hitch a ride so I could inspect the site in person. The station was still there and still upright, but the damage was significant. First, the station was completely encased in ice, something like I've never seen before. On top of that was a massive load of rime ice. Our cord arm we use for our solar sensor that's installed straight was bent downward from the combined weight and the constant wind. Even the sensors weren't safe. The RM Young wind speed and direction sensor was frozen in place and had its propeller broken off, the failure point being the metal shaft on the inside. It was remarkable. Even with all of that, the station was still standing. After repositioning the microwave dish to our amazement, it connected! Too bad we can't see any data!

As stated before, Skyline is one of our most exposed stations, so consistent maintenance is something we expect. The part that's hard to predict is exactly how the weather will cause failure, whether it's sensor damage, structural bending, or the communications link being pushed out of alignment.

In a strange way, the failures are also informative; they show us what the mountain demands from the equipment in higher elevations, and it gives us the opportunity to keep making better, more reliable weather stations. And that is Skyline Station: a weather station that probably shouldn't exist, but like most things on Mount Washington, with enough motivation, bright ideas, and engineering, we make the impossible possible.

Virtual Tours of Mount Washington's Summit and Expanded STEM Programs

BY **BRIAN FITZGERALD**

Greetings from the Education Corner! It's been a busy winter engaging learners of all ages in weather, climate, and Mount Washington while we also look ahead to spring and the return of long days and warmth. For those of you who have tuned in for the first time, or continue to follow our *Science in the Mountains* lecture series, we were fortunate to host an exciting launch of *The White Mountains Almanac* at Tin Mountain Conservation Center this past November and Weather Routing, Inc.'s Jeremy Davis ('99 summit intern) who covered weather forecasting for the maritime community in January. The highly anticipated almanac, written with Mount Washington Observatory, AMC, and Hubbard Brook Ecosystem Study staff, details the region's evolving climate, ecology, and natural beauty through gorgeous illustrations and thoroughly researched data visualizations that investigate month-by-month White Mountain phenomena. If you haven't ordered yourself a copy or read the digital version, make sure to check it out on the Observatory's research webpage.

If you know of students, teachers, or families who are looking for ways to engage in hands-on weather, climate, and mountain-based learning experiences, be sure to check out our new offerings.

Now more than three decades old, the Winter Overnight Edutrip program continues to deliver a learning experience like no other with six small group overnights at the Observatory's summit weather station. This winter featured a return of familiar topics such as the Observatory-focused "Winter on Mount Washington" and

MWOBS Director of Education Brian Fitzgerald (right), MWOBS STEM Programs Manager Jackie Bellefontaine (left), and collaborator, educator, and founder of PolarSTEAM Field School Erin Towns at the AGU Annual Meeting.

"Mountaineering Essentials" with local climber, guide, and search and rescue leader Joe Lentini. Broadcast meteorology was once again a theme with former summit intern and WJAR Providence, Rhode Island meteorologist AJ Mastrangelo. World renowned mountaineer and author Freddie Wilkinson was also invited to share his international climbing experiences through the "Alpine Mindset"-theme overnight program, only to be thwarted by not one, but two postponed programs due to extreme weather conditions. Maybe the third time is the charm?

The *Extreme Mount Washington* summit museum may have closed in mid-October, but Observatory staff have been hard at work preparing to welcome hundreds of thousands of visitors once again in the year ahead. A recently developed virtual tour of the summit was completed by undergraduate students from Worcester Polytechnic Institute's (WPI) White Mountain Project Center using 360-degree imagery to transport visitors on their tablets, phones, laptops, and even virtual reality headsets to Mt. Washington State Park and the Observatory's weather station and museum. The public will have the ability to access

the virtual tour through the Observatory's website, along with summit partners. Be sure to "take a trip" to the summit by finding the virtual tour on the Observatory's "visit us" webpage found on the top right-hand corner of the mountwashington.org homepage. Feel free to use the tour to prepare for an upcoming summit trip, follow-up from a recent trip, or share with a friend! If you have suggestions on how to improve the experience further, we're all ears, as we look to work with WPI once again to refine and expand the tour.

While there's lots of exciting educational initiatives for adult and family audiences, there's even more happening for our kindergarten through twelfth grade (K-12) students and teachers that we serve. This January we welcomed two brand new AmeriCorps School Program Educators, Zac Masters and former summit intern Alyssa Bélanger who have brought a tremendous amount of knowledge and enthusiasm into a wide range of classrooms throughout our region. Zac and Alyssa now round out a team of five educators solely focused on serving students and teachers across the Northeast through programs such as school day, after school, virtual, field trip, and distance learning programs.

In addition to the more traditional school-based programming efforts, the education team has launched a brand-new set of programs including a homeschool series (January-June), February and April vacation week camps, and an additional week of the growing summer camp *Storm Scouts*. If you know of students, teachers, or families who are looking for ways to engage in hands-on weather, climate, and mountain-based learning experiences, be sure to check out our new offerings.

Finally, we're happy to report that the MWOBS's education efforts were well-represented this past December in New Orleans, Louisiana, at the American Geophysical Union's (AGU) annual meeting. One of the largest gatherings of earth and space scientists, MWOBS was fortunate to send both STEM Programs Manager Jackie Bellefontaine and Director of Education Brian Fitzgerald for the first time. Because of generous supporters of our work, these important convenings serve not only as valuable professional development opportunities for our staff, but places to share the Observatory's growing expertise in the science education field. Jackie, in her programming efforts, shared her innovative field-based approach to working with Upward Bound high school students to excite and grow interests in polar and climate-related careers and skills. Brian's session spoke to the now long-running professional development programs for K-12 educators that use extreme weather data as a means for growing data literacy and computational thinking skills.

Our team is incredibly grateful for the support our expanded educational efforts have seen in the last several years. We hope that you or someone you think may enjoy our programs will come check out a free virtual program, join a homeschool learning session or field trip, or reach out if you are not sure where to start. Happy learning!

FEATURE

Bringing Polar Byrd I to Mount Washington

BY **JACKIE BELLEFONTAINE**

In 1968, my grandfather joined the Polar Byrd I "Dustin Transpolar Flight", which was the first commercial flight to carry civilians across both poles and touch down on all continents in just 26 days. This round-the-world flight was a tribute to renowned polar explorer and pioneer of aerial exploration, Admiral Richard E. Byrd. Admiral Byrd led several historic expeditions to Antarctica from 1928 to 1956, including establishing the first United States Antarctic base on the Ross Ice Shelf (Little America I) during his second mission in 1928, the first flight over the South Pole in 1929, mapping uncharted territories such as Marie Byrd land, and is also credited for laying the groundwork for international scientific cooperation in Antarctica. The Polar Byrd I transpolar expedition, also known as the "Dustin Transpolar Flight" was proposed by Commander Frederick G. Dustin, who was a fuel engineer on the second Byrd expedition to Antarctica, a veteran of six polar expeditions and a local to Vermont.

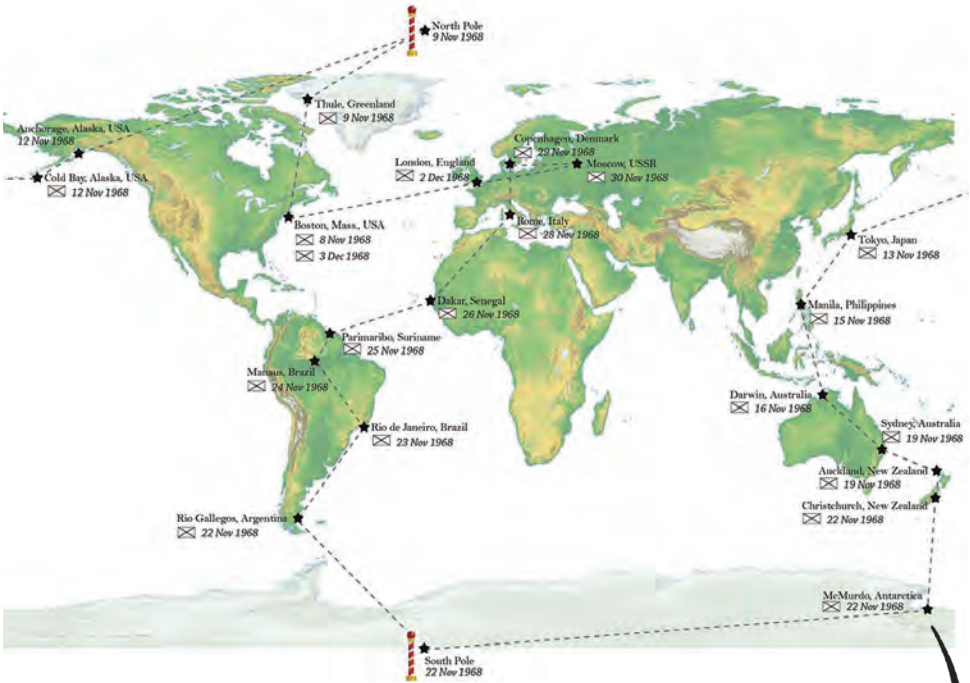
The purpose of this historic and ambitious civilian voyage was not only to memorialize Admiral Byrd's extensive legacy but sought to raise funds to establish the Admiral Richard E. Byrd Polar Center in Boston, MA (now since dissolved). Boston was chosen as the location for this center since Byrd raised his family there and spent his final years in a brownstone on Brimmer Street. With personal ties to the city, he received a hero's welcome and ceremony, with banners and cannons, upon his return to Boston after his second Antarctic expedition in 1935. At the time when Frederick G. Dustin first became to dream up Polar Byrd I in the late 1950s, my grandfather, Edgar Bellefontaine, was the Chief Librarian at Suffolk County Courthouse's Social Law Library (Boston) and was a lover of history, and friend and former UMaine classmate of Frank Reed, who was assisting Dustin with planning the voyage. With his connections, my grandfather joined Commander Dustin, Reed, and a small planning board to organize the ambitious transpolar flight. One of these planning members was Edward C. Bursk (editor of H*arvard Business Review* and professor emeritus of marketing at Harvard, and friend of Edgar's), who wrote and delivered a recruitment letter that targeted individuals with interest and means to embark on this journey, and join the founding board of the Byrd Polar Center. In the letter, he detailed how the reader will join a select group of

60 participants, and 10 crew members, that will enter history by "taking part in a mission of great significance for the United States and the entire world. A mission, incidentally, which has never been attempted by man," and that they "will personally have the chance to help enrich mankind's fund of knowledge about two of the last earthly frontiers, the polar regions". The Dustin Transpolar Flight recruitment letter would later be studied in university business courses as a successful example of direct marketing.

Bursk's letter successfully captured the interest of 60 entrepreneurs and titans of industry, all of whom paid the ticket price of $10,000 to join the historical flight. The highly priced ticket covered all travel expenses, accommodations, food and drink, excursions and gear. The remainder went into escrow to establish the Byrd Polar Center in Boston. Some names you might recognize from the passenger list included James Walgreen (Walgreens Pharmacy), and J.A. Germain Bombardier. Another notable member of the crew was Helen "Buttons" Dustin, wife of Commander Dustin. A photo from the journey shows Buttons exiting the Polar Byrd I with a note on the back describing her as the first woman passenger to circumnavigate the globe and touch down on all continents.

On November 8th, 1968, with the passenger list and exciting itinerary set, my grandfather joined fellow adventurers and flight crew members at Boston Logan Airport to board the Dustin Transpolar Flight. The plane that would ferry the group around the globe and become the first commercial jet to circumnavigate the world and land on all seven continents was a Convair 990A (Polar Byrd I) chartered by Modern Air Transport and piloted by former Airforce One pilot, Harold Neff. At 10:00 AM, "the powerful engines roar(ed) their speed to the northerly skies of Thule (Greenland)" and the historic flight was off. The 26-day itinerary was packed with receptions, cultural immersion, and meetings with foreign dignitaries as the Polar Byrd I crossed the globe. While in Japan, my grandfather and fellow passengers had the opportunity to meet with Emperor Hirohito, then in Rome to join a private audience with Pope Paul VI at the Vatican. As impressive as these meetings were, the standout leg of his itinerary was the Dustin Transpolar Flight's arrival at McMurdo Station, Antarctica.

The landing of Polar Byrd I at McMurdo Station made history by becoming the first commercial jet carrying paying passengers to land on the icy 10,000 ft runway. Once landed, my grandfather, his colleagues and flight crew donned their bright red ReFrigiWear suit customized to include a "Byrd Polar Center" patch on the chest and exited the aircraft to experience Earth's icy, last frontier. During their time on the ice, the group was given tours of McMurdo Station, Scott's Discovery Hut and Scott Base before settling in for a lecture delivered by an NSF representative. However, the highlight of their time in Antarctica was a brief ceremony held at the Richard E. Byrd memorial, which was then located next to the Chapel



Map of the Dustin Transpolar Flight's round-the-world path (above) and a picture taken of Polar Byrd I on the runaway at McMurdo, Antarctica (below).

Polar Byrd I (McMurdo, Antarctica) 1968

of the Snows. During the ceremony, Buttons placed a bouquet of roses at the base of the Byrd memorial bust. After a packed day, the Polar Byrd I refueled and took off from the polar continent to continue their journey around the world. After landing in other countries including Brazil, Senegal, Russia, Denmark and England, the Dustin Transpolar Flight finally returned home to Boston 26 days later. The stories from around the world, carried on the Polar Byrd I almost 60 years ago, are still a source of excitement among aviation enthusiasts, historians, and the families of the participants.

Edgar Bellefontaine with his polar suit and sporting his classic look, complete with thick rimmed glasses and a cigar in hand (1968, left). Jackie Bellefontaine, wearing the same suit on the summit of Mount Washington almost 60 years later (2025, right).

So, how does Mount Washington fit into the story of the Dustin Transpolar Flight? Growing up in Boston, I was surrounded by stories of Admiral Byrd, and my grandfather's trip around the world to commemorate Byrd's legacy. Out of all the grand audiences with foreign dignitaries, lavish dinners, and exploration of exotic locations, his experience in Antarctica captivated me the most. So much so that as a child, I vowed to be the next Bellefontaine to reach Antarctica. This personal motivation, combined with my interest in polar related sciences, has driven me throughout my career. It led me to the University of Maine to study Earth Sciences, to the Juneau Icefield Research Program, and to Mount Washington's winter internship in 2021. My grandfather passed in 2010, and much of his memorabilia from Polar Byrd I was distributed amongst family. The item that was referenced the

most by family was his red ReFrigiWear suit that donned the Byrd Polar Center patch. In early 2025, when my grandmother's, Greta Bellefontaine's, health began to decline at the age of 93,

I inquired about the whereabouts of the iconic red suit. Come to find out, my father had the suit packed up in our attic, which he retrieved and officially passed down to me. Upon seeing the suit, I immediately began to envision myself bringing it with me on some future journey to Antarctica. However, given my grandmother's health and no current plans to reach the remote icy continent, I decided that I would take it up with me to the summit of Mount Washington for her to see another Bellefontaine donned in red at another, icy and legendary location. With the help of my colleagues at MWOBS, I was able to bring the 60-year-old suit up to the summit via the Bombardier snowcat (as you may recall, Bombardier was a passenger on Polar Byrd I) on a blustery winter day. Once I reached the summit, I donned the suit and headed for the summit sign. MWOBS Weather Observer/Staff Meteorologist/Resident Photographer, Ryan Knapp, took a photo of myself that, with the absence of the summit sign, looked like I was standing at the South Pole. Though I still haven't accomplished my dream of reaching Antarctica, Mount Washington's winter is an excellent polar-like environment that keeps my passion for cold, dynamic places alive. I also say with pride that the Bellefontaine's adventurous spirit lives on, and that Mount Washington has been added to the Polar Byrd I, Dustin Transpolar Flight's legacy.

FEATURE

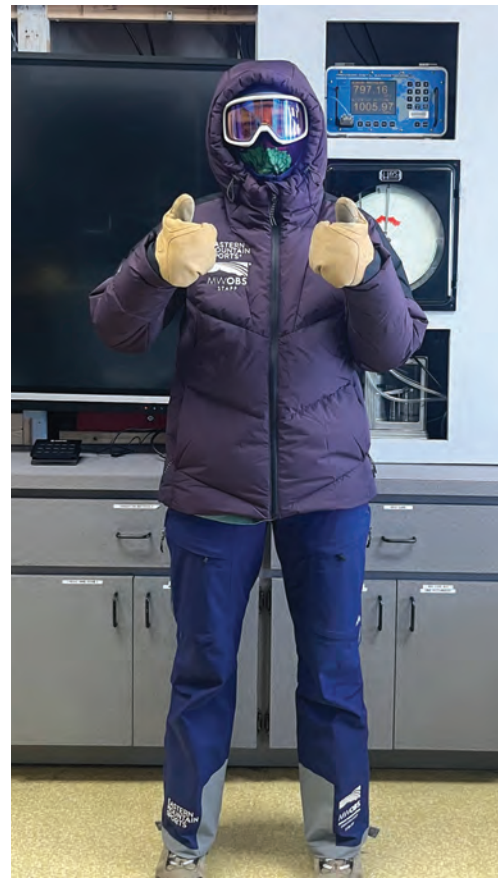
A Week in the Life of a Weather Observer

BY **ALEX BRANTON**

Wednesday

Today is shift change day, which means three of us plus our seasonal interns (and anyone else joining us for the day or week) are heading up to the summit for our week-long shift, and the staff currently on the summit are heading down. It is a morning of travel: Our team first meets at the base of the Mt. Washington Auto Road, where we have to be together and ready at 9 a.m., gathering and loading any needed supplies as well as duffle bags with personal items for the week (we also take turns picking up groceries for the week ahead, which are loaded into our mode of transportation).

At the time of writing this, it is late October, so transportation means meeting shoulder season conditions with chains on our van tires. Once we meet briefly and pack our vehicles, we head up, with a two-way radio contact with the summit and other partners to ensure safe passage. The trip typically takes about forty-five minutes to an hour, though it can take much less time in the summer and much more in the winter, depending on the conditions.



Getting ready to go outside in my Eastern Mountain Sports gear.

Once we arrive on the summit, we are greeted by the current shift and volunteers, who help bring everything inside. We also work together to pack up the vehicle(s) for the downbound shift, including any refuse and recycling from the week prior.

This is the one time of week where all of the summit staff is together, so it's a vital time to exchange insights from the week, discuss incoming weather systems to watch, and catch up on everything and anything. Our shift change meeting is led by our Summit Weather Operations Manager, Mike Carmon, and usually lasts an hour or two. Beyond that, I have other meetings including one with our Education team, and once the previous shift has departed, the rest of the day is spent getting ready for the week ahead.

Thursday

For me, Thursdays are the most difficult because this is the first full day of an eight day shift on the summit after six days off. My day began at 5:45am to get ready for my 6:30am day shift. First on my agenda was a briefing from our night observer, and getting ready for the Appalachian Mountain Club (AMC) radio call at 7 a.m. This radio broadcast goes out to backcountry huts throughout the White Mountains, where we provide them with current conditions and the forecast for the next 48 hours. Next, I prepared for the daily radio call with Mount Washington Valley's WMWV. Similar to the AMC hut call, we present the current summit conditions and the 48-hour forecast for WMWV's listeners at 7:45am (we also do forecasts with NHPR and Radio Vermont).

Next up for this Thursday morning, I had the incredible opportunity to appear on Fox Weather at 9:15am. I was nervous before going on air since this was my first time being on live television, but I quickly became comfortable having a conversation about Mount Washington with meteorologist Amy Freeze. Soon after at 10 a.m., I had a communications meeting with Charlie Buterbaugh and Ellen Estabrook to talk about social media strategies and other media opportunities.

Once the morning finally calmed down, I finally had time to eat breakfast and walk around the building for daily checks. During this walk, I noticed the water filters for the Observatory's main water supply were dirty. Noticing this, Jay Broccolo, Director of Weather Operations, and I replaced the dirty filters with new ones. Shortly after completing this task, temperatures outside rose to above freezing. This meant it was time to put the R.M. Young wind instrument back up. When temperatures are below freezing, we take this instrument down to protect it against icing. Putting the instrument back up involves running the wire through the post on the top of the tower, screwing the instrument until its tight, and rewiring it back into the data logger. It may seem like an easy, straightforward process, but it can be challenging if winds are blowing strong. Luckily, it was an easy task today.

By this time, it was 11:45 a.m. and it was my turn to take weather observations. From this time until 6 p.m., I must go outside every hour to record various meteorological variables and input them into our database. Also during this block of time, it is my turn to write the Higher Summits Forecast. After the forecast is uploaded on our website and my final observation is completed, it is time to eat dinner with the summit staff and our volunteers for the week. Tonight, its chicken fajitas and mac & cheese. To wrap up the day, the other observers and I played Super Mario Bros. on our Nintendo Switch and hung

out with Nimbus in the living quarters. Finally, I talk on the phone with family right before going to sleep around 8:30 p.m.

Friday

Once again, my day started at 5:45 a.m. so that I could prepare for my 6:30 a.m. shift. (This wake-up is made easier by our partner Righteous Vices Coffee Roasters—thanks for the joe!) I was on morning observations today, meaning for the first six hours of the day I went outside every hour to record the weather. Periodically throughout the morning, I shoveled snow and deiced various instruments, objects, and structures outside. Also in the morning, it was my turn to do daily chart checks. This consists of checking every form and digital database from the day prior to make sure that everything is correct and consistent. This usually takes a couple of hours and, combined with observations and deicing, takes up the whole morning.

At 12 p.m., observation duties transition to my co-observer, and at 1:45 p.m., it's time to switch the precipitation can. The precipitation can sits in the middle of the summit for six hours at a time and collects precipitation. Switching the precipitation can requires carrying an empty one across the summit, removing the active can from its stand, replacing the active can with the empty can, and carrying the can with 6 hours' worth of precipitation back to the weather room to be measured. This may not seem difficult; however, when winds are high, the ground is icy, and visibility is low (as it is most of the time in the winter), it can be difficult to walk across the summit. You are also carrying data that you cannot get back if you spill it onto the ground. Taking this into consideration, I consider swapping the precipitation can a difficult task. Luckily today, winds were only about 40 mph and visibility was 1/16 of a mile, so it was not particularly difficult.

After measuring the precipitation, I settle in at my desk to get some computer tasks done. Today, I reviewed candidates for an upcoming winter internship. I had 15 resumes and applicant questionnaires to sift through and this took a few hours to complete. Next on the agenda was Facebook Live. On Fridays, we present the weekend's Higher Summits Forecast on Facebook Live in an effort to inform those planning a weekend trip to the White Mountains of expected weather conditions on the higher terrain. After I wrap up Facebook Live, its 6 p.m. and time for dinner. Tonight, its BLT's and leftover mac & cheese. To end the day, fall summit intern Amy and I sat down to plan a backpacking trip for our upcoming off week. Unfortunately, the weather does not look great for backpacking in the White Mountains next week, but hopefully things change and we can get outside. After some snuggles with Nimbus, it's time for bed.

Saturday

Saturdays are the usually the least busy days on the summit. I started my morning at 4:45 a.m. so that I could get a run in on the treadmill. At 6:30 a.m., it was time for the start of my workday by getting ready for the WMWV radio show. I spent the rest of the morning developing education programs, and at 11:45, it was my turn to take over on outdoor observations. Rain, wet fog, and melting

snow made for a soggy day. Conditions like this ensure that you are soaking wet every time you go outdoors and only partially dry off when spending time indoors between observations.

Presenting a Facebook Live Weekend Higher Summits Forecast.

In the time that I spent in the weather room between observations, we had college football playing on the big TV monitor. Since Saturday marks the middle of the summit shift, we try to have a chill day by watching sports or a movie as we work. Summit intern Amy was on schedule for creating the Higher Summit's Forecast today. She is at the point where she is comfortable forecasting on her own, but I spent some time finalizing it with her. After the forecast is posted and the last observation is submitted, we join or volunteers for a chili dinner. We continued to watch football and play with Nimbus, who was particularly energetic tonight, until it was time for bed.

Sunday

Today, I woke up to below freezing temperatures, snow, and slightly elevated winds (~40 mph). It was my turn to do morning observations, which meant I had to go outside in these conditions less than an hour after waking up. Climbing to the top of the tower and deicing this early in the morning is always a bit difficult. Deicing involves standing on the top of the tower and hitting the posts that the instruments are mounted on with a rubber mallet until the ice falls off. Typically, this is done every hour with the hourly observations but sometimes has to be done as frequently as every 15 minutes.

Shortly after the first observation was submitted, our instrument that reports wind direction, a sonic anemometer, became disconnected. This caused a domino effect, which resulted in the malfunction of many of our digital tools. My co-observer and I spent almost an hour deicing the sonic anemometer so that it could be dismounted. Deicing took so long because the screws holding it in place were iced over and were difficult to remove. It took another couple of hours to fix the instrument. In the meantime, I was on the phone with our Director of Technology, Keith Garrett, so that he could help guide us to get everything back in working order. To make things worse, Keith lost phone service during our call and we were on our own during one of the most important observations of the day, the 7 a.m. synoptic observation.

During these few hours, I was unable to input any data into our database; I had to manually code our observations into METAR form, use a compass to determine wind direction, and use paper forms to keep track of my observations. Luckily, by 11 a.m., after several hours spent outside working on the instrument and making phone calls to Keith, we were able to get everything back up and running. Thank you Keith! By this time, the morning was over and observation duties were handed over. Sunday afternoon football was turned on in the weather room and we resumed operations as normal.

Unfortunately, dedicating the whole morning to fixing an instrument meant we had to make up unfinished work in the afternoon. For me, that meant completing the daily chart check and the transportation weather forecast. The transportation weather forecast is done every Sunday and is the forecast for road conditions on the Mt. Washington Auto Road. This is only sent to our Transportation Coordinator and snow tractor operators, Jon Powers, Craig Hill, and Jurij Czernow. This forecast helps them to plan transportation on the road and make decisions about the usage of chains and when and where we should use the snow tractor. At 4:45 p.m., all summit tasks were complete and we had 1 hour until the next and last observation of the day. With some free time, we took advantage of the opportunity to play in the newly fallen snow! After playing in the snow and submitting the last observation, it was time for dinner and to watch more football. Tonight, we had spaghetti and warm chocolate chip cookies.

Monday

Today, I woke up early after receiving a text message from our night observer, who said she was having trouble with a wind instrument. I woke up at 4:30 a.m. and threw on my snow pants and coat over my pajamas and was ready to help! The instrument took my shift partner Charlie a few hours to fix while I helped our night observer with submitting observations and fixing/verifying data. By the time everything was back in working order, I had just enough time for a treadmill workout before my 6:30 a.m. shift. I started my normal shift with the WMWV radio call and then began daily chart check. At 10 a.m., it was time for my first virtual program of the day. Today, I presented the Extreme Weather Observations program to all 3rd grade classes in Concord, New Hampshire. These programs are my favorite because I get to interact with kids who are so intrigued by Mount Washington and the work of meteorologists at MWOBS. They usually ask funny questions, like, "has anyone ever fallen off the mountain?" This was the first of two programs for the day and it lasted until 11 a.m. When the program concluded, I began creating the grocery list for the next shift. Because we live on the mountain for eight days at a time, we eat on the mountain for those eight days. As I shared before, this requires grocery shopping and it is done by a weather observer on their upbound shift change day. Since my shift is currently on the mountain, it is our job to send an upbound observer a grocery list.

In between programs, it was also my turn to take over weather observations at 12:45. After sending the grocery list

and taking my first weather observation of the day, it is almost time for my next program, which was scheduled for 1:30-2:30 p.m.. This was the same program I had given earlier to the same grade level. At the end of the day, I had shared the extreme weather of the mountain and what it takes to live and work on Mount Washington with 14 3rd grade classrooms! As I was wrapping up the program, we finally started to clear from the fog! We ran outside to take photos of the newly fallen snow and the blue sky. We also took the opportunity to play in the snow. After about an hour, everyone returned inside while I took a weather observation. After, I continued to work on daily chart check in between observations until dinner. Tonight, we had grilled cheese. Unfortunately, I had not finished all tasks for the day so I continued working after dinner until 9 p.m. During this time, I completed daily chart check and helped remount the R.M. Young anemometer. This was not an easy task and we had to troubleshoot errors before it was back in working order. After a fifteen-hour day, it was finally time for bed.

Tuesday

Tuesday is the last full day of the shift and everyone is looking forward to going home. Today, I started on morning observations. Shortly after beginning the day shift, we did an alignment check with the anemometers due to the issues we were having with them throughout the week. After re-aligning the instruments, we were confident that they would be in working order for the next shift when they arrived on Wednesday. Next on the agenda was 10 a.m. resource meeting. This is the only time where summit staff and all departments of the valley staff have the opportunity to share what they are working on and what they experienced over the past week.

During the meeting, Director of Weather Operations and Director of Technology, Jay and Keith, arrived on the summit to work on various things. Several things needed their attention today and they worked on the summit until 4:30 p.m. Charlie helped Jay and Keith while I took on a full day of observations and completed daily chart check. In between tasks, we all contributed to cleaning the office and the living quarters. After the last observation was submitted and Amy submitted her forecast, it was time for our last dinner of the week on the summit. Tonight, we had breakfast for dinner, which we ate quickly so that we could pack our bags and finish cleaning. Reflecting back on the entire week, it was certainly an exhausting one and I am looking forward to a restful week off. Nevertheless, I really enjoy working on the summit and I will be ready to return next Wednesday.

If you're interested in learning more about life as a Weather Observer, check out my blog post "100 FAQS About Being a Weather Observer on Mount Washington."

https://mountwashington.org/100-faqs-about-being-a-weather-observer-on-mount-washington/

FEATURE

The Big Wind - April 12, 1934

A POEM BY **BILL OFSIANY,** MWOBS SUPPORTER

The conditions, times, wind speeds and directions described come from the journals of the observers.

The wind blew hard from the Southeast,
That day in '34,
When the Rockpile went in the record books,
And the wind on the summit did roar.

It started strong in the morning,
But icing slowed the spin,
Of the instrument they called Number Two,
That was heated from within.

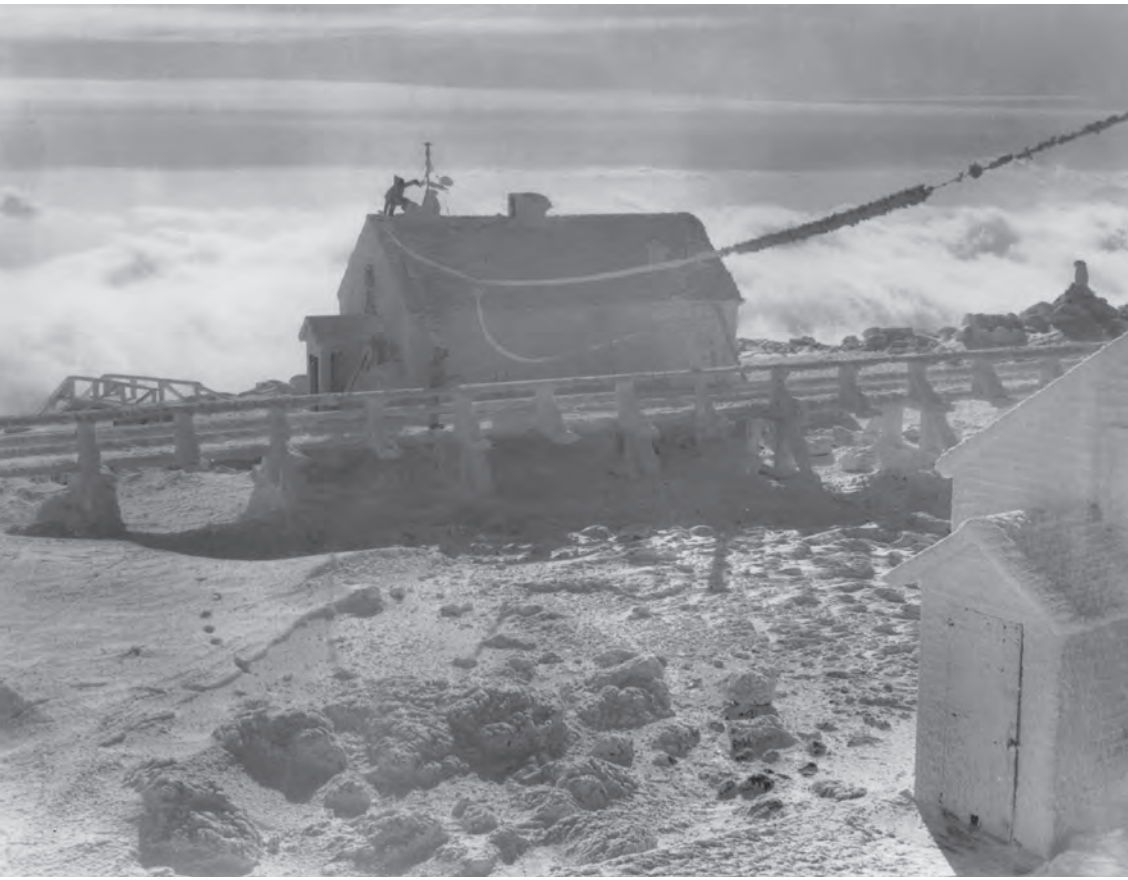
Glaze ice was collecting on instruments,
Just as it does today,
And a club was used to clear the ice,
'Til a gust blew the tool away.

By noon the wind hit 220,
Then gusted to two twenty-five.
The events of the day were historic,
But would building and crew survive?

The building was chained to the mountain,
As the wind tried to blow it away,
But the crew was too busy recording,
The gusts that were blowing their way.

A record was set that afternoon,
On a day that saw no sun,
The wind had reached an incredible speed,
That topped out at 231.

The record held for 62 years,
And is still called "The Big Wind Day,"
When the weather observers made history,
That we still celebrate today.



A weather observer climbs to the anemometer on the original Mount Washington Observatory building, located in the Stage Office of the Mount Washington Summit Road Company. Photo by Winston Pote

Editor's Note: Bill has volunteered for the Observatory for almost twenty years, spending time both on the summit and at the North Conway offices, particularly in the gardens. You can find more of his writings on our website at mountwashington.org/journal.

Time, Place, and Memory: Robert C. Penza on Mount Washington

BY **RANDALL ARMOR,**
MOUNT WASHINGTON COG RAILWAY

I'm not originally from around here, and neither was Robert C. Penza. We never met, but his daughter, Sharon, is married to an old friend of mine, Albert. A very long time ago, Albert and I worked together in Philadelphia, my hometown. After Philly, Albert went east, betting his future on Atlantic City's nascent casino industry. My own wager drew me north, where I spent decades playing against house odds in Boston's creative and academic communities. When that gig was finally up, one more roll of the dice rewarded me with a home up here in northern New Hampshire, and serendipitously, with a job at the Cog Railway. I suppose that makes all the characters in this story "flatlanders"– more about that shortly.

Albert and I had long since fallen out of touch, and that's where things stood for nearly half a century. But on a recent September afternoon, thanks to an out-of-the-blue Facebook message from him, I accompanied Sharon and her friend Martha to the summit of Mount Washington via the Cog. She carried with her a manilla envelope containing some of her late father's most cherished mementos– his discharge document from the Army and a handful of black and white snapshots taken during his time living and working on Mount Washington. Sharon ventured north to see the place that had been so important to him.

Bob Penza was born and raised in Hammonton, New Jersey. He entered the US Army in 1952, and was selected

to attend the Signal School at nearby Fort Monmouth. High marks on the entry test and subsequent training earned him an assignment to the Army Signal Corps facility at the summit of Mount Washington as a weather observer. Apparently, life at 6288' left quite an impression on a kid from the Jersey boondocks. According to Sharon, for the rest of his life you couldn't be in a room with Mr. Penza for more than 5 minutes without being regaled with tales of pleasure and peril at the top of New England– the memories always came back effortlessly and were retold with passion. She believes that the time her father spent at the summit was the high point of his life.

The high point of Sharon's visit was a tour of the weather station, graciously arranged by MWOBS educator (and part-time Cog Railway brakeman) Jackie Bellefontaine. Peter Crane, the Observatory's curator, scanned Bob's photos and documents into their research collection, and mentioned that the image included here is one of the few he has ever seen showing even a portion of the Signal Corps building.

Now, back to us flatlanders. There's a bumper sticker you see up here every now and then, and I don't mean the ubiquitous one. It's the one that reads "*Welcome to New Hampshire. Now go home*". I get it. Even the most patient among us do occasionally get frustrated by the seasonal influx of out-of-towners to our neck of the woods. But it's important to remember that travel is a therapeutic and attitude-expanding experience for most people. Sharon says that finally coming up here made the memory of her father come alive.

Indeed, Mount Washington is a destination high on many travelers' "bucket lists". Here at the Railway, I can't tell you how many "once in a lifetime" stories we hear from our visitors– it's why we try to do our best to live up to their expectations, regardless of where they live or where they were born. Because for some, like Robert Penza, those once-in-a-lifetime memories are held in such reverence that they stand at the pinnacle of a long, fruitful life.

From Songbirds to Snowbanks: Spring Adventures on the Mt. Washington Auto Road

Spring on Mount Washington is a spectacular season of discovery, and there's no better way to experience it than with two exclusive guided tour offerings that appeal to both nature lovers and adventure seekers. For a rare glimpse into the world of one of North America's most elusive birds, the **Bicknell's Thrush Tour** offers an unforgettable early-morning journey into the high-elevation nesting grounds of this secretive species. And for those drawn to raw mountain landscapes and dramatic seasonal transitions, the **Spring Adventure Tour** provides an insider's view of the Auto Road as crews clear towering snow banks to prepare for summer travel.

The elusive Bicknell Thrush. Photo by Maurice-DeMille.

The Bicknell's Thrush Tour is a unique opportunity to pursue one of the most sought-after bird sightings in the Northeast. Bicknell's Thrush is not only rare but also highly restricted in its breeding range, preferring the cool, moist, low vegetation above 3,000 feet where few humans venture. Tours depart at dawn from the base of the Auto Road, ensuring minimal disturbance and enhancing your chances of hearing and seeing this shy songbird in its natural habitat. With small group sizes and knowledgeable guides, this two-hour experience brings you into the heart of the thrush's rugged world, offering moments of quiet wonder that birders and nature enthusiasts will cherish.

Just as captivating in its own way, the Spring Adventure Tour invites adventurers of all ages to witness a different kind of mountain magic: the dramatic spring clearing of the Mt. Washington Auto Road. As winter loosens its grip, snowplows, snowcats, and specialized equipment carve a path through walls of snow that in some years reach 25 feet high. You'll travel up the mountain in a four-wheel-drive van with chains, rising above the tree line to around 4,800 feet,

with plenty of opportunities to pause, snap photos, and soak in the alpine environment.

Together, these tours showcase the dynamic beauty of Mount Washington in spring — from delicate wildlife encounters to awe-inspiring spring clearing scenery. Whether you're a birdwatcher, a photographer, or simply someone who loves the thrill of discovery, these seasonal experiences are perfect ways to celebrate the turning of the seasons on Mount Washington.

Learn more & reserve your seat:

mt-washington.com/guided-tours/bicknells-thrush

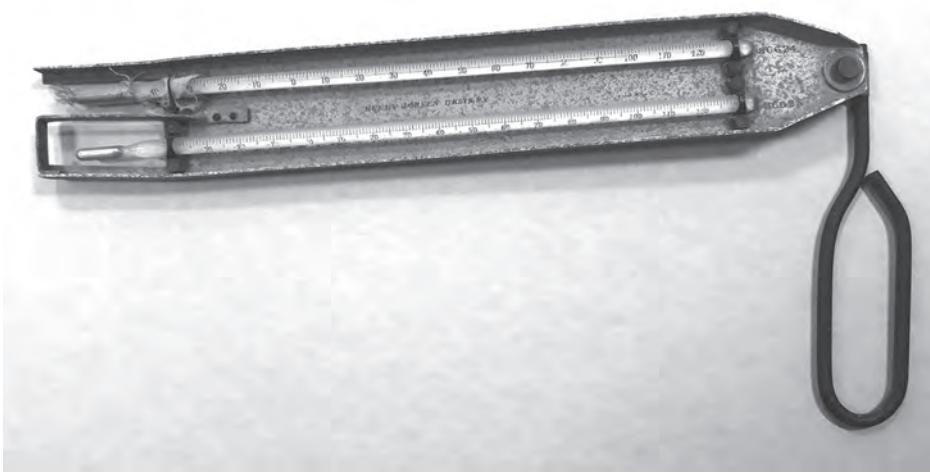
mt-washington.com/guided-tours/spring-adventure/

Cragway Drift in 1969 with Road Crew member Bob Arsenault.

Cragway Drift in 2019 with Auto Road GM Tobey Reichert.

The Sling Psychrometer

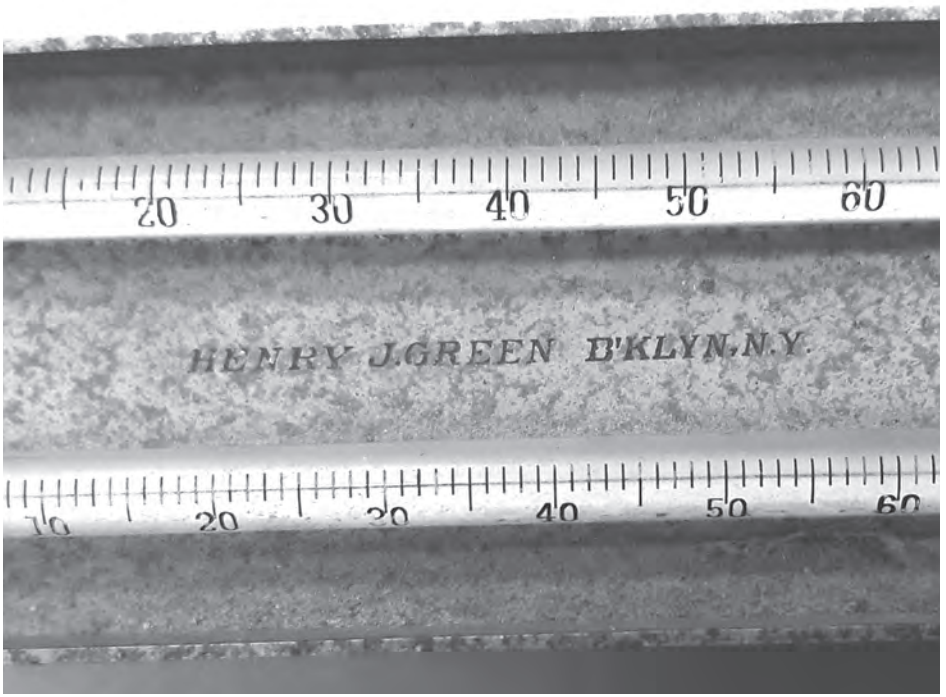
BY **PETER CRANE**



The sling psychrometer pictured here once belonged to Joe Dodge. It was given to the Observatory collection by Briggs Bunker and his family.

Joe Dodge (Joseph Brooks Dodge), was a founder of the Mount Washington Observatory. He also served as Huts Manager for the Appalachian Mountain Club, based in Pinkham Notch, at the eastern base of Mount Washington. Weather was one of his many interests, and he became deeply involved in weather observation after the New Hampshire floods of November 1927. Dartmouth Professor James W. Goldthwait, also a New Hampshire highway geologist, wished to learn more about weather, particularly precipitation, in the White Mountains, and worked with Joe to receive weather observations from the AMC's backcountry huts. Dodge himself kept track of the weather in Pinkham Notch, and presumably used this sling psychrometer in the process.

A sling psychrometer is a weather instrument used to determine temperature, dewpoint temperature, and relative humidity. The psychrometer consists of a simple frame and two thermometers, one of which has a cloth wick attached to its bulb; the wick is moistened prior to an observation, and the device is swung



about gently to hasten evaporative cooling from the wick-covered bulb. By observing the dry bulb temperature and the wet bulb temperature, the dewpoint temperature and relative humidity can be calculated with a table, a special circular slide rule, or nowadays via a computer program. A similar instrument has been used by the summit weather observers since the Observatory's founding in 1932.

This particular sling psychrometer, with an aluminum frame and steel handle, was manufactured by Henry J. Green of Brooklyn, New York. Green's uncle, James Green, started a scientific instrument company in 1832, specializing in barometers, but gradually expanding his product offerings. Henry joined his uncle's company as an apprentice in 1864, and became a partner in 1879. When James retired in 1885, Henry changed the name of the company. This barometer is similar to a "Bureau of Mines Sling Psychrometer" which appears in a circa 1910-1915 Green catalog. It lacks the aluminum case which accompanied some models of the psychrometer.

As noted above, the instrument was donated to the Observatory by Briggs Bunker. After Joe Dodge retired from the AMC in 1959, he served as the cooperative weather observer in Conway until his death in 1973, and Briggs picked up the baton from Joe shortly thereafter. He continued to serve in that capacity into 2006.

Our Volunteer Community in Action

BY **WENDY ALMEIDA**

The Observatory's Fall Volunteer Gathering is a meaningful event each year to reflect on the impact of our volunteer community. On November 13, 2025, we gathered to pause, connect, and thank the many volunteers who support our work throughout the year in ways that often happen behind the scenes.

Volunteers packing Almanacs to be mailed at our North Conway office.

One of those behind-the-scenes efforts happens every month in our North Conway office, where a dedicated group of longtime volunteers gathers to help with membership mailings. While many volunteers support this work throughout the year, a smaller group stepped in just before the holidays to help with our largest mailings of the year.

In November and December, these volunteers helped mail nearly 2,000 membership renewal notices. Offering both mail and online options helps us meet members where they are, and this work plays an important role in keeping our membership community connected to the Observatory's mission.

A special thank you to our monthly mailing volunteers who helped with our year-end mailings: *Ray Cooper, Linda Denis, Linda Dresch, Hank Dresch, Donna Dunn, Peter Fisk, Karen Franke, Kim Henry, Marie Kapsar, and Karen MacDonald and Gary MacDonald.*

We're also grateful to our card-writing volunteers who helped kick off the new year by handwriting notes to supporters in January. These personal messages mean a great deal to the Observatory community. Thank you to *Marty Basch, Marietta Deegan, Maureen Jenks, Erica Fuller, Marilyn Kasper, Jay Katzanek, Andy Keegan, Rebecca Pillsbury, Nancy Protzmann, Bruce Shepley, Elizabeth Seabury, and Erica Valez.*

White Mountains Almanac Launch and Mailing

November also marked the launch of our first-ever *White Mountains Almanac*. Volunteers stepped in to help manage the enthusiastic response to requests for print copies, mailing more than 1,000 Almanacs. Their help was especially important in getting the first wave of orders out the door.

A special thank you to *Linda Denis, Kim Henry, and Jonathan Keys* for jumping in during this busy moment.

Nimbus Sock Packing at Minus33

MWOBS volunteers also spent a day at the Minus33 mill headquarters in Ashland, New Hampshire, helping package hundreds of Nimbus socks generously donated by Minus33 for our 2025 year-end donors. It was another example of volunteers jumping in wherever help was needed to support the Observatory's work.

Volunteers working at the Minus33 headquarters in Ashland to mail Nimbus socks to our donors.

Thank you to *Donna Dunn, Paul Goundrey, Jay Katzanek, and Michelle Sauque.*

Winter Summit Volunteers Step Up

Since January, the Observatory's winter trips calendar has been especially busy. Summit volunteers have stepped up to support staff through a cold, snowy winter, often adjusting plans and taking on extra hospitality duties as trips are rescheduled due to weather conditions. Their flexibility and commitment make a real difference during a demanding season on the summit. Thank you to the many summit volunteers who do this work every winter!

Summer 2026 Volunteer Applications

We are still accepting applications for 2026 summer summit volunteers. The deadline to apply for a summer summit hospitality volunteer position is Tuesday, March 31, 2026. There are also many other ways to volunteer and support the Observatory's work throughout the year. Visit *mountwashington.org/about-us/volunteer* to learn more.

For a full list of our 2025 volunteers, look for our upcoming Annual Report at mountwashington.org/annual-report.

Fueling Weather Research on Mount Washington: Righteous Vices Coffee Roasters

BY **MWOBS STAFF**

Righteous Vices Coffee Roasters, a local coffee roaster and shop located in Center Conway, New Hampshire, has been a partner of the Observatory since 2024. As the "Official Coffee of Mount Washington Observatory," their roasts are regularly sent to the summit of Mount Washington and are much appreciated by staff working around the clock. We recently spoke with Righteous Vices' co-owner Adam Belanger about their backstory, their love of coffee, and their support for local causes.

What inspired you to start roasting coffee, and how did this company come to be?

Orion Kugel (co-owner) and I worked together at a coffee roasting company for years where we not only learned the business but found our passion for quality coffee and roasting. When we were presented with an opportunity to buy the business and rebrand, we jumped at the chance. With that, Righteous Vices was born.

How do you engage with the local community, and why is being a local business important to you?

As a small local business, the support of our community is the only reason we are still around. We try and give back whenever and however we can. Typically, that means providing delicious organic coffee to different events and organizations such as MWOBS. It makes us very proud to drop off bags of freshly roasted coffee knowing it's making its way up to the top of Mount Washington. When someone comes to us and asks us to donate some freshly brewed coffee for an event, we are sure to make it happen.

We also recently got a chance to work with the marketing students at Kennett High School in 2024. They created custom labels and a Halloween themed dark roast. We then set up a booth at the annual Night in the Forest Tattoos' Halloween event, where the students sold bags of their coffee along with special coffee drinks. It was a really fun way to get students involved and excited about local business.

Can you tell us about your partnership with MWOBS?

When we got asked to partner with MWOBS, it was one of the easiest

Orion Kugel (left) and Adam Belanger (right).

decisions we ever made! We take pride in the fact that our coffee is keeping the summit staff warm and energized. They drink our House of Fire Dark Roast, a blend of organic Peruvian and Sumatra beans. We also provide single serving coffee packs for *Seek the Peak* every summer!

Is there a roast or product you're especially proud of, and what's the story behind it?

Our roasting philosophy is based on the simple pleasure of a great cup of

The dream of providing excellent coffee to our community while also giving back has become a reality.

coffee. We get the best organic beans we can, full of delicious flavor notes such as milk chocolate and citrus. We are sure not to over roast the beans, which allows those flavor notes to shine through in every cup of Righteous Coffee.

We are extremely proud of our current roast lineup. We started with a lot more, and over the years we have narrowed it down. We currently offer organic "House of Fire" Dark Roast (a homage to our band), "Mind Reader" Medium Roast (a fan favorite) and a 50/50 blend of the two called "Fire and Vice."

One of our specialty roasts, the Shack Blend, is only available at the Sunrise Shack. They have been our biggest supporters since day one. It means the world to us every single time someone tells us they love our coffee. It's what keeps us going— that and the caffeine of course.

Can you tell us about your team; your founders and their backgrounds?

Orion Kugel, Andrew Phillips, and myself started Righteous Vices Coffee Roasters in March 2022. The business plan was clear; combine our passion for simple things done right and apply it to our love of roasting coffee. All three of us are lifelong residents of Mountain Washington Valley and graduates of Kennett High School—We are also founding members of local band *Way of the Headband*.

Righteous Vices Coffee Roasters formed from the ashes of Good Vibes Coffee Roasters. Orion and I worked for Good Vibes for years. Since opening, its coffee has been made available in over twenty local retail stores, six Hannaford locations and five local restaurants. The dream of providing excellent coffee to our community while also giving back has become a reality.

What's next for your company— any upcoming projects, goals, or experiments you're excited about?

2026 is going to be our biggest year ever. We have lots of stuff planned for this year, including the return of our beloved canned cold brew. Follow us on Instagram and stay tuned… we have lots in store!

Learn more about Righteous Vices at ***www.righteousvices.com***.

25 Years of Membership, a Lifetime of Connection

BY **WENDY ALMEIDA**

Robert (Bob) Watts' connection to Mount Washington Observatory stretches back decades before he became a member 25 years ago. Long before his name appeared on a membership list, he was building trails, crossing rivers, and learning firsthand what it means to work and live in the White Mountains.

In the early 1950s, Bob spent four summers on the Appalachian Mountain Club (AMC) trail croo (crew). "That's how I got to know the White Mountains and the Observatory," he recalls. As part of the croo, Bob helped maintain and build trails during an era when the work was especially hard in remote locations. In 1953, he served as the principal assistant on a six-week project to build a 36-foot suspension bridge over the Peabody River. The croo lived on the riverbank during construction. "I knew Joe Dodge reasonably well as a junior employee of the AMC, and we had a great relationship with Pinkham Notch in terms of tools and donkeys and everything else."

Those early experiences left a lasting impression. Bob studied geology at Cornell University and spent 30 years in the U.S. Navy as an aviator, but his connection to Mount Washington never faded. When he became a member of the Observatory, it was driven by deep respect for the work being done on the summit.

"I've been impressed with the data collection activities that have gone on over that entire period of time," Bob explains. "That's what gives you confidence in the conclusions you draw from such an enormous cache of weather data. And that is hard to duplicate."

Over the years, Bob has watched the Observatory evolve, from touring the summit to learn about its instrumentation to seeing improvements in everything from anemometers to how transportation machinery has changed. Yet what stands out most to him is the continuity, the careful, persistent work of collecting data on the mountain.

He also reflects on the broader impact of the Observatory's work. "The accuracy of weather forecasting today is so much greater than it was 50 or 100 years ago," he notes, crediting long-term datasets like the Observatory's for helping advance forecasting and safety in the mountains and beyond.

Bob recently received a copy of the White Mountains Almanac. "I reviewed

it in quite some depth, and I was impressed all the way through."

From trail crew member to aviator to longtime Observatory supporter, Bob's story reflects a lifetime shaped by weather, mountains, and careful observation. His 25 years of membership help ensure that the work he values — rigorous data collection and research — continues for generations to come.

Thank you, Bob, and to all our members for their support that makes this work possible, ensuring the continuity and integrity of the data that informs weather research and forecasting.

Bob at age 17 during his first year on the AMC Trail Crew, then headquartered in Whitefield: "The photo was taken in a small stream that sheds the area between Vose Spur and the east side of Mt. Carrigain. This spot was next to Desolation Shelter, a great shelter but removed many years ago when the Pemigewasett Wilderness was declared a 'Wilderness Area,' and no man-made structures are permitted in Wilderness Areas."

MEMBER MILESTONES 25 YEARS

Mark Asaro
William Batchelder
Cynthia A Bliss
James H. Bride III
William Bright
Patti L. Chappell
Donna Coco
William D. Craig
Robert and Deborah DeMarco
Joseph V. Egan
Larry E. Ely
Robert Foppiano
John F. Gorman III
Art Griswold
Michael Henry
Jessica Herchenroder
Richard Holt
Ellen Jacobs
Arthur V. Ketterer
George H. Kowallis
Wade Landgraf
Richard P. Leach
Peter C. Lugbauer
Scott A. Mackay
Jim Manhart
Carla McLaughen
Steve Medlyn
Jay C. Pingree
Joan Plodzik
George Preoteasa
Hannah Proctor
Randy R. Ramsthaler
Jeffrey Reed
Ed Rosenbaum
Bill Schneider
James A. Shekleton
Robert Solomon
Greg Spurr III
Kelly Stacy
Cynthia L. Terry
Jim and Kathy Thompson
Jennifer Wolven
Pam B. Wood

...Thank you!

Paul T. Fitzgerald

BY **ROB KIRSCH,** MWOBS TRUSTEE & IMMEDIATE PAST PRESIDENT

The Observatory and Mount Washington communities have lost a giant. Paul Thomas Fitzgerald passed away peacefully early on February 5, 2026.

Paul was born in Springfield, MA, on April 27, 1950, and moved to Laconia at the age of two. He attended St. John's School, Laconia High School and graduated from St. Michael's College. Paul was in the first graduating class of the Franklin Pierce Law Center, now UNH Law School.

Paul opened a law practice in Laconia with a classmate. He spent nearly fifty years serving the people of the Lakes Region and his hometown—steadfast, principled, and always ready with a wry smile that softened the hardest conversations.

Public service called him early. Paul served two terms as Mayor of Laconia. During his time as Mayor, he helped transform Laconia's famed Motorcycle Weekend into the full fledged Motorcycle Week that today draws riders from across the country. Paul loved the open road, and his glistening Harley was more than a motorcycle; it was a companion on countless rides with his wife Cheryl through the Lakes Region and beyond. Paul also served as Chairman of the Laconia Police Commission.

We celebrate Paul because of his humanity and decades of tireless support for the Observatory and Mount Washington.

Paul was a lifetime member of the Mount Washington Observatory and was elected to serve as a Trustee in 1985. He immediately stepped up to chair what was then known as the Operations Committee. Over the next four decades he was a constant part of the Observatory board's leadership. Paul served on the board's Executive Committee, was the President of the Observatory for eight years, led efforts to recruit Trustees as chair of the Governance Committee for many years and served as the Observatory's Secretary.

That summary, as full as it sounds, only begins to outline the depth to which Paul gave himself to this organization. He participated in and in multiple instances led efforts to recruit executive leaders for the Observatory. He readily gave of his time whenever a new or complex issue arose. When fire ravaged the State Park electric generators in 2003, Paul, then serving as President, was a constant, steadying presence,

community. Whether visitors reached the summit on a track, a road or a trail – he was there with a smile and a story. He respected and befriended the leadership and employees of the many public and private entities who make the summit of Mount Washington what it is, and he spoke glowingly of each whenever a summit visitor's question or comment gave him an opening to do so. Mount Washington and the Observatory, in particular, was infused into Paul's DNA, and he readily shared the joy it gave him with all he encountered.

offering guidance to keep the staff safe and to support them in maintaining our summit observations. For more than a decade Paul and Cheryl were present as ambassadors at the summit weather station, welcoming thousands of hiker-participants in the Observatory's annual Seek-the Peak fundraising celebration.

Paul's service to Mount Washington extended beyond the Observatory. The Governor appointed Paul to represent the public on the Mount Washington Commission. He served there for decades, including several years as Commission Chair. As a Commissioner, Paul never wavered from his dedication to making the summit a welcoming, memorable place for the millions of people who visited there during the years he served as a Commissioner.

Paul actively engaged with all who participated in the Mount Washington

Paul leaves behind his wife of 40 years, Cheryl Ann Fitzgerald; sons, Travis and Shawn Nichols and their spouses and children; his brothers, Edward and Michael Fitzgerald and their families; as well as grandchildren, nieces, and nephews who will carry his stories forward.

Paul's death leaves a void that long will be felt across the expanse of the Summit. In January 2026, the Board of Trustees, in a unanimous vote, honored Paul's service with the Observatory's Founders Award. A future announcement will provide the date when we will recognize Paul together.

In lieu of flowers, Paul's family invites donations in Paul's memory to the Mount Washington Observatory, P.O. Box 2310, North Conway, NH 03860.

UPCOMING EVENTS

Seek the Peak 2026

Join us on **July 18th, 2026 from 4 to 7 p.m.** for the 26th Annual Seek the Peak Après Hike Celebration! As always, we encourage participants to seek their peak anytime, anywhere this summer and come together in a culminating community gathering. This year, the celebration is at Wildcat Mountain, where participants will have the opportunity to take the Wildcat Express chairlift to the summit of Wildcat Mountain and enjoy sweeping views of the Presidentials (and Mount Washington) among many other awesome activities— Stay tuned!

Register today at seekthepeak.org and receive a **50% off Early Bird Registration** discount!

IN-KIND GIFTS

Jay Pingree
Mt. Washington Valley Vibe Magazine
Radio Vermont Group
Big Dave's Bagels
Tuckerman Brewing Company
Mountain Warehouse, Eastern Mountain Sports
Entabeni Systems/Black Mountain Ski Area
New Hampshire Public Radio
Peter Limmer & Sons
Home Depot
Marianne Jackson
Minus33
Cranmore Mountain Lodge
Jack Middleton

TRIBUTES & MEMORIAL GIFTS

Robert Heaver ..... In Honor of All The Staff of the Observatory!
Joanne E Burrill ..... In Memory of Alton E Burrill
Arthur O. Poltrack ..... In Memory of Anthony S. & Arlene O. Poltrack
Arthur V Ketterer ..... In Memory of Barbara
Annette Lawlor ..... In Memory of Bob Coleman
Cheryl Chartier ..... In Memory of Bruce Chartier
Peter Muellers ..... In Memory of Christopher Brown
Debra Bolmer Bean ..... In Memory of Clint Bean
Jeff Bean ..... In Memory of Clint Bean
Grant Gray, PC ..... In Memory of Conservation Officer Levi Frye
Dan Perry ..... In Honor of Dan Perry
Chris DeVries ..... In Memory of Diane DeVries
Patricia and Edward Kura ..... In Honor of Edward J Kura
Barrett King ..... In Honor of Ethan the Great!
Jeff Lathrop ..... In Memory of Fran & Cynthia Lathrop
Timothy and Carla Muskat ..... In Honor of Harrison and Galen Muskat, strong hutmen and loyal sons
Marguerite Swain ..... In Memory of Howard E. Swain, Jr.
Craig Sutter ..... In Honor of Jack Middleton
Mary Anna Marley ..... In Honor of Jackson Marley
Ruth Kennedy ..... In Memory of James Durkee

TRIBUTES & MEMORIAL GIFTS

Andrew Timbie ..... In Memory of Jan Richards
Christine Boutilier ..... In Memory of Jim Boutilier
Philip Ostroski ..... In Memory of Joe Ostroski
Bruce Roberts ..... In Memory of John B Roberts (Dartmouth "34)
Robert Dowling ..... In Memory of Julie Schiavone
Dennis Paul Marrotte ..... In Honor of Kenneth & Jane Rancourt
Christopher Jennings ..... In Memory of Mal & Betty Jennings
Martha Frost ..... In Memory of Marion M. "Mim" O'Connell Frost
Karen Erikson ..... In Honor of Mark Blessing
Eric Carpenter ..... In Memory of Michael Brouillard
Jon Wilson ..... In Memory of Mike Courtemanche
Derrick Hill ..... In Memory of Mike Hill
Craig R Webb ..... In Honor of Morgan Webb
Jeffrey B Miller ..... In Honor of Mr. Drew Landry
Sue Burgess ..... In Memory of My Dad and his love for all kinds of weather
Mary Koury ..... In Memory of My Dad, Jim Maynes
Kyra Tehve ..... In Honor of Nimbus
Barbara Sadler ..... In Memory of Paul F. Sadler
John R Horan ..... In Memory of Pauline Horan and Linda Horan
Carole Benoit ..... In Memory of Pierce Beij
George E Temple IV ..... In Honor of Purdue BS Engineering Grad Dec. 2025 George Ethan (Gates) Temple
Christopher Connolly ..... In Memory of Ralph Kane Connolly
Sean Connolly ..... In Memory of Ralph Kane Connolly
Caitlin Bagley ..... In Memory of Raymond J. Edwards
Jacquelyn Trefry ..... In Memory of Richard G. Trefry
Joanna C Daniel ..... In Memory of Richard M. Daniel, Jr.
Corie Rand ..... In Honor of Richard Rand
Kerry Swift ..... In Memory of Rob and Jane Swift
Rob Bunting ..... In Honor of Rob Bunting
Doug Henry ..... In Memory of Ruth and John Henry
Sally Pagliuca ..... In Memory of Salvatore Pagliuca
Bob Miller ..... In Memory of Sam and in honor of his family
Kara Morgan ..... In Memory of Sam Gawel
Leah Gawel ..... In Memory of Sam Gawel
Aditi Gupta ..... In Memory of Sam Gawel
Amelia Pavlov ..... In Memory of Sam Gawel
Jessica Gawel and Ramon Perez ..... In Memory of Sam Gawel
Seth Melamed ..... In Memory of Sam Gawel
Debbie Baker ..... In Memory of Sam Gawel
Matt Gannon ..... In Memory of Sam Gawel
Norman Silverman ..... In Memory of Samuel Gawel
Cultra Trail Running LLC ..... In Honor of Shadow Bear from Cultra TRP
Darrell Kimball ..... In Honor of Staff members
Tor Clark ..... In Memory of Victor and Debbie Clark
Chris Demers ..... In Memory of Wayne Wrubel
Bruce Dale Shepley ..... In Honor of Wendy Almeida
Nancy L Eastham ..... In Memory of William Eastham
Allie Poll ..... In Memory of Zoe

CORPORATE SUPPORT

GREEN FLASH

Airline pilot Hans Laenen and private pilot Dr. Martin Acquadro in front of their Cessna Crusader, the team and aircraft that accompanied Photographer Ines Boehnert for her photoshoot of Mount Washington (cover photo). "To position and maneuver an aircraft for proper photoshooting takes skill and patience, Boehnert shared. "We have had a lot of fun together during our aerial projects."

CORPORATE SUPPORT (Con't)

MINUS 33 MERINO WOOL

MT. WASHINGTON AUTO ROAD

EMS EASTERN MOUNTAIN SPORTS EST. 1967

APPALACHIAN MOUNTAIN CLUB AMC

GLOBAL rescue

Obōz FOOTWEAR

THE MOUNT WASHINGTON COG RAILWAY

MWOBS®
MOUNT WASHINGTON OBSERVATORY

Just because school is out, doesn't mean we take a break from teaching about weather and climate! Connect with us all year long through our camp programs hosted in North Conway with field trip programs to the summit of Mount Washington. You can also invite our educators to your summer camp, campground, library or function.

Learn more at
mountwashington.org/camp

Pictured: *Storm Scouts* Summer Camp

MWOBS®
MOUNT WASHINGTON OBSERVATORY

WINDswept

PO Box 2310
North Conway, NH 03860
603.356.2137