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Photo Essay: Seeking the Northern Lights

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Night 1. Thingvellir National Park

PHOTO ESSAY

Seeking the Northern Lights

Timothy Wenson

When planning a vacation for February, most of us would dream of someplace warm and tropical, a getaway from the dreary cold that is common during the New England winter. But when you have a passion for photography, you might do something crazy and fly to the Arctic to take pictures of the northern lights. That's exactly what my wife Kate and I did on our trip to Iceland last winter.

Iceland is a beautiful island roughly the size of Ohio and located just to the southeast of Greenland. Situated in line with the Gulf Stream, it actually gets much less snow than we receive in southeastern Massachusetts, and the temperature is quite a bit warmer in the winter. In February, temperatures range from about 20° to 40°F (-7° to

4°C). For reference, when we flew back into Logan Airport at the end of our trip, the temperature was -4°F. Our main reason for visiting Iceland in the winter is that the northern lights need dark conditions in order to be visible, and the length of the night varies greatly at different times of the year when one gets that close to the

North Pole. During the Winter Solstice in Iceland, there is a little more than four hours of daylight; in contrast, the Summer Solstice has only three hours of dusk/twilight while the sun ducks under the horizon and then rises again.

The Aurora Borealis (northern lights) and Aurora Australis (southern lights) occur as a result of electrons colliding with atoms and molecules in the Earth's upper atmosphere (80 to 500 km above Earth's surface). Accelerated electrons collide with oxygen and nitrogen atoms and molecules, transferring energy and exciting the atoms and molecules to a higher energy state. When the atoms and molecules return to lower energy states, they release their energy in the form of light. The best area for aurora activity is a polar latitude between 60 and 75 degrees, where the lights may be observed more than half of the nights in a given year. Iceland is located roughly 65 degrees North, just outside the Arctic Circle (<http://www.swpc.noaa.gov/phenomena/aurora>).



Night 2. Away from the city I

Alongside the local weather forecast, there is a nightly forecast for expected Aurora activity. The Aurora forecast is based on the Kp-index, which describes the strength of variations in the magnetic field of Earth ranging from zero (minimum activity) to nine (maximum activity). By averaging the maximum variation in the magnetic field strength over three hours, forecasters can make a fairly accurate prediction for the strength of northern lights activity. Most days the Kp-index is between 0-3 (no activity to moderate activity); the highest numbers are quite rare (<http://en.vedur.is/weather/articles/nr/2549>).

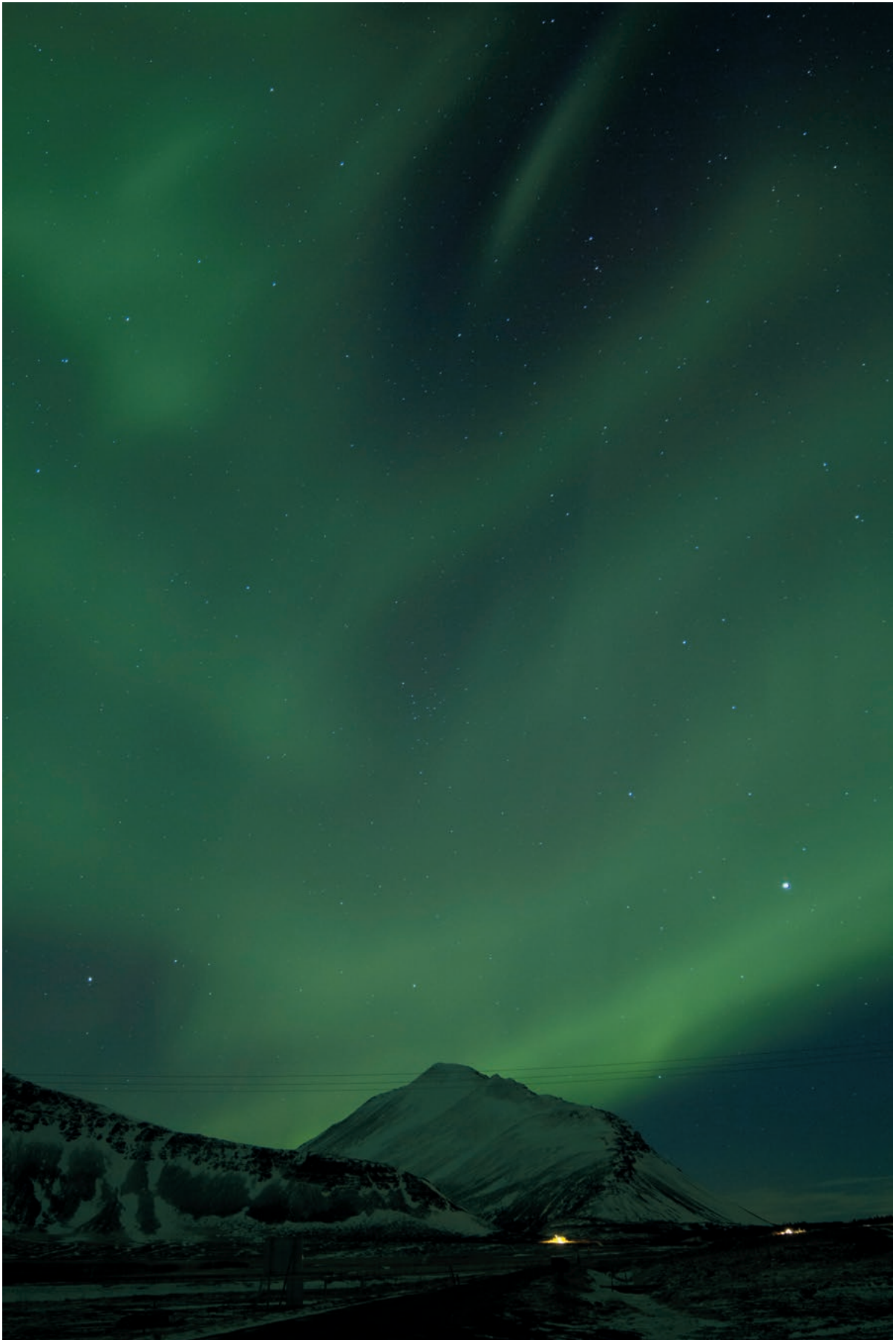
Our first night in Reykjavik, Kate and I embarked on a “warm baths, cool nights” tour that consisted of a visit to one of Iceland’s famous geothermal hot springs, a dinner buffet of traditional Icelandic foods, and a stop in Thingvellir National Park to take in the northern lights. Unfortunately, the aurora forecast for that night was low, rating only a one on the Kp-index.

Iceland is famous for its geothermal pools and spas. While our hotel did have a relaxing geothermally heated indoor pool and spa on the bottom floor, we chose to visit an outdoor pool to get the true Icelandic experience. The air temperature at Laugarvatn Fontana (<http://www.fontana.is/>) hovered around 0°C, and its geothermally heated pools ranged from 30 to 39°C. After a long, relaxing soak interrupted by brief freezing-cold sprints between the hot tub and various pools, we headed in to try the buffet. The highlight of the feast was a sweet, dark rye bread cooked for 24 hours buried in hot sand. The rest of the food might

be described as “authentic Icelandic cuisine” and “not at all labelled in any way.” With a bellyful of mystery meatballs and various seafood dishes, we donned our cold-weather gear and got back onto the bus for the short trip to Thingvellir National Park.

Our tour guide, Raven, told us stories along the way, recounting tales of the local culture, even singing us a traditional Icelandic song. Before reaching Thingvellir National Park, the bus driver pulled over into a parking area. He and Raven had seen some Aurora activity and decided to stop before getting to the park. With the Aurora forecast so low, this may have been

Everywhere around us we could see [the northern lights] dancing and undulating in the dark night sky.



Night 2. Away from the city II



Night 2. Outside Reykjavik with light pollution from the highway



our only chance to see the lights. The tour reminded me of going on whale watches; if you didn't see the lights, you would get a free ticket to try again the next night. With that in mind, the tour guides seemed ready and willing to stay out as long as it took for us to see the northern lights.

Photographing the northern lights was a major item on our bucket list so we were prepared with the necessary equipment. Our kit consisted of the following essential items: DSLR cameras (a Canon 6D for Kate and a Canon 60D for me), wide-angle lenses with large apertures (28mm f/1.8 and 14mm f/2.8), sturdy tripods, and off-camera shutter-release cables. Without any one of these items, we would not likely have come back with any usable photos. We had also done research into the recommended settings to use on our cameras; with potentially limited time to see the lights, we needed to be ready and not fumbling with camera settings.

With the naked eye, the northern lights we saw that night were not very impressive. Without knowing where to look, you might mistake them for clouds. The main reason for this lies in how the rods and cones in our eyes take in colors. During the day, our vision takes advantage of the relatively few cones (6-7 million cones vs 120 million rods) in the retina to view colors. Daylight vision can adapt rapidly to changing light levels, keeping the light pointed toward the *fovea centralis* where most of the cones reside. Rods are more sensitive to light and movement than cones, but also take longer to adapt. Rods also cannot see vivid colors, particularly reds; in fact, a common recommendation for night photography is to use a red flashlight, as it does not affect your night vision the same way a bright, white light does (<http://hyperphysics.phy-astr.gsu.edu/hbase/vision/rodcone.html>).

We could still pinpoint where the Aurora was in the sky that night, and



Night 2. Outside Reykjavik

after taking a few long exposures and then viewing them on our cameras' displays, we could see what it is that makes people come so far to get a glimpse of the northern lights. The lack of light pollution in the area made it an excellent place to take pictures of stars as well, although that was not our primary goal. The first tour had a mixed group of people, most of whom were primarily interested in the spa and were not serious photographers. From their disappointed chatter I could tell that many of them expected bright, colorful lights that they could snap pictures of with their iPhones. Several people tried and failed to get images, and we helped as much as we could (the bus driver even offered to help people with their camera settings). Eventually, after we had taken a satisfactory number of pictures, we got back onto the bus with everyone else to escape the cold and wind.

The next night had a better Aurora forecast (3 out of 9: moderate). After a full day exploring the other wonders of

Iceland in daylight, we booked another tour, hoping for a clear night with a greater level of activity. Luck was on our side as this night turned out to be our best opportunity to photograph the northern lights. Before our bus left the city of Reykjavik, we could already see Aurora activity in the sky. We stopped briefly just outside the city on the side of the highway and were able to get photos to the north and south (the southern side even had mountains to use in the foreground). After getting a few shots there, we packed up and moved down the road away from the busy highway and city lights. When we made it to our destination, we were finally able to appreciate the full beauty of the northern lights. Everywhere around us we could see them dancing and undulating in the dark night sky. In a few of my photos you can get a sense of the movement, but it was really quite breathtaking to view in person.

This kind of photography is exciting because you can really appreciate the scene you are capturing. Since you have

to take 20-plus-second exposures and keep your camera absolutely still the entire time, there is nothing to do but look around, plan your next shot, and take it all in. I was able to get photos in several directions, including some straight up into the sky and others using mountains in the foreground. We stayed out that night until 2:00 a.m. and were still able to see the lights when we returned to our hotel. Most of the images included here are from that night. I can only dream about what a night with a higher Kp-index would be like. Maybe on our next trip.



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