Using a View Camera at "The Home of the World's Worst Weather"

Surviving the Winter Wind on Mount Washington

Photographs and text by Paul Wainwright

THE TEMPERATURE IS BARELY ABOVE ZERO DEGREES FAHRENHEIT, there is an almost 40 mph wind blowing, and I am going out with my wooden view camera to make photographs. Right! Now I ask you: why would anyone in their right mind want to take a view camera out into such harsh conditions?

Why? I'll tell you in one word: *rime*.

"What's rime?" you ask. Rime is a form of ice that occurs at high altitudes in freezing conditions when there is both high wind and fog (actually clouds). It forms feather-like projections from every surface that the wind strikes, and it is perhaps the most fascinating natural phenomenon that I have ever seen. It produces endless variations of patterns and textures, and sometimes resembles little (or not so little) flags on all of the solid objects around you.

However, contrary to our intuition, rime actually points *into* the wind! This can be understood from an explanation of how it is formed. In clouds, the tiny droplets of water can be in a liquid state even when temperatures are well below freezing. When these droplets hit an object, they solidify and stick to that object. As more and more droplets hit the object, they build up a layer of ice crystals, and slowly, over time the wonderful feathery formations of rime are produced. As with snowflakes, the patterns created are infinite.

THE HOME OF THE WORLD'S WORST WEATHER

Each winter I have an opportunity to spend a week as a volunteer at the Mount Washington Observatory, a weather research facility at the top of Mount Washington. At 6288 feet, Mount Washington is by most standards not a tall mountain. However, it lies at the confluence of three major weather patterns in the northeast United States, and is well deserving of the Observatory's slogan: "The Home of the World's Worst Weather." For example, the highest wind speed ever recorded on earth (231 mph) was recorded on Mount Washington. The highest temperature *ever* recorded there was only 72 degrees. It is not at all uncommon to have snow in the summer months. Mount Washington is almost always windy, especially in winter and it is in the clouds more often than not, which makes it an ideal place to find rime.

During the summer months, more than a quarter million people visit the state park at the summit of Mount Washington each year. It is accessible by both the Mount Washington Auto Road, built in 1861 as a carriage road, and the Mount Washington Cog Railway, built in 1869 and still powered by coal-fired steam locomotives. However, in the winter it is a different place altogether. Except for the few brave souls who climb it in these harsh winter conditions, it is accessible only by a Bombardier snow tractor, a large diesel-powered machine with oversized tank tread-like feet for negotiating the snow and ice on steep terrain. The summit of Mount Washington is sub-arctic tundra and the weather there is very different from the surrounding White Mountain National Forrest in the center on New Hampshire.

In past years, I have brought my 35mm camera with me and tried several times to make photographs of the rime, but have been disappointed. I guess I'm addicted to the exposure and development controls and fine grain that a large format camera provides. Even in "mild" winter conditions on Mount Washington there is almost always a strong wind blowing, and a wooden field camera with exposed bellows would almost certainly have suffered from vibrations, or maybe even been damaged by the wind.

FIRST I NEED TO MAKE SOME SAWDUST

Necessity being the mother of invention, I spent the past year thinking about how I could use my view camera in such conditions. In the September/October 2000 issue of *View Camera*, Gordon Hutchings described how Morley Baer would wrap his dark cloth around the bellows to protect it from wind. However, I doubt that Morley would have been too successful in a 40 mph wind, since in such conditions a dark cloth would become a sail, and you would never see it again. On Mount Washington, a dark cloth would quickly become part of the landscape in Tuckerman Ravine!

Being both a photographer and a woodworker, I set out to design a wooden enclosure that would cover the bellows, and would provide stability between the camera back and the base, the lens board and the base, and between the lens board and the back. Once focused, I wanted one solid lens-bellows-film combination that would not flop around in the wind. Since my goals here did not include architectural photography, I was willing to sacrifice most of the camera movements to do this. I was willing to keep the back square to the base, and I was willing to eliminate lens rise and fall. However, lens tilt would be important to enable me to focus along a horizontal receding plane, such as the ground. A small amount of lens swivel might also be useful, but I would be willing to rotate the entire camera 90 degrees and use the lens tilt to focus along a receding wall if needed. Also, I knew beforehand that I wanted to use my 210 mm lens, so I was willing to customize the solu-

tion for that lens.

I had one other very important requirement: I wanted to make absolutely no modifications to the camera itself.

My yet un-named invention is shown in **Figure 1**. I built a two-part wooden enclosure that telescopes within itself as the camera is focused. I used high-quality arctic birch plywood from Russia, and used a box joint cutter with my router to produce extremely rigid corner joints. The back part of this device is square between the base and the back, and it is held firmly to the back by brass brackets that fit under the knurled knobs that control back tilt. This back portion is held firmly to the camera base by a small bungee cord that goes from one side to the other under the camera.

The front part of my enclosure rides inside the rear enclosure, and supports the front part of the camera at the two points where the lens board attaches to the front standards. The two brass brackets fit under the knurled knobs that control lens rise/fall and tilt, eliminating the rise/fall movement, but still allowing the lens to tilt. The inside of this front enclosure is tapered to allow sufficient space for the bellows. After focusing, there are two thumbscrews that secure the front and back portions of the enclosure to each other, forming one solid unit.

While it is possible to focus by moving both the back and the front, I do most of my focusing in this arrangement using the front. Since a dark cloth is useless in a high wind, I compose and focus using a wooden focusing hood, also made in my shop. For an additional measure of stability, I generally stand upwind of the camera while making the exposure (except if this throws a shadow on my subject). Also, I use my free hand to hold the tripod firmly to the ground.

Figure 1. My Zone VI 4x5 camera is shown here with the wind enclosure attached. The rear section of the enclosure is attached to the back by brass brackets that fit under the knurled knobs that control back tilt, and is held firmly to the camera base by a small bungee cord. The front of the enclosure telescopes inside the rear section is tapered to allow bellows clearance, and attaches to the lens board by brackets that fit under the lens rise/fall/tilt knobs. Two thumbscrews secure the back and front sections to each other after focusing, creating one rigid film/lens configuration. Although most camera movements are eliminated by this design, sufficient movements are still allowed for the task at hand: making photographs of rime in the wind.

Figure 2. The author and his invention, on location on Mount Washington. In such harsh conditions, skin must be kept covered to avoid frostbite.

THE FIELD TRIAL

I awoke briefly in the night to hear one of the observatory staff members de-icing the weather instruments in the tower four floors above me. It was a dull metallic thud-thud-thud sound and it was music to my ears because I knew we were in the clouds, and that rime was forming. In the morning I awoke to find the clouds had cleared, and that weather conditions were ideal for testing my wind enclosure: the temperature was on the positive side of zero (barely), and the wind was just under 40 mph.

Figure 2 shows me with my camera on location on the deck of the Sherman Adams building on Mount Washington.

A few words about clothing. In harsh conditions it is very important to dress appropriately, especially in wind. Frostbite is a very real danger, and every inch of your skin must be covered. In Figure 2, I am wearing several layers of synthetic long underwear, a fleece jacket, a down-filled Gore-Tex jacket, wind-proof ski pants, insulated boots, a balaclava that covers my face and head, a hat that ties around my chin, and goggles (which were removed just so I would look better in the photo). If you are considering venturing out in similar conditions, be sure to spend a few extra bucks on synthetic shirts and pants from a store that sells such items to hikers and campers, because cotton will absorb your perspiration and leave you chilled, possibly leading to hypothermia.

The difficult part of the outfit was my gloves. You need a fair amount of dexterity in order to use a view camera, yet in the cold and wind you need warmth, too. As shown in Figure 2, I am wearing two pairs of thin gloves: the first pair is heavy glove liners typically sold in outdoor equipment stores. The second pair is fleece with the fingertips cut off. Between these two pairs of gloves I have chemical hand warmers, which are typically sold at ski shops. I am also wearing toe warmers in my felt-insulated boots.

Upon pulling out my light meter I was amazed at how bright it was. I was getting an exposure value (EV) of 18 from the sunlit rime, which is a good stop more than I would typically get from white objects at sea level. This is due both to the high altitude (there is less atmospheric filtration of the sunlight) and to the fact that everything around me was white, thus providing lots of bounce illumination. I spent the morning photographing the rime, and enjoying every minute of it. Toward noon several hikers appeared in full winter gear. I introduced myself as the resort photographer. We all had a good laugh.

The Results

Figure 3 (page shows an example of the wonderfully abstract photographs that can be made of rime. If the

Figure 3. Shiny areas of the rime are not caused by melting (it's almost zero degrees), but are caused by sublimation: the direct evaporation of ice.

photographic subject is just of the ice, there is very little tonal variation (even the shadows are quite bright). I placed the brightest part of the photograph at Zone VI, and gave the negative n+2 development to separate the tonalities of the ice. This gives the greatest number of possibilities for printing.

Printing photographs of rime is difficult to do. I want to show good separation and tonal definition to the ice, yet I do not want areas of the ice to be too dark from just cranking up the contrast. I find the best approach is to make a print with the correct overall contrast but just slightly darker than desired, then bleach the entire print in a very weak solution of potassium ferricyanide to just lighten it enough to bring the highlights up close to paper base white. This printing down and bleaching back procedure will tend to add definition and tonal separation to the highlight areas while not significantly changing darker areas of the print.

CONCLUSIONS

For me, one of the great joys of being a large-format photographer is finding solutions to technical and artistic challenges. My yearlong quest to modify my camera for harsh windy conditions was both a challenge and a joy, and I hope you have found inspiration from my experiences. I also hope that you like my photographs of rime.

I would like to thank the Mount Washington Observatory, and especially the summit staff, for their hospitality and encouragement.

The Mount Washington Observatory is a nonprofit scientific and educational institution whose purpose is to maintain a permanently staffed observatory atop Mount Washington. It also aims to use its unique facilities to conduct programs of environmental observation and technical research, and to develop educational programs to advance public knowledge of the unique meteorology, natural subarctic environment and human history of the Mount Washington region (www.mountwashington.org).

Paul Wainwright holds a PhD in physics from Yale, and has been making black-and-white images for more than 40 years. In 2001 he retired from a long career in research at Bell Labs to pursue large format fine-art photography full time. His interests include details of landscapes and architecture, and applying his research background to make the more technical aspects of photography simple to understand. Wainwright lives and works in Atkinson, New Hampshire, and teaches advanced workshops at the New Hampshire Institute of Art (paul@wainwright.mv.com).