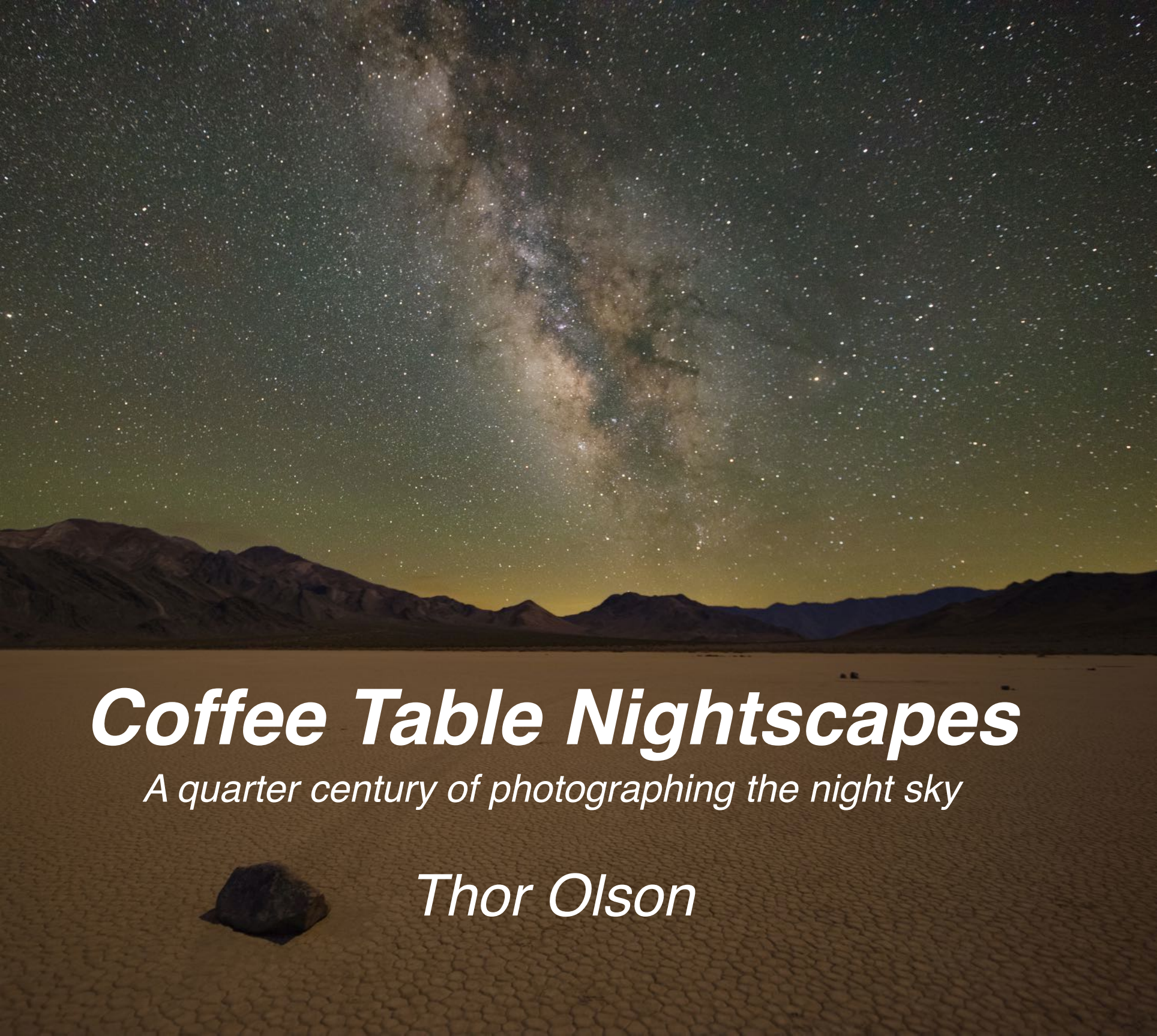

Coffee Table Nightscapes

A quarter century of photographing the night sky

Thor Olson

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Cover photos- the last and first pictures in this collection:
Front cover: Milky Way Sails the Playa (2021)
Back Cover: Hale-Bopp over Hyland Tower (1997)

The pictures and stories in this book can also be found at
http://thorolson.com/coffee-table-nightscapes

Preface

This story begins nearly thirty years ago. My nine-year-old son asked me to go out to help him identify some constellations for a school project. We drove a few miles to a park where we watched the stars emerge from the twilight. We discovered that the moons of Jupiter could be seen through binoculars, located constellations with familiar zodiac names, and saw the Milky Way splashed across the sky. It was an enchanting experience.

I wondered what else could be seen in the sky. I had friends with telescopes who were kind enough to let me peer into them to view “deep sky objects” (galaxies and nebulae). It was fascinating! The idea of ancient photons being collected by a telescope lens and then focused on my retina made a powerful impression on me and continues to do so even to this day.

I soon began acquiring my own equipment and immersing myself in the world of amateur astronomy.

Having been an amateur photographer my entire life, it was not long before I wanted to capture those views on film. During this time two bright comets appeared in two successive years. They provided my first photographic targets and begin this collection.

My son has grown up and now has sons of his own. He will likely encounter a similar experience while helping them with school assignments. Meanwhile I'm still investigating the night sky, attempting to capture its romance and magic through the lens of my camera. I hope you enjoy my favorites from the first 25 years!

Thor Olson
2021

Introduction

This is a collection of photos taken over the course of 25 years with some stories to accompany them. I call it "Coffee Table Nightscapes" to indicate that they are my favorites suitable for that artifact of an earlier time, a book of beautiful photographs and touching captions that adorned the low table in the formal space of a home. This is my contribution to that genre.

A major technological revolution over the last quarter century began when homes really did have coffee tables with books on them. This revolution changed the way we take pictures. The transition from film to digital has had an enormous impact on our lives, how we interact and communicate with each other, and how we experience the world.

We take pictures of everything, share them, save them, discard them (or not), because it is effortless to do so, and the costs are so tiny. This is a major change from the time, just one generation ago, when taking pictures was complicated and expensive and few people took more than the occasional snapshot while on vacation or at a birthday party.

The early photos presented in this volume were recorded during that time, on film, with all the constraints and requirements of that analog medium. The camera was aimed for the best composition of the scene, and when everything was aligned, focused, and the proper aperture selected, the shutter was opened.

And held open. Photons trickled in and the molecules in the film emulsion were triggered to change state, and when subsequently immersed in a chemical developing bath, converted to an opaque silver compound. This was the mechanism that enabled images to be captured from before the Civil War to the start of the 21st century.

Today, film has been replaced by silicon sensors. At first, they were poor imitators of film, but over time they have evolved, developed, and become far superior, exceeding the sensitivity of the old silver-haloid systems. It is now possible for photographers to take clear and noise-free pictures of the night sky without the obstacles and constraints of film. And they do!

That is not to say that taking pictures of the night sky is no longer challenging. There are still the difficulties of being at the right place and time with the right weather! And while there is no longer the need to keep the shutter open for hours at a time, it is now necessary to make many multiple exposures and combine them later via computer. Life is filled with tradeoffs.

I am trying to keep up, and the last images in this book show my recent work. Presenting my favorite pictures in chronological order portrays the evolution of the technology and shows the ebb and flow of my skills using it.

If you have a coffee table needing a book to accent it, I'd be honored if you consider this a candidate!

Hale-Bopp over Hyland Tower

This picture was taken with a Kiev-88, which is a Russian-made clone of a Hasselblad (a high-quality camera that was taken to the moon). It uses the larger size 120 format film. A colleague suggested that this unused camera should be stored in my office instead of his. And since I had no use for it there, I decided I should try it out on one of my comet photo outings.

Not being very familiar with cameras of this type I made quite a few mistakes with film loading and handling, but this one survived. It was taken early on a Saturday, from the Hyland Park area in Bloomington.

The comet hour
The early hour was a characteristic of the comet's schedule, not mine. Like all the other celestial objects, the comet rises in the east and sets in the west. At this point in its visit, the comet rose at 2:00 am and climbed the sky until the sun rose and washed it out in the dawn. There was a window of a few hours when it was at its photogenic best.

I had wandered around looking for a good viewpoint, and feeling the pressure of the coming dawn, stopped at a parking lot to make the last pictures I could before dawn.

I set up the camera, and since I was not yet sure of what exposures yield good results, I bracketed my shots, taking a series of pictures with increasing exposure times.

Early morning activity
In spite of the hour, there always seems to be someone out and about. As I had the shutter open and timing for a 2-minute exposure, a car turned onto the street in front of me and drove past. The headlights flared into the camera lens, a bright beam cut across the view, followed by the red glow of taillights.

I had begun to learn that unexpected events like this don't necessarily mean that the shot is ruined. I completed the timing, closed the shutter and advanced the film.

On developing the film later, I found the frame where the car drove past. No sign of the car was there! Instead, a white line underscored the silhouetted buildings, and the details of the snowbanks in front of me were visible. It was an interesting effect, but in the end, this is the exposure and composition I liked best.

Bloomington MN,
4:00 am 15 March 97.
Kiev-88 80mm f/2.8,
30 second exposure on Tech Pan 120 film

City Cometscape

Notes from Thor's astrophoto journal:
I thought that the view of comet Hale-Bopp over a cityscape would make a striking photograph. There were only certain view angles and observing times that worked however. To get the comet to hang over downtown Minneapolis in March, the time worked out to be around 3:00 am along a northeast line of sight. Surprisingly few vantage points existed; the streets headed off in the wrong direction, or the view was obscured by trees, buildings or streetlights.

By checking street maps and making various late-night explorations to the city, I was quite excited to find this site at the south shore of Lake Calhoun. The comet was in full view, the sky clear, air transparent. I set up the camera and made a series of exposures, certain that one of them would capture the beautiful view.

The shot that got away
The next day I decided to wind off the end of the roll and reload the camera with a different film type. This was when I discovered that there had been no film in the camera. It was a very discouraging moment.

The picture in your mind's eye of a missed shot only gets better with time. Over the next two weeks as I tried to recreate it, the lost picture gained a stature that could not have been met by any earthly conditions.

No rest for the city
On these outings I found that the city never sleeps. There are people out and about at all hours and my nocturnal activities seemed no more odd than the agendas of anyone else I encountered. I watched night-time trampoliners, really early joggers, and others with more private intents. It's all part of a world detached from daylight but constantly illuminated.

Even though that first night's view could not be reproduced, there were other views. In the end I found this entirely different composition, still from the lake shore, to be perhaps an even better image to capture my original intent. Were it not for the missing film, I would have missed this picture.

Lake Calhoun/Bde Maka Ska, looking at Minneapolis,
4:00 am 23 March 1997.
Kiev-88, 80mm ,
20 seconds at f/4 on PMC400

Third Tail

On April 8, a friend joined me to observe Hale-Bopp at my nearby and nearly-dark site at Lake Zumbra. We enjoyed watching the very young moon set, then went about preparing to take some pictures. I was hoping to get a shot taken at a smaller lens aperture so the stars would have less distortion than in my earlier photos.

We were able to make three exposures of the comet. Two of the three showed a tracking problem: the weight shifted across the drive gear during the exposure. The result looked like a double exposure with every star appearing twice, once while the motor was "pushing" the gear, and again with the gear pulling the motor. The separation is a measure of the backlash in the system. Just another of the 1000 obstacles to taking pictures of the sky.

Fortunately, one frame turned out. The stars are mostly quite sharp little points. Their relative colors also show up nicely. The comet itself has a broader dust tail than a week earlier; and the ion tail seems to have two parts! Is this the "invisible third tail"?

The stars above Comet Hale-Bopp belong to the constellation Perseus. Just to the right of the comet's head is a tight grouping of stars. This is M34, an open cluster, the 34th entry in the famous Messier list of "non-comet" objects.

The lure of stargazing

Another common astrophotography hazard occurred to us: the bright headlights on the police car that came to check on us. It seems to happen every few outings. I had to explain to my friend that there are two types of cops: those that want to see your permit, and those that want to see Jupiter. These were comet-viewing cops.

In spite of record-setting low temperatures, we took in a few other sights that night. We saw Mercury at about its highest possible position, the double cluster, the Orion Nebula (M42), the trapezium (the four stars that light it up), and we capped the evening off by inspecting Mars (complete with polar icecaps).

So this photo carries with it the pleasant memories of an evening's stargazing under clear skies with a friend to share the experience.

Lake Zumbra (Victoria MN)
9:00 pm 8 April 97
Kiev-88 80mm
5 minutes at f/4 on PMC400

Banff Poles

While camping trips make great venues for photographing the sky, sometimes it is difficult to get a full view of it. But here is an opening in the canopy, the lodgepole pines framing the pole star. The camera was aimed at Polaris, and the shutter opened for an hour. The flickering campfires and lamps illuminated the boughs of the trees.

A startrail picture like this is a powerful illustration of the Earth's motion. The pole star shows almost no motion. The others show longer arcs the further away, but all of them make an equal arc: a one-hour exposure cuts 1/24th of a full circle.

Tunnel Mountain Campground, Banff Park, Alberta Canada
10:40pm 17 Aug 1998
20mm f/4 Nikon lens
1 hour exposure on E200 Ektachrome
processed +2 stops (ISO 800)

Four-Hour Lodgepoles

Think about lying on your back as a child watching clouds drifting past. This is the nighttime equivalent. The stars etch a trail on the film as they follow their course through the night. The different temperatures of stars show as different colors, the cooler stars glow a warm orange, the hottest stars are a bright blue.

Lake Louise Campground, Banff Park, Alberta Canada
12:00am 19 Aug 1998
20mm Nikon lens at f/8
4 hour exposure on E200 Ektachrome
processed +2 stops (ISO 800)

BeaverTails

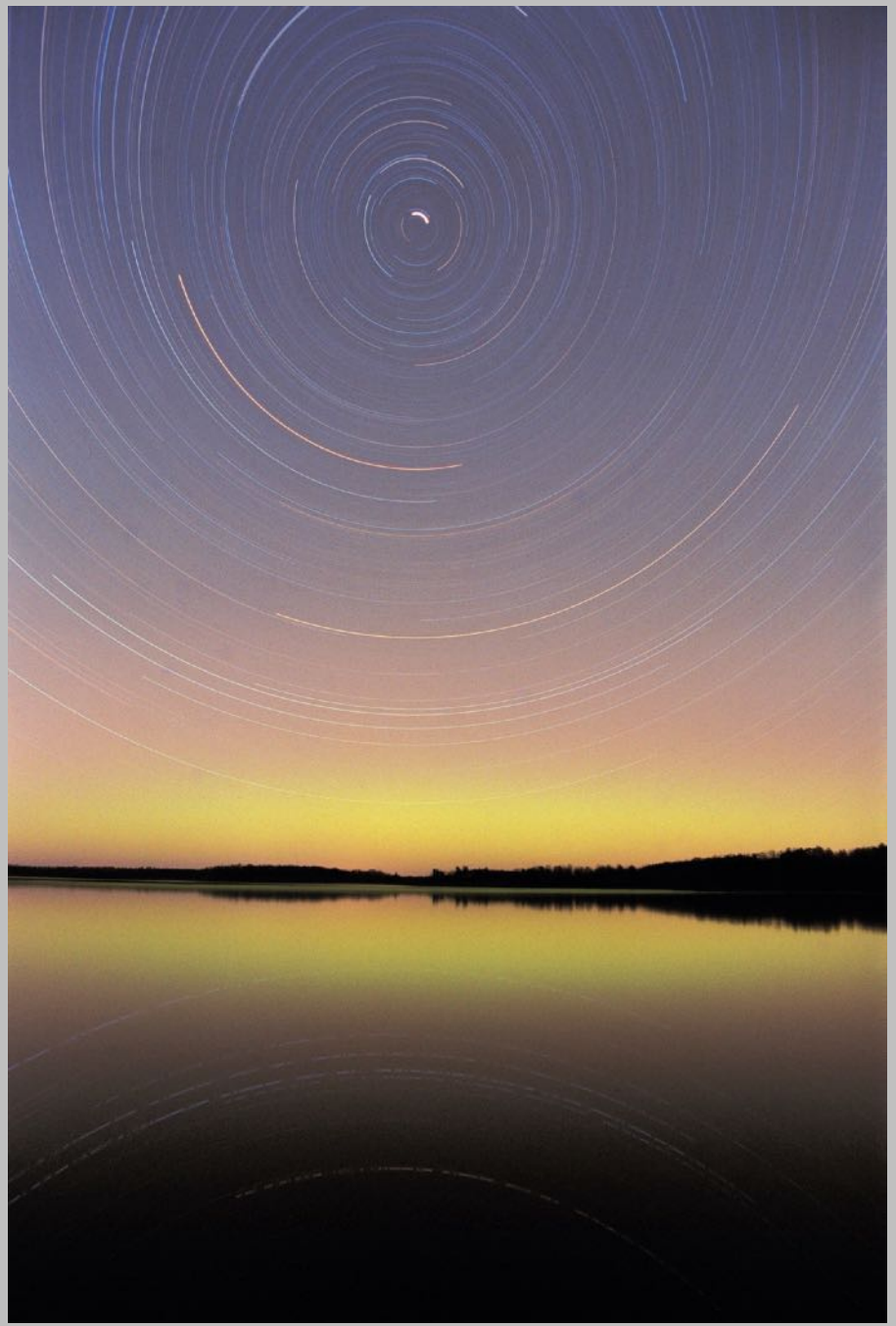
This night had brought together nearly all the elements for my target picture: a lake far away from city lights and radio towers, one with no cabins or roads on the north while I had access from the south, a long night to contain a long exposure without the lake being already frozen, a stagnant high pressure center stalling the winds and keeping the lake surface at a mirror finish. And my schedule had allowed me to take a night away to make the shot! All these prerequisites had been met.

I set up my equipment and busied myself with other activities while the camera recorded the motion of the sky. A loud KERSPLASH startled me. Who would be throwing boulders into the lake in the middle of the night? I peered out onto the lake to see dark shadows swimming back and forth directly in front of my camera. Each traversal left a wake breaking up the reflected starlight. Occasionally a shadow would suddenly turn over end and dive, slapping its tail onto the water surface to make the boulder-throwing sound.

I cursed the beavers. They filled the night with constant gnawing sounds as they busied themselves around me. About halfway through the night I was startled again, this time by the sound of a tree crashing to the forest floor next to me. One more hazard to add to my list.

The picture I obtained was almost perfect, accented by the glow of the northern lights, and the intermittent breaks in the reflected trails as the beavers swam across the view, oblivious to my intent.

Swamp Lake, north of Mille Lacs MN
21 Oct 1998
20mm Nikon lens at f/8
6 hour exposure on Fuji Super-G



Kinnikinnik

There is a progression of techniques in taking pictures of the night sky. The simplest is to place your camera on a tripod and open the shutter for a while. The stars form streaks on the film as the Earth rotates under them, creating a startrail image. As I considered what I would need to take more advanced astrophotos, I found that there is plenty to learn and much opportunity for pleasing compositions even with this simple method.

I pondered how to capture that feeling I once shared with a friend seeing the stars from zenith to horizon, then continuing beneath us as we looked out over their reflections in an alpine lake. This became the inspiration for my quest of the ultimate startrail picture: a full semicircle of startrails reflected in the calm waters of a lake. I have not achieved this goal, but the pictures in this series are some of the rewards along the way.

Kinnikinnik is the closest I came to making my target image! The conditions were perfect: a clear dark sky, no aurora, a calm lake with no creatures disturbing it, but my timing is off. This is my first and only time at this site and I arrived late after a day of traveling. I was unprepared to last the night, and after a few one and two hour trial exposures, I succumbed to the cold and returned to my distant hotel room to recharge. I never made it back.

Although not successful that year, I am looking forward to more adventures in future years. In a way, I hope I never quite find full success in this project!

Kinnikinnik Lake near Flagstaff AZ
14 Nov 1998
24mm Olympus lens at f/4
2 hours on Fuji 800 Superia

Orion Rising

I made an expedition to northern Arizona in November of 1998. It was partly to find out what is involved in transporting photo and telescope guiding equipment to other parts of the world. Although cumbersome (I shipped a 90 lb crate ahead to be available when I arrived), it worked.

On the first night I found a remote site in the high desert. The map showed what looked like paved roads to a fishing lake. Evidently the map notations are different in Arizona; at least there were ruts where earlier vehicles had found their way.

The lake was remarkably calm and I marvelled at the darkness of the sky as I watched Orion rise in the east. I could hear wildlife including coyotes, owls, and yes, ducks. But they were far away and the water remained like a mirror. The sky glow here is not from aurora, but instead from distant Flagstaff, a city with an ordinance to use sodium vapor street lighting. The color is strongly yellow, but easily filtered and removed by the astronomical observatories that are hosted by the town. My film however captures all of it.

Although Orion is spread out into an unrecognizable form, he can be identified by the bright orange star, Betelgeuse on the left, and bright blue star Rigel on the right. The triad of belt stars makes a catscratch-like trail, and you may notice a distinctly red star that is even more obviously red in its reflection. This is the famous Orion nebula, a glowing region of gas and dust where new stars are being born.

Kinnikinnik Lake, AZ
14 Nov 1998
24mm Olympus lens at f/2.8
1 hour exposure on Fuji 800 Superia

Planetrise

The subtle details of the night sky fade away with the dawn, but the brightest remain: the planets Jupiter and Saturn rise above a windbreak on a prairie farm. The sky will brighten, and they will eventually be lost (though if you know where to aim a telescope, they can be found again in broad daylight)!

On this occasion, the clear skies held through the night. The distant haze provided the right conditions to spread the long rays from the sun. It's an unusual transition of colors from orange to blue, a combination not found in many other places in nature. The planets poke holes in the otherwise smooth shading.

Central Minnesota
11 July 99
E200 Ektachrome

Ranier by Moonlight

I am told it is unusual to see the top of Mount Ranier. The generally overcast skies of the region and the immensity of the mountain usually guarantee that clouds will somewhere get in the way of the view. On this day however, the sky had been clear. It stayed clear while the sun set, and as the glow of twilight was replaced by the feeble illumination of a young moon, I worked my way up the mountain's shoulder to this site, aptly named Reflection Lake.

My daytime explorations had found this lake, but the surface had been broken everywhere by wind ripples. Now the air stilled, and the water became stable enough even for a time exposure of the mountain's reflection. I wanted to include some startrail features in this picture, but it is an awkward choice: if the shutter is open too long, the moon would wash out the sky and the trails would be lost. Too short, and the stars do not make sufficiently long marks. This was my guess, 30 minutes, a balance between starlight and skylight.

This picture also answers the question, "what color is the sky at night?" Maybe nocturnal creatures can see in color at night, but we don't. The moon lights up the world, including the sky, with reflected sunlight. The same physics applies, just at lower levels of illumination, and so the sky is blue!

A few cirrus clouds stream past in the distance, but they're not enough to keep the brightest stars from showing. Four of them above and to the left of the mountain peak are the bowl of the Big Dipper, each bluish except for the brightest star in the constellation, Dubhe, a distinct orange color.

The moon set shortly after exposing this picture. Its low angle is apparent from the long shadows on the distant snowfields. My time in Ranier Park would end the next day, but this was a remarkable evening to finish my visit.

Mount Ranier National Park
19 August 1999
Nikomat with 20mm lens at f/5.6
30 minute exposure on E200
push-processed +2 stops

Climber Trails

The skies held clear, the temperature dropped, and the moon set by midnight, allowing me to compose a view of Polaris directly above the summit of this ancient volcano.

There are a number of interesting light sources in this picture. The startrail arcs are made by a one-hour sweep of the Earth beneath the North Star. The green glow of distant Seattle shows to the northwest, the amber of closer but much smaller towns are northeast, and the sky itself illuminates the snowfields on the mountain. An additional light source can also be found *within* the snowfields.

As I started this exposure, I could sense a faint glow that seemed to come from the slope of the mountain itself. Training a telescope on the area, I found what might be unseen hikers bearing flashlights searching through the snow. I was impressed that a flashlight could be seen at these distances. Camp Muir, where climbers rest on their way to the summit, was four miles away!

I learned the next day that what I had seen was not just a couple of hikers resetting their tent stakes. They had started their ascent to the summit! In order to reach the top and get back down before the snow gets dangerously soft, they must strike out at about 1:00 A.M. This photo captures their first hour of progress on a beautifully clear and starlit night.

Mount Ranier National Park
19 August 1999
Nikomat with 20mm lens at f/5.6
One-hour exposure on E200 push-processed +2 stops

Andromeda Galaxy

The Andromeda Galaxy spans a portion of the sky that is larger than the full moon! But a full moon would wash out the sky, making the galaxy hard to see, even with binoculars. When the sky is dark it can be seen as a hazy smudge, making it the most distant object (more than two million light years away) that we can see with the naked eye.

In the eyepiece of a telescope the smudge becomes larger, but to detect the wonderful spiral structure and faint blue outer arms of this galaxy requires the light-accumulating power of a piece of film placed at the telescope's focal point. The stars in this picture are in the foreground, artifacts from our own galaxy, which we must look through to see into our neighbor's part of the universe.

Cherry Grove Observing Site, MN
08 Oct 99
E200 Ektachrome, pushed +2 stops
Superposition of two 20-minute exposures

Lunar Eclipse Sequence

I have seen a total lunar eclipse before, but it was by accident, and I was unable to successfully photograph it. This time I knew it was coming and the skies were clear, but the brutally cold temperatures caused me to find excuses to stay indoors. I was goaded into it however by my son, who pointed out that I had acquired considerable cold weather gear, equipment, and specialized clothing for my peculiar hobby. If not now, when would I ever put them to use?

Of course to maintain any sense of pride, I quietly took his point and proceeded to set up in the neighborhood open area. It is directly under a streetlight which exposed my activities to the neighbors, whose curiosity was not deterred by the temperature. By the time the edge of the moon started to dim, a small group of kids and their hardy parents had assembled to see what would happen.

Our informal eclipse party would last for the next few hours, with people cycling through neighboring houses, returning with hot chocolate, warmed-up feet, and more participants. My own schedule called for taking an exposure every ten minutes, not quite enough time to leave my post.

It was enough time to explain what was happening and to show views though the telescope as the edge of the Earth's shadow crossed the face of the moon. I like to explain that if we were on the moon, the Earth would be backlit, and that everywhere along its edge is at either sunset or at sunrise. The sky there is familiar to us: red and orange, the colors refracted slightly around the Earth's edge by the air. It is this reddish-orange light source that illuminates the moon when the sun no longer hits it directly.

It is interesting that the edge of the shadow shows a bit of brownish cast. As the last bit of direct sunlight hits the very edge of the moon, the orange-brown shadow details emerge. It has been there all along, but our eyes can now adapt to this much dimmer light level.

These views are quite similar to the visual experience. At full totality however, the moon seemed to be a grayish brown color. The deep red in the photo is not artificial; the film sees it better than we do.

Minnetonka MN
20 Jan 2000
First image 8:55 pm CST
Nikon-F at prime focus of Takahashi CN-212
(Newtonian 820mm at f/3.9)
E200 Ektachrome

Total Lunar Eclipse

During totality the Earth is backlit, as viewed from the moon. Everywhere along its edge is at either sunset or at sunrise, providing a red and orange light source to illuminate the moon as we look at it from Earth.

This picture was taken during the midpoint of the eclipse when the moon was deepest in shadow. The "bottom" of the moon is brighter. This means that the moon didn't pass through the dead center of the Earth's shadow, but toward one side.

This view is similar to the visual experience. At full totality however, the moon seemed to be a grayish brown color. The deep red in the photo is not artificial; the film just sees it better than we do.

20 January 2000
10:55 pm CST, Minnetonka MN
Nikon-F at prime focus of Takahashi CN-212
(Newtonian 820mm at f/3.9)
2 second exposure on E200 Ektachrome

Orion Nebula

On most winter nights, the distinctive constellation of Orion the Hunter is plainly visible in the southern sky. Orion sports a "belt" from which hangs a three-star "sword". The Orion Nebula is the smudge of the middle star in Orion's sword. A closer look at it reveals that it is not a star at all, but a group of stars shrouded in a cloud of dust and glowing gas. This is a stellar nursery where new stars are being formed. As the gas coalesces, it is energized and emits a characteristic red glow, not bright enough to be seen visually, but captured nicely on film.

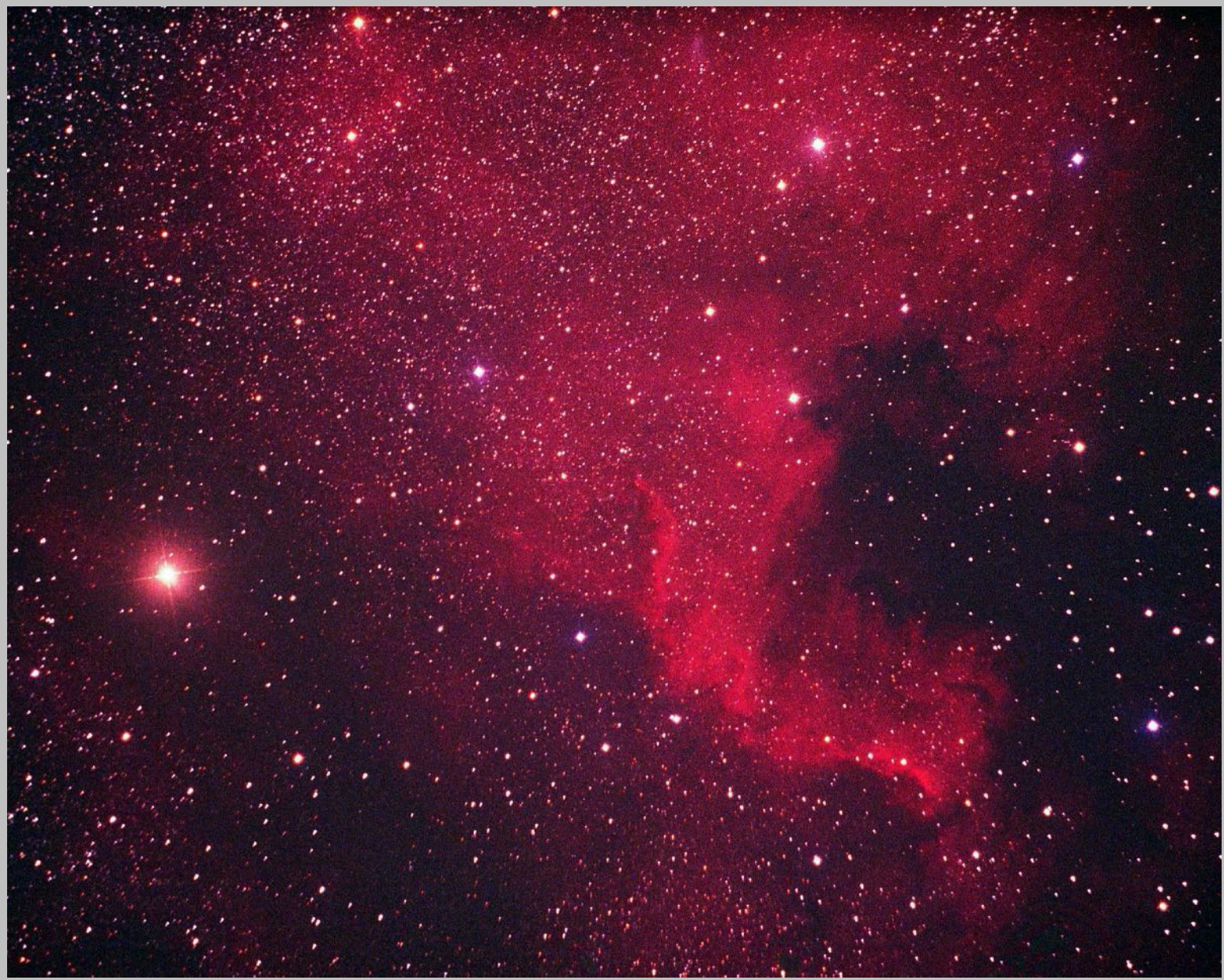
Cherry Grove Observing Site, MN
04 March 2000
Nikon-F at prime focus of Takahashi CN-212
(Newtonian 820mm at f/3.9)
E200 Ektachrome
Superposition of two 10-minute exposures

North American Nebula

In the constellation Cygnus (the Swan), there is a large complex of glowing gas nebulas, and this portion has a shape suggestive of a familiar continent. The strong red color is easily recorded on film, but large telescopes and special filters are needed to make it visible to human night vision.

The bright star on the left, "62-Cygni (xi)", dominates this picture, but if you were to look at the sky, it would not be particularly noticeable among the dozen even brighter stars in this constellation!

Cherry Grove Observing Site, MN
07 June 2000
Nikon-F at prime focus of Takahashi CN-212
(Newtonian 820mm at f/3.9)



Horse Head Nebula

This is a favorite target for astrophotographers. It's a famous image, but quite challenging to capture, partly because it is only visible during the winter months when Orion the Hunter is up. The weather conditions will always be cold, at least in the northern latitudes, and so winter gear is required.

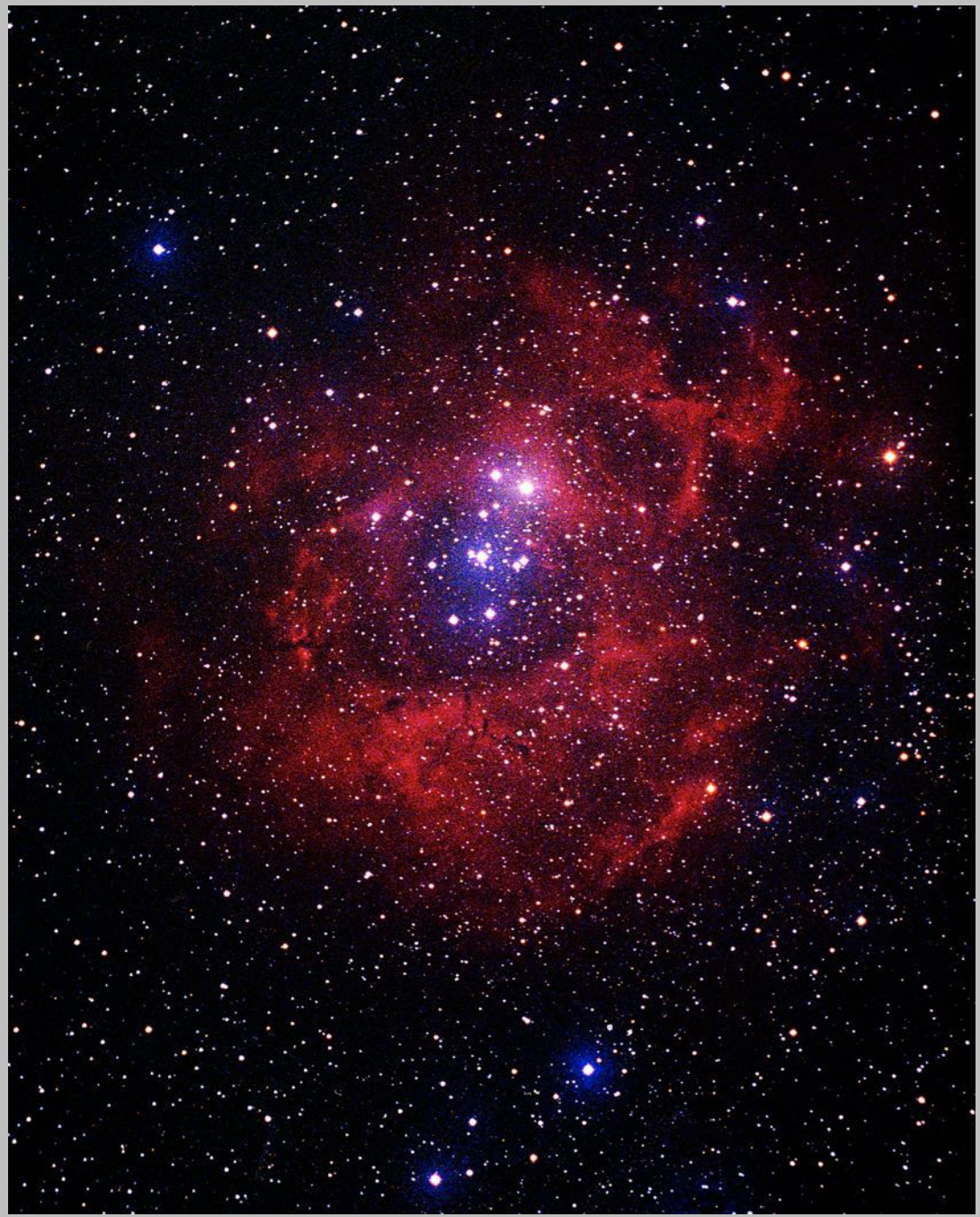
It is not easy to actually see this target. The nearby bright star, zeta Orionis, is a convenient marker, but its glare easily washes out the faint glow of the Horsehead and another nearby object just below zeta, the "Flame Nebula".

Portage Lake, MN
25 Nov 2000
20-minutes at f/4
Kodak PJ400 color negative film, pushed 1 stop

Rosette Nebula

This is a very large region of sky, but the beautiful red remnants of this supernova explosion are faint. One of the attractive features of the Rosette is the cluster of stars at its center. One of these may be the star that exploded eons ago leaving this signature shell of expanding and glowing gas.

Portage Lake, MN
25 Nov 2000



Haleakala Clouds

It is an unnerving experience to be looking *down* at the clouds. In this view the color of the sky seems exaggerated, but it is our proximity to space that gives it the dark tint: there is less air above us at this elevation. The clouds we are looking down upon take on the reflected color of the sky. This makes a stark contrast to the rust-red landscape of the volcano's summit. The island of Hawaii can be seen in the distance, apparently floating among the thundercells building up around it.

Haleakala Crater, Maui, HI
April 2001

Windy Night

Not an ideal night for star pictures! The moon is full, clouds and haze fill the sky, and nearby lights conspire to wash out the darkness. Even so, the pattern of the Big Dipper constellation behind the palm trees is enchanting.

In most startrail pictures a fixed camera records a static landscape and the only motion is from the clocklike rotation of the stars. In this case the palm trees are turned into flowers waving in the wind, even as the startrails keep their sharp focus. The rising full moon and the lights of this Hawaiian island color the clouds, furthering the dreamlike quality in this picture.

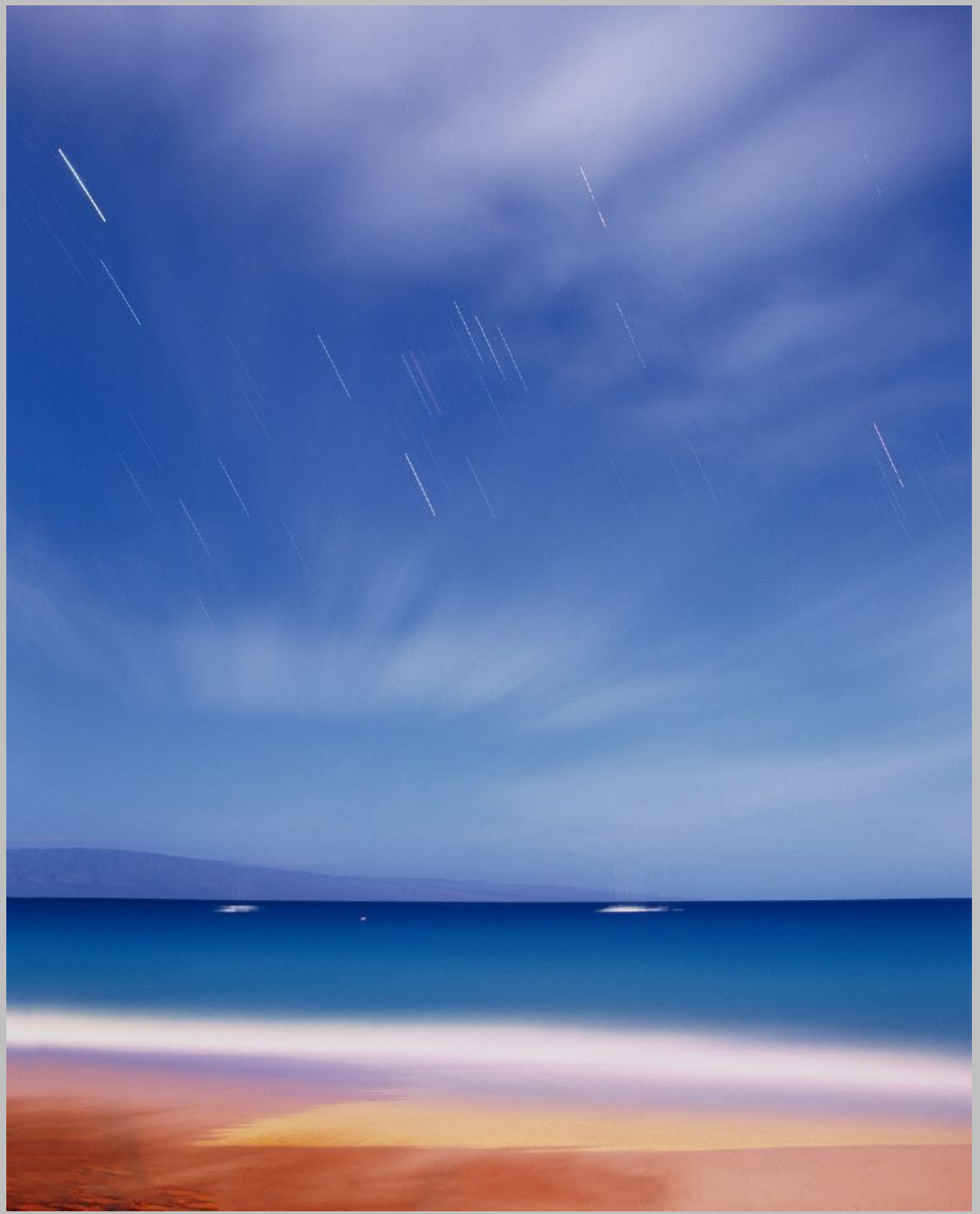
Maui, HI
3 April 2001
Pentax 67 w 55mm lens at f/8

Orion at the Beach

It looks like a daytime picture but there was only the full moon. With enough exposure, what looks like black sky to me becomes sky blue to the film. The dreamy quality is made by the passage of light clouds blowing through during the exposure, and by the cumulative misty effect of waves breaking on the shore. A rogue wave climbs far up the beach and glistens in the moonlight for a moment before sinking back into the sand. A close look will find masts waving as their moored sailboats maneuver against the wind.

The constellation Orion is hiding in the clouds. The three belt stars make a characteristic cat scratch during the time exposure. To the left, undimmed by faint clouds is Sirius, the brightest star in the sky.

Kanapaali Beach, Maui, HI
06 April 2001
Pentax 67 w 55mm lens at f/8
16 minute exposure on E200 pushed 1 stop



South Dakota Windmill

I had a picture in my mind's eye of a windmill in front of night sky startrails. But windmills, once a common but neglected artifact of an earlier technology, had become historical oddities. I realized this after looking for an intact specimen, not near any security or residence lights, and a reasonable distance from any road traffic. I wondered if any windmill that I could see from the road would ever meet these requirements. After hours and miles I realized I wasn't seeing any windmills. Where were they? How could the very icon of rural farm life have disappeared?

Eventually I did come to find this windmill in the heart of South Dakota. I marked its location and returned to it later in the evening to record the stars making their passage behind it.

In this picture the stars are transient, leaving their trails behind them. In a larger time scale, the windmill is transient, eventually turning to rust and dust while the stars continue on.

Central South Dakota
16 July 2001
Pentax 67 w 55mm lens at f/4
30 minute exposure on Fuji Provia 100
pushed 2 stops

M33, Triangulum Galaxy

This is another target on my list. I find spiral galaxies to be fascinating, and this is a large one, but its brightness is rather low, and so it is difficult to capture the delicate details in the spiral arms.

I think this is an improvement over my first attempt, but I still wonder how I can get the full impact of this face-on spiral and how I can keep all the stars nice and small and round. I will likely return to this target in future years.

Table Mountain, Ellensburg WA
21 July 2001
Takahashi CN212 at f/4,
tracking by ST-4 autoguider on guidescope
Superposition of 20- and 30-minute exposures
on LE400 film

Trifid Tracks

There's always something. I managed to get the tracking and focus properly set for this shot of the Trifid Nebula, but sometime during the exposure an airplane cruised by with its running lights on. Note the three pairs of white and red "stars" along the track from the plane's flashing beacons.

Table Mountain, Ellensburg WA
21 July 2001
Takahashi CN212 at f/4
20-minute exposures on LE400 film

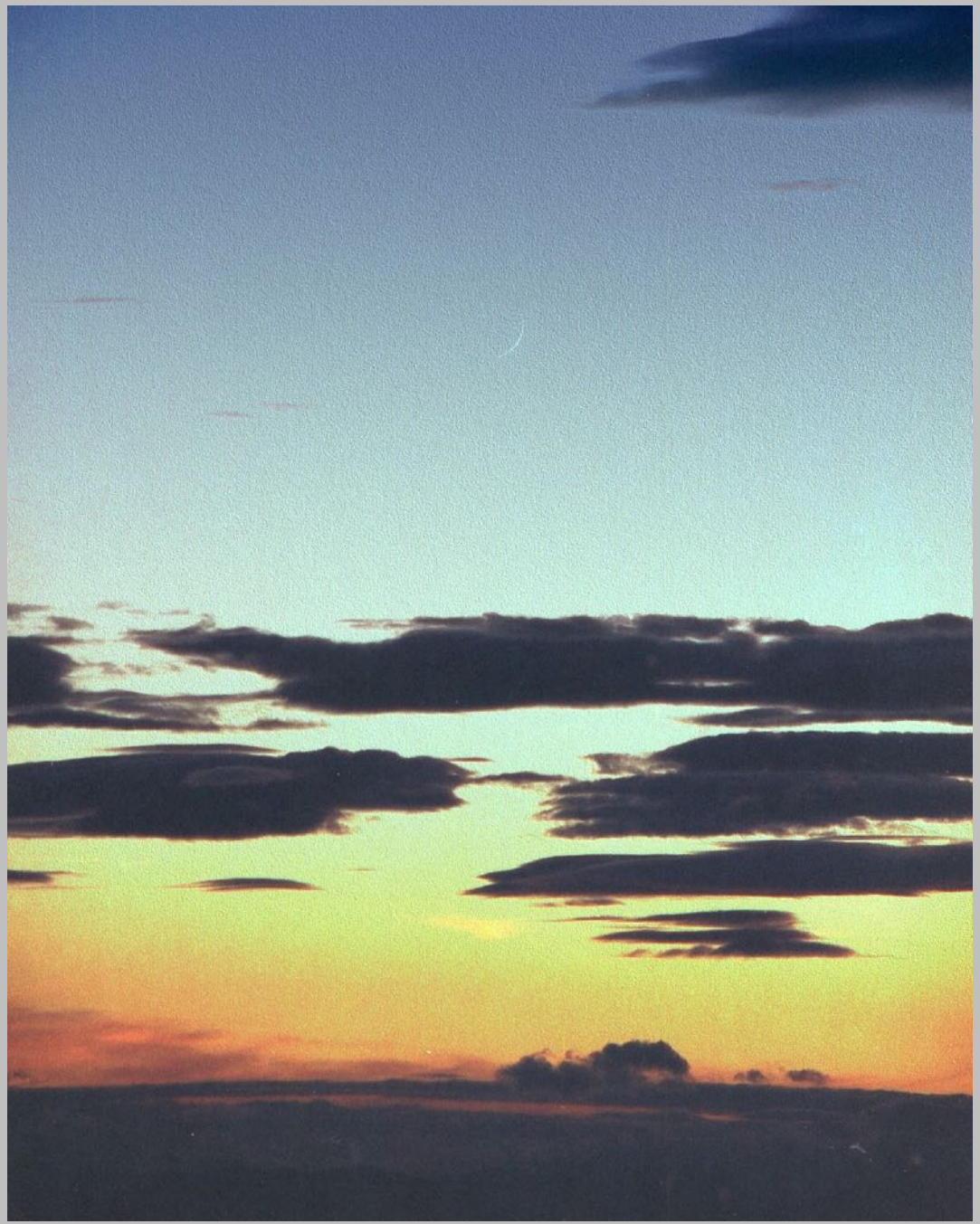
Young Moon

There are many cultural calendars that are based on the lunar period of 29-1/2 days, most famously the Islamic calendar comprising twelve such lunar months. Each month begins upon the sighting of the new moon. On the 29th day of the old month, trusted Muslim observers are assigned the task of detecting the new crescent. If it is not actually visually sighted, the month continues for another day. As a result, the Islamic lunar year usually has alternating months of 29 and 30 days.

If the young moon is less than 12 hours old, it will be nearly impossible to see because it is still so close to the sun (the youngest moon ever seen is 11 hours, 40 minutes, by an observer in Iran). But because of differences between observers and sky conditions and geographic location, the Islamic month will differ among Muslim countries. And because twelve lunar months is eleven days short of a solar year, the Islamic religious events such as Ramadan, drift across our Gregorian calendar.

The young moon can be found using the technique of "averted vision" in this post-sunset photo.

Table Mountain, Ellensburg WA
22 July 2001



Glacier Moonset

The moon, about to drop behind the mountain peaks. It will continue to illuminate the sky until it sets below the horizon.

Glacier National Park
23 July 2001

Glacier Rainbow

The late afternoon breeze pushed cumulus clouds through the mountain pass, some of them containing excess water. Dark smears drained the rain from them as they proceeded down the valley, eventually to evaporate entirely. The mist that was left behind refracted the low angle sunlight into a double rainbow. From my vantage point, the rainbow was complete, its ends striking each side of the valley making a perfect arch.

I was amazed at this. Catching sight of even a partial rainbow is a rare treat for me, but to see one this large was a life treasure! Many people in my position would stand and savor the view, my reaction was to take its picture.
It exceeded a normal viewfinder (a rainbow is 84 degrees across!) and the widest-angle lens I possessed just barely fit it in the frame. I did my best to center and arrange the shot during the short life of the ephemeral arch. The picture captures the abrupt eerie change in lighting from inside to outside the rainbow. I was elated to have been at the right place at the right time.

Glacier Park MT
23 July 2001
Nikomat with 20mm lens
Elite Chrome 200 push +2 stops

Glacier Crown

I was here! I was at the top of Glacier's world. I could look down into the glacier-cut valleys but was still shadowed by the heads of mountains that stood even higher. I had been here before, but as I now examined the site of my photographic goal, it didn't match my minds image.

I had to rethink my composition, but standing at the top of one of the most beautiful places on the planet, I didn't have to look very hard to see new possibilities. Mt Pollack loomed to the north, Clements and Reynolds to the south and west. The valley to the east contained more distinctive peaks. I settled on this view of the head of Mt Pollack.

Polaris is the center of stellar motion, and there is a light band accenting the sky: the band of the Milky Way, in this region containing the bright stars in the constellations Perseus and Cassiopiea. The remnant of a summer sun that never gets very far below the horizon provides the red glow behind the mountain's silhouette.

The blending of light in this picture is over an uncertain time period. I opened the shutter at 1:30 but found it closed at 2:30, the victim of a chilled battery. Fortunately, it had done its job well enough to yield Mt Pollack's portrait.

Glacier National Park MT
23 July 2001
Pentax 67 with 55mm lens
Less than one hour exposure on Fuji Provia 100 +2 stop push

Swiftcurrent Moonset

In front of the Many Glacier Hotel is Lake Josephine, a candidate in my quest for reflected startrails. On the night I was here however, so was the moon. I waited for it to set, a long wait til it fell below the horizon, but not long at all for it to be eclipsed by looming Grinnell Point. Although the moon was now no longer directly visible, it still lit the sky. Film is cheap (I keep telling myself) and I never know if the sky will stay clear, so I made several exposures during its gradual hidden descent. The wind was calm, and the lake became smooth. I hoped the conditions would hold.

I dared only leave the shutter open for 30 minutes though, because the sky would wash out if exposed longer. During this time the moon drifted down behind Grinnell Point, leaving a trailing glow. Also, during this time, I looked around at the scene, wondering what would be captured on film.

The lake had become so calm, and the water was so clear that I could see bottom! At first I was intrigued by the array of fallen trees and rocks and other natural lake bottom material. Then I took a larger view and found it a bit distracting, I wondered if the film would be able to see star reflections at all. How is it that I could see this debris anyway? The moon wasn't bright enough to light the scene in this way.

The Many Glacier Hotel is an old renovated lodge-like building. A combination of rustic log construction and swiss chalet trim makes it a novel structure at the edge of the lake. Its five stories make it seem unnaturally tall, even in an environment of tall lodgepole pines. Each floor has a lakeside balcony, each balcony connects with an outdoor stairway, each staircase with an access door from the hotel illuminated by floodlights. Here was the source of my unwanted lighting.

I proceeded up the stairway, stopping at each door, and with gloves normally intended for cold-protection, unscrewed each overhanging floodlamp bulb until the entire end of the hotel became dark. It was a clandestine act, but in the name of fighting local light pollution I committed the deed.

The moon was still setting, now behind the distant peak of Swiftcurrent Mountain. Wisps of clouds were coming in, the air frequently breaking the glass surface of the lake, but I made a one-hour exposure, this time without the distraction of the foreground lake bottom.

Glacier Park MT
25 July 2001
Pentax 67 with 55mm lens at f/4
60 minutes on Fuji Provia 100 +2 stop push

Skinny-dippers

As I unloaded equipment from my car, a fully occupied, muffler-deficient vehicle drove into the dead-end road and parked next to me. Its boisterous occupants piled out and gradually noticed me as they tried to organize themselves for the next phase of their outing. Their effervescence subsided momentarily as they tried to figure out why a lone man with a red flashlight would be at the end of this road at midnight. One of two women in the group, after confirming my non-relationship with law enforcement explained, "We're going skinnydipping…so what're you doing? Wanna join us?"

I politely declined.

As I set up my tripod and framed the picture I sought, the party continued at the shore, their jokes and laughter flowing out over the lake surface, but otherwise not affecting the composition in my viewfinder. I opened the shutter, hoping to get an hour's worth of startrail arc. Maybe the group would forget about swimming, now that they were actually at water's edge. It's one thing for someone to make the suggestion, quite another to carry it out. A sudden splash followed by an excruciating scream interrupted my vicarious participation in the party. Another splash, another scream, then two more with associated hollering.

I had learned better than to close my shutter and pack up. With nighttime pictures one is never certain of the results, and even though it was certain that my intended shot had vanished, there is always the possibility that some other, unexpected effect might be captured instead.

And this is an example of such unexpected imagery. The activities of the skinny-dippers, though invisible to me, were exposed by the patterns of light recorded over the hour that the shutter was open.

An interesting combination resulted, the prelude of calm allowed the reflection of the mountain to make an impression on the film, and then, when the rough surface finish dissolved its image, the reflection of the lights from the mountain's ski area distorted into flares of color. The film adds all the light together to make the picture.

One final detail was captured. Though I could not see the partiers as they splashed around, evidently there were favorite resting places in the water. A close look at the lake surface reveals their shadows as they paused to enjoy the sensory experience of swimming under the stars at midnight.

Mt Hood Recreation Area OR
07 Aug 2001
Pentax 67 with 55mm lens
25 minutes at f/4 on Fuji Provia 100 +2 stop push

Frog Lake

Mt Hood stands silently in the late summer twilight as lights blaze at the ski area that is open all year round. The waters of this lake are calm enough to mirror the scene as the stars make an hour's travel around Polaris.

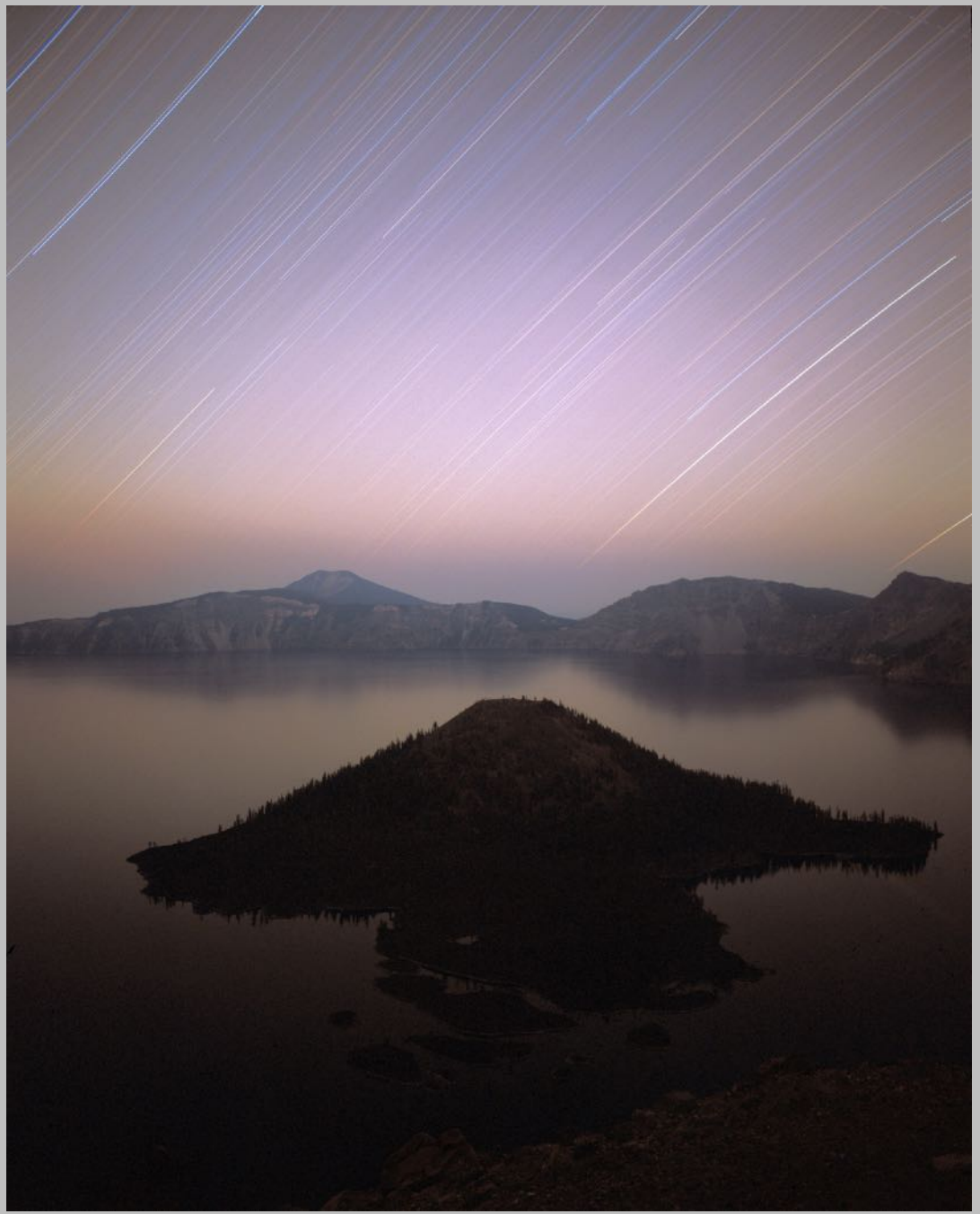
Mt Hood Recreation Area, OR
August 2001
Pentax 67 w 55mm lens at f/5.6

Crater Lake

The states of Washington and Oregon were filled with the smoke of their burning forests in the summer of 2001. The weather patterns did not provide quenching rain, but instead fanned the flames with strong winds. Strong enough that even the famously calm reflecting surface of Crater Lake was roughened such that the startrails I sought to capture made only a frosty reflection.

The sky, normally clear and blue, acquired amber tones, a side effect of the forest fires filling the air with smoke for weeks before. It gives a warm feeling to this long exposure. The foreground is Wizard Island, often photographed during the day; here is its appearance when illuminated by smoke-colored starlight.

Crater Lake National Park
August 14 2001
Pentax 67 with 55mm lens
3 hours at f/4 on Fuji Provia 100 +2 stop push



Teton Trails

I had managed to book a room in Jackson, successful only because the tourist levels had declined slightly as roads closed to forest fires. In spite of my luck, I did not spend the night there! I proceeded to Grand Teton Park and set up my cameras and telescope at one of the trailheads. There was no moon, the sky was crystal clear, conditions perfect. The only illumination in this 4-hour exposure is starlight, yet the features of the mountains are visible. Eagle-eyed scrutiny may reveal some of the trails leading to the summits, exposed by night climbers, their flashlights punctuating the turns and twists of their route.

16 August 2001
Grand Teton National Park, WY
Pentax 67 with 55mm lens
4 hour exposure at f/4 on Provia 100 pushed 2 stops

Old Faithful, Even at Night

Does a geyser erupt when no one is there to see it? Here is Old Faithful erupting on schedule, long after the crowds have abandoned the benches on the boardwalk. The Big Dipper bowl stars lie behind it.

Even though the tourists have gone, the lights in the area cast colors on the steam as the wind carries it away. Green and orange from the mix of lights from the nearby hotel and parking lots are accented by the sweep of an occasional headlight as cars and campers find their way home.

Yellowstone National Park
17 August 2001
Nikomat with 50mm lens
15 sec at f/1.4 on Elite Chrome 200 +2 stop push

Devils Tower in an Hour

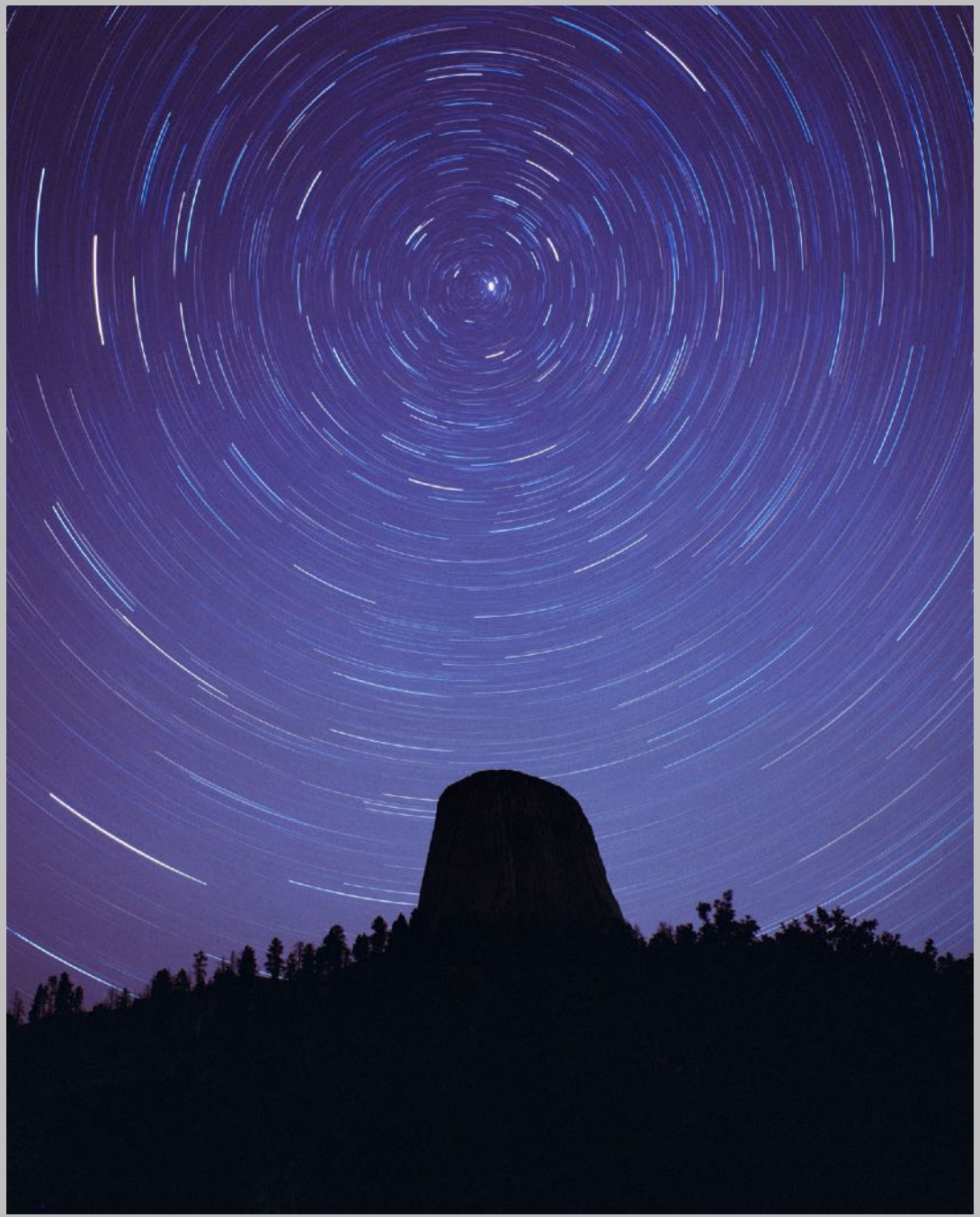
At the entrance to the National Monument there was a one-hour photo lab, an incongruous business next to the tourist-pandering souvenir store. I was surprised to find it there, but evidently there were enough tourist snapshots to support it, so I was pleased to take advantage of its services. I brought in my roll of LE400; it had the one single shot that I took last night when the clouds broke. I was hoping to find out if the exposure was going to be usable or if I should plan on spending another night to try again.

The photo lab was run by two women who were distinctly unexcited to see me-- a scruffy long-haired guy who had been out camping the last couple days-- coming in with a single film cassette. One of them started to make fun of me because I told her there was only one exposure on the roll. She must have thought I was nuts.

Well, since it was a one-hour photo lab, I came back an hour later and I encountered a completely different response. She was effusive in expressing how excited she was and asked "How did you ever take this picture?" She wanted to know if she could have a print?, could she show people?, how did I?, where did I?…

So this one picture, an orphan on a full roll of otherwise empty film had completely changed her attitude toward me. I was now a rock star, and she wanted me to sign a copy of my latest hit, and so I did. She placed it prominently among her portfolio of prints promoting her one-hour photo lab in this remote and most unexpected place.

Devils Tower National Monument
20 August 2001
Pentax 67 with 55mm lens
60 min at f/4 on E200 +2 stop push



Polar Windmill

The silhouetted windmill became the symbol of a journey I took in 2001, my “nightscape odyssey”. It was the first and the last subject I photographed on the six-week trip. In between were other fascinating scenes, some that were challenged by the disappearance of truly dark skies from our horizons.

The windmill, once a common but neglected artifact of an earlier technology, has become as rare as the clear dark nights of their time. This one had survived, and was functioning, and on this night was conveniently aimed to catch an east wind that had no breath. I found the spot where Polaris could be centered in the view through the stalled blades, an awkward angle at this latitude. The exposure was timed to be exactly 80 minutes, the time for the Earth to rotate 1/18 of a full circle, the angular separation between this windmill’s 18 blades.

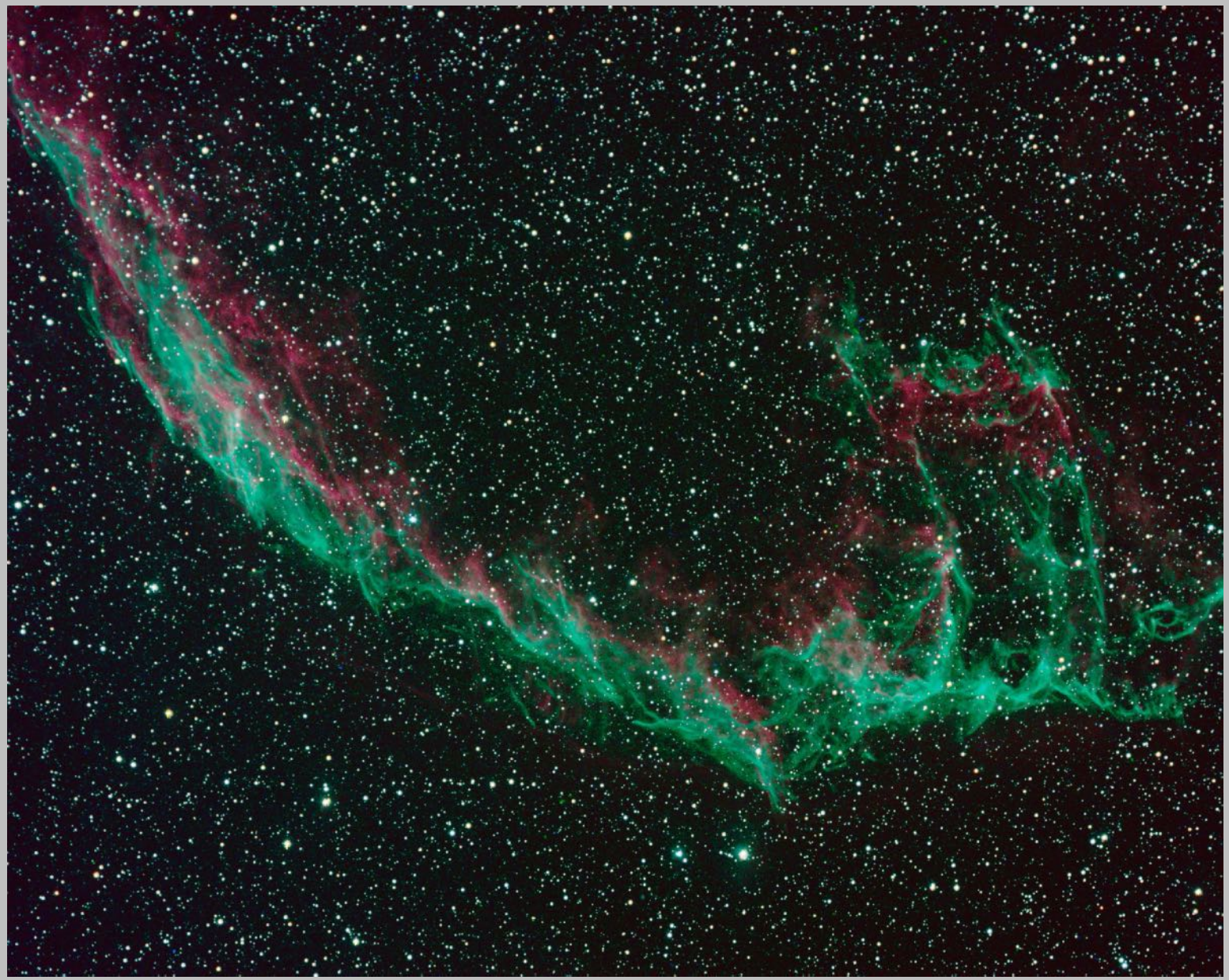
Central South Dakota
Pentax 67 w 55mm lens at f/4
80 minute exposure on Kodak E200 pushed 2 stops

Colorimetric Veil Nebula

This picture was created by colorimetrically combining six frames obtained by Mike Cook into a calibrated color space. The hues and relative intensities indicate the colors we would see if our vision was sensitive enough to see color at these low light levels.

The Veil Nebula is a supernova remnant- a star exploded, casting off a shell of gas that expands outward. The gas is hot and ionized and emits light at characteristic wavelengths. Hydrogen glows red at a characteristic 656nm, and also a blue-green at 486nm. Ionized oxygen emits green-blue light at 501nm. Most pictures of the Veil show a bright red cloud because the red H-alpha light is easy to record on film and CCD sensors. It is a challenge to display the blue-green colors because it falls in the gap between the blue and green-sensitive layers of film, and other imaging systems.

Six frames from SBIG ST-10 CCD camera using red, green, blue, H-alpha, O-III, and H-beta filters on an Astrophysics 130mm f/6 refractor. Colorimetric and spatial processing was used to combine the frames into this final image. Collaboration with astrophotographer Mike Cook.



El Capitan's Midnight Crown

El Capitan's immense figure blocks my view of the north star Polaris. I can only guess where it should be based on the time and positions of other stars. A position in an open field in Yosemite Valley allows me to make this composition.

The moonless night meant that the only illumination was by starlight. The park is sufficiently remote to escape the light pollution from large cities, but not enough to avoid airplane traffic. The distinct dotted lines mark the strobe lights of distant flights, unknowingly adding their trails to those of the stars.

Yosemite National Park
13 April 2002
Pentax 67 w 55mm lens at f/4
90 minute exposure on Provia 400

Yosemite Falls

I was given a hint that I should consider Yosemite Falls as a startrail target because the trail to it ran along a north-south path. I wasn't brave enough to hike in the dark, but I did find a vantage point from across the valley that placed Polaris directly above the falls.

The moonless night meant that the only illumination was by starlight. The park is sufficiently remote to escape the light pollution from large cities, but not enough to avoid airplane traffic. To minimize them crossing the view, this exposure was done in the very early morning hours when all the airplanes have found their destinations and the only sound in the air was the distant rushing of water.

Yosemite National Park
13 April 2002
Pentax 67 w 55mm lens at f/4
2 hour exposure on Provia 400

Altamont Windfarm

I had tried once before to get a nighttime picture of these modern-day generators, to complement my shot of a more traditional windmill. The proximity to the large population near San Francisco Bay fills the sky with light, and my previous pictures had been washed out. This time I was armed with a light pollution rejection filter and enough time to find this interesting composition. I rediscovered a characteristic of these filters- they are very angle-of-view sensitive.

Altamont Pass, Livermore CA
1 Feb 2003
Nikomat with 50mm lens at f/8
60 minute exposure on Provia 400

Orion and Friends

The constellation Orion is a distinctive pattern in the winter sky. Look for the three-star belt, with another three-star sword hanging from it. Here he is with some of his less visible friends. The large red arc is Barnard's Loop, which encircles the Orion Nebula (lower of the two red areas) and the Horsehead and Flame Nebulas.

Betelgeuse is the red giant star at Orion's shoulder, not to be confused with the circular red Rosette Nebula to the left. The bright blue star at the lower left is Sirius (the Dog Star), and sailing above it in the blue river of the winter Milky Way is the red wisp of the Seagull Nebula.

Lake Superior shoreline near Two Harbors, MN
March 2004
Pentax 6x7, 55mm, f/5.6
E200 +2 stops, 20 minutes, guided

Split Rock Lighthouse

Spring comes late to the Arrowhead Region of Minnesota. Snow was an obstacle to bringing equipment to this site, but once there, I could enjoy a solitude that amplified the sounds of the great lake. The beating of waves against the shore diminished through the evening as the temperature dropped and the water in this back bay was held captive and quiet beneath a thin ice glaze. Occasional cracks and "tinks" were heard as daytime puddles froze in their rock bowls.

This time exposure captures the stars traversing their east-west passage over the recently thawed waters of Lake Superior. Park security lamps are now the only light on the famous cliff, illuminating the distinctive shape of this former, but now dark, guardian beacon.

Two Harbors, MN
21 March 2004
Nikomat with 150mm lens at f/5.6
60 minute exposure on Provia 100 +2 stops

Bridalveil Falls

The stars follow their gradual southern arcs parallel to the terrain during this 90 minute exposure. The water is unusually high this season, catching and reflecting starlight during its freefall down to the valley floor, the long exposure creating a flowing river of mist not possible to capture during the bright daylight hours.

Yosemite National Park, CA
April 2004
Pentax 67 w 55mm lens at f/4
90 minute exposure on Provia 400

Yosemite Meteor

Yosemite Falls is at a thunderous volume in this season, seeming to pour starlight over the edge of the cliff into the valley. The water continues its downward path via Lower Yosemite Falls, the dim watery glint reflecting a moonless night.

A meteor bright enough to light up the forest flashed through the sky just before the end of this 90-minute exposure. A fireball that left a glowing plasma trail, it is a member of the Lyrid meteor shower, an annual April event. It cuts a chord across the arcs of stars making their daily tour around Polaris.

Yosemite National Park, CA
22 April 2004
Pentax 6x7 w 55mm lens at f/4
90 minute exposure on Provia 400

Half Dome

During the day, Yosemite must have the highest number of tripods per capita in the world. Mine is set up at night during this difficult hour. Traffic, in the form of late arriving tourists, security rangers on patrol, and mangy coyotes, all serve to distract me while exposing this shot from Sentinel Bridge.

Half Dome, the signature shape of Yosemite, is illuminated by starlight, revealing the patterns of rock varnish on its face. The faint light from the sky also reflects gently on the Merced River as it flows beneath my vantage point.

Yosemite National Park, CA
April 2004
Pentax 67 w 55mm lens at f/4
60 minute exposure on Provia 400

Yosemite Valley Moonlight

The light of a setting crescent moon illuminates the famous valley. El Capitan looms on the left, a point of light is seen on its face, the flashlight of a climber, strapped to the wall for an overnight pause in progress. Half Dome is in the distance, and Bridalveil Falls pours reflected moonlight into the valley, the headlights of cars seeming to carry it downstream alongside the Merced River.

Yosemite National Park, CA
April 2004
Pentax 67 w 55mm lens at f/4
60 minute exposure on Provia 400

Monumental Sunset

As I approached the Navaho Nation, the sun set and I was able to take this photo of Monument Valley, silhouetted by the glowing sky.

Utah, northeast of Monument Valley
2 November 2005
Canon EOS 20Da

Earth's Shadow behind Monument Valley

As the sun sets in the west, the view to the east shows a distinct purplish band at the horizon. This is the Earth's shadow on the sky, a forecast of the twilight to come.

Monument Valley, Navaho Nation
3 November 2005
Canon EOS 20Da

One Day Moonument

A beautiful composition where a very young moon, maybe less than a day old, following a short distance behind the setting sun, accents the sky.

Monument Valley, Navaho Nation
3 November 2005
Canon EOS 20Da

Monument Valley Moon

A day later, a crescent moon accompanies the ancient monument.

Monument Valley, Navaho Nation
4 November 2005
Canon EOS 20Da

Monument Valley Lightshow

A 90-minute exposure captures a variety of lights. The stars mark their clockwork passage across the sky of course, but civilization also leaves its mark. Airplane beacons flash as they pass through, distant towns show on the horizon, and local traffic finds its way along the private road below. Private, but not unseen, and when the headlights aim in my direction, with the lens wide open, the film captures their flare.

Monument Valley, Navaho Nation
4 November 2005
Canon EOS 20Da Pentax 6x7, 55mm f/3.5, 90 minutes
Kodak E200 +1 stop push

Monument Valley Earthshine

There is enough earthshine to illuminate the night side of the moon.

Monument Valley, Navaho Nation
4 November 2005
Canon EOS 20Da

Orion Nebula HDR

An early experiment in using different exposures to build a high dynamic range (HDR) image of the Orion Nebula. The "Running Man" nebula is revealed to its upper left.

Monument Valley, Navaho Nation
5 November 2005
Televue 85 f/5.6
Canon EOS 20Da

Pleiades

Also known as the “Seven Sisters”, the wispy blue glow is from dust reflecting the light of these nearby stars.

Monument Valley, Navaho Nation
5 November 2005
Televue 85 f/5.6
Canon EOS 20Da

Flatirons and the Moon

This is an early experiment in taking star trail photos with a digital camera. Ninety exposures of 1-minute each were composited with the "lighten" blending mode in Photoshop. During this elapsed time, the moon entered the frame. It has been dodged out except for its position in the final exposure.

I had traveled to Boulder Colorado frequently, where this section of the Rocky Mountain's front range offers protection and beauty to the CU campus. In all of my prior trips, the days were sunny and clear, but when the sun set, the mountains pulled a blanket of clouds over themselves.

Not so on this day, the day I had come to see my son graduate. A few wisps of moisture drifted across the peaks, but the sky stayed open, and the full moon illuminated the slabs of the flatirons with its distinctive diffuse light.

In the high resolution copy of this image, the individual exposures are discerned. Each was actually 55 seconds long, separated from the next by 5 seconds. This is too long a delay, the gaps between the star trail segments is visible. At lower resolution, the segments merge together to form the classic pattern of stars apparently streaming across the sky.

Boulder Colorado
12 May 2006
EOS 20Da, EF-S 10-22mm at 22mm
55sec, f/5.6, ISO 200

Sentinel Point

Sentinel point in Yosemite National Park. One of my first digital startrail images comprises four exposures of 15 minutes each. Image composited and noise reduced in Photoshop.

Sentinel Point, Yosemite
27 April 2006
Canon EOS 20Da, EF-S 10-22m at 10mm
4 x 15 min at f/4, ISO800

Horseshoe Bend

I had learned that there was a famous feature of the Colorado River called Horseshoe Bend near Page, Arizona but it was not particularly obvious to travelers passing through that town. Sure enough, marked by an inconspicuous sign, I found a parking area at the trailhead of a half-mile hike that ends abruptly at the rim of the canyon. A thousand feet below, the river makes a dramatic winding around this peninsula from the far side plateau. It is a huge view; this wide angle shot attempts to fit it all in.

A nearly full moon is out, illuminating the scene. This is a composite of individual frames, each of 5 minute duration taken over a two hour period. During that time, clouds of various types drifted past, sometimes obscuring most of the sky. This image shows the first 30 minutes and the last 40 minute periods of the total time, revealing the brightest stars trailing across a lunar-lit sky.

Horseshoe Bend
4 Nov 2006
EOS 20Da, EF-S 10-22mm at 10mm
5 min, f/8, ISO 100

Zion Watchman

The Watchman is the peak that dominates the campground at the south end of Zion National Park. This is a view up the valley of the Virgin River over an hour and a half period, at the end of which the moon rose and illuminated the canyon walls. Trees and camping vehicles were occasionally lit by the headlights of a late-to-bed car finding the way to its campsite.

Zion National Park
6 May 2007
Canon EOS 20Da, EF-S 10-22mm at 10mm
12 x 8min at f/5.6 ISO 800

Mitten Buttes at Sunset

West Mitten and East Mitten Buttes of Monument Valley are bathed in late afternoon lighting, the geology further reddened by the beauty light of sunset.

Monument Valley, Navaho Nation
7 May 2007
Canon EOS 20Da, 17-55mm (21mm)
1/500 at f/11, ISO 400

North Window

It is possible to drive to the floor of Monument Valley and enjoy a 17-mile loop that presents magnificent views of the geology wonders here. At one point along the drive is this view, called the "North Window", a particularly beautiful scene in the moments before sunset.

Monument Valley, Navaho Nation
7 May 2007
Canon EOS 20Da, 17-55mm (38mm)
1/500 at f/8, ISO 400

Monument Valley

Gouldings Resort is a historical island of lodging within the island of the Navajo nation within the state of Arizona. It borders the sacred area of Monument Valley whose iconic mitten shapes are seen silhouetted on the horizon. The resort itself is in the lower foreground, casting its bright lights onto the eroded red walls of the ancient mesa.

This is a composite of 14 exposures representing an elapsed time of almost two hours. Evening travelers through the reservation are seen on the distant road. Some are workers preparing for an upcoming weekend airshow event that will feature the monuments as a backdrop. Hollywood westerns were once the source of this activity, but the only signs of those movies now are nostalgic photos and posters found in museums, and hotel lobbies.

Monument Valley
8 May 2007
EOS 20Da, EFS 17-55mm at 35mm
8 min, f/8, ISO 400

Pikes Peak

Pikes Peak dominates the city of Colorado Springs and can be seen for hundreds of miles around. I did not attempt to climb or drive it, but found a view from across the valley above Woodland Park. There is considerable light cast on the sky from these growing urban centers and the fresh snow dusting Pikes Peak reflects it. The clear mountain air shows the southern stars of the Milky Way traversing the space above.

This is a combined exposure (from film) of 3-1/2 hours. Even though this is a remote forest road, in that time there is certain to be traffic, and headlights can be seen traveling the road in the meadow below the great mountain.

Pikes Peak, CO
1 Nov 2007
Pentax 6x7, 55mm at f/5.6
120 min + 90 min on Provia 400

Comet Holmes

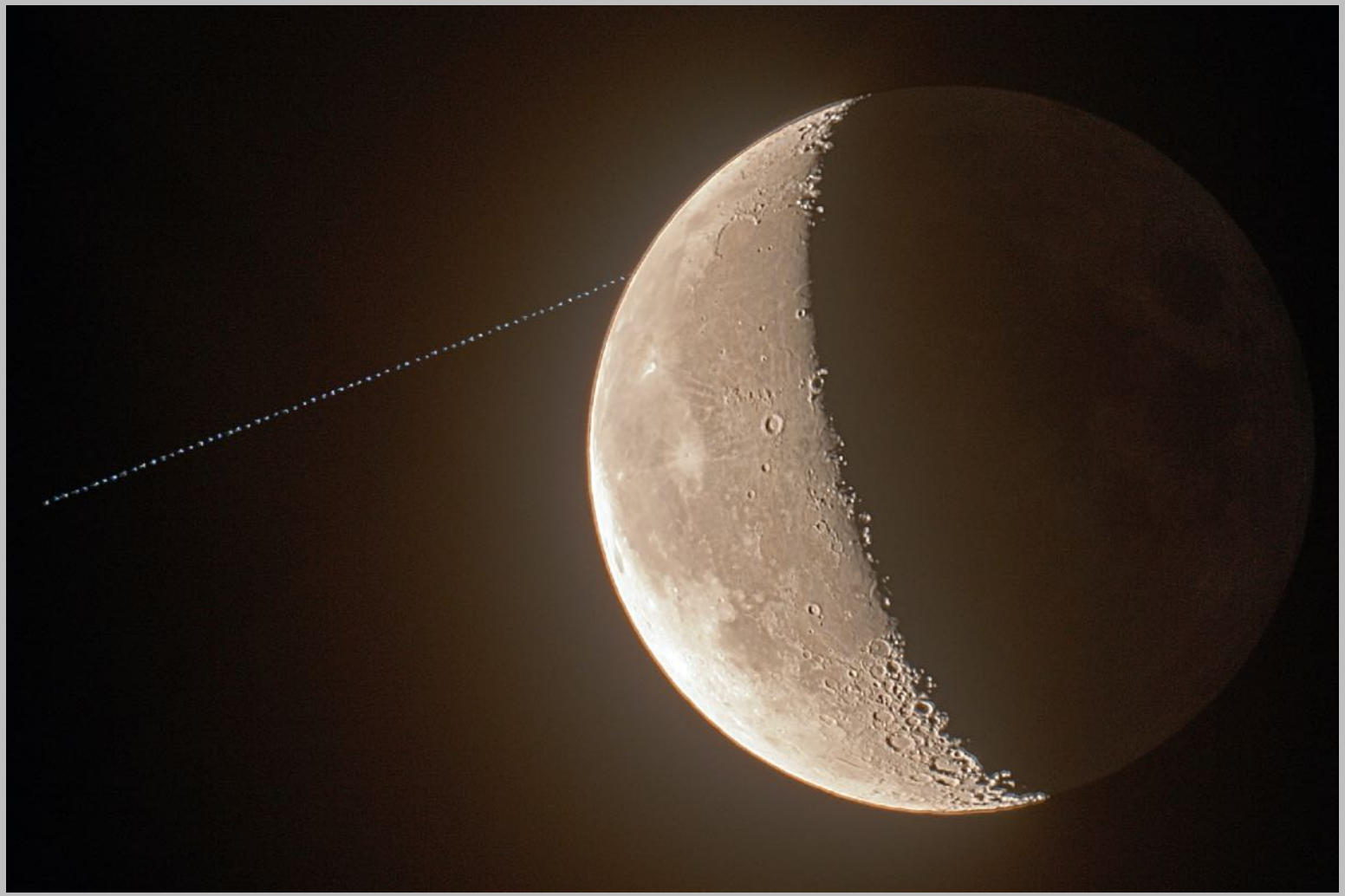
In 2007 a comet passed through our neighborhood and allowed me a chance to try the high dynamic range (HDR) imaging techniques that were being developed at that time. The idea is to combine a range of exposures to get a large range of detail. In this case 10 exposures covering the range from 1 second to 8 minutes are combined, selecting the best tonal information from each. This allows the otherwise obscured ion cloud surrounding the dusty nucleus to become visible as a faint blue-green glow. I was able to use this image as an HDR example in a conference presentation I made on this topic the following week.

2 November 2007
Takahashi CN212 in Newtonian configuration (f/4)
Canon EOS 20Da, ISO 800

Regulus Occultation

When the moon, in its monthly travel around Earth, moves across a bright star, it is called an occultation. On this date, the moon is moving toward the bright star Regulus. Here is a superposed series of pictures taken over 1 hour as Regulus apparently "approaches" and then is eclipsed by the moon.

3 November 2007
Takahashi CN 212, Newtonian configuration, f/4
EOS 20Da, ISO 800, 1/500 sec
superposition of successive exposures one minute apart



West Mitten

This is a picture I have attempted to capture over many years. At each of my travels to an annual conference, I would take one end of the week to drive to remote corners of Arizona. I shipped my camera and telescope equipment ahead to meet me and would then have a chance to do imaging under the clear, dark and arid desert skies.

The landscape at Monument Valley is unique, but access to the area is restricted. It straddles the Arizona-Utah border and is within the land of the Navaho Nation, that unproductive unwanted area partitioned off to contain the remnants of a people conquered by the westward expansion of a growing country. The land may not be organically fertile, but the landscape is spiritually rich, and many visitors come to see and experience it. The Navaho park around the monuments permit limited tours during the day, and is closed completely at night.

Even so, my first visits allowed me to stay at a campground with a view of the signature shapes of two monuments known as the "mittens"; their offset columns make them look like the thumbs in a pair of mittens. The view was obscured however and a clear night sky portrait would require a viewpoint from somewhere deeper in the park.

The road into the park is a rough cut into the desert floor that is a challenge to just about any vehicle. During the day, the ruts and holes and sandtraps are visible if not always avoidable. At night, access is blocked. To reach the vantage point that would make the picture in my minds eye, I would need to find a way.

On this night, a last chance before I needed to depart for home, I arrived after dark and worked my way to a position I thought would give me that picture. It was an uneasy moment however, and I felt that I was trespassing on sacred ground. I expected at any moment that park security would show up and escort me out. I almost abandoned my plan, but after some time in the dark and quiet, decided that I had traveled far and hard to bring myself to this place, and that I should go ahead and attempt to capture the spirit of the land and sky on that evening.

I set up my cameras and started their exposures. Once started, I waited quietly, watching the Big Dipper work its way behind the monument, like clock hands indicating the time and season. Two cars lumbered and lurched past me on their way to homes further in the valley. It occurred to me that even if they noticed, they would perhaps be more fearful of an unknown vehicle parked darkly off the side of the road than offended by someone taking pictures of their beautiful land.

After five visits and as many unsuccessful attempts, I was finally able to make this picture of the West Mitten as the landscape rotates under the North Star.

Monument Valley, Navaho Nation
14 Nov 2007
EOS 20Da, EF-S 10-22mm at 20mm
21x300 sec, f/5.6, ISO 800

Owachomo North

Natural Bridges National Monument is in Utah and is the first International Dark Sky Park. It is so remote, and the air so dry, that one can see stars all the way to the horizon! And nowhere on that horizon is any hint of city light dome. The park itself is powered by a solar array; the residents are misers in conserving their battery power.

The bridges are not to be confused with "arches" (found in a national park elsewhere in the state), as they are formed by different geologic processes. There are three popular bridges here, accessible by short hikes. This one suited my purposes best, lying on an east-west axis and in a valley allowing a view at the celestial pole. Across a dry riverbed, I found the position to capture this low angle composition.

I set up my cameras (I was also shooting film) and started the exposure sequence. The moon was in the process of setting and it illuminated the texture of the rocks, and also helped me find my way back to the trail head where I had a telescope and mount. I enjoyed some deep sky observing, but then needed to get back to tend my cameras. The 15-minute hike was now in complete darkness. A flashlight was needed to avoid wandering off into the desert at a missed trail marker, and the last of it was the climb under the bridge and down into the riverbed. The route I took is apparent.

Natural Bridge Owachomo (North)
15 Nov 2007
EOS 20Da, EF-S 10-22mm at 10mm
18x5min, f/6.7, ISO 800

Owachomo South

The view to the south at Owachomo Natural Bridge does not include the south celestial pole, but it clearly shows the stars revolving around it. At higher elevations, the stars transition across the celestial equator, and then arc the other way, following the rules for the northern hemisphere.

Natural Bridge Owachomo (South)
15 Nov 2007
EOS 20Da, EF-S 10-22mm at 10mm
18x5min, f/6.7, ISO 800

Serengetti Startrails, East

A safari in Tanzania takes one almost exactly to the Earth's equator. A camera pointed east to make a startrail image will show those due-east stars taking paths perfectly perpendicular to the horizon. Stars to the north and south bend toward their respective centers of apparent motion.

Serengeti National Park, Tanzania
14 June 2008
Canon EOS 30D, 10-22mm (10mm), ISO 400
composite of 3-minute exposures at f/6.7

Serengetti Startrails, North

A safari in Tanzania takes one just south of the Earth's equator. Here there is no visible North Star; it resides just below the horizon, obscured by the acacia trees and grasses of the Serengeti plain. A startrail image reveals its implicit location; the arcs to the north are perfect semicircles.

Serengeti National Park, Tanzania
14 June 2008
Canon EOS 30D, 10-22mm (10mm), ISO 400
composite of 3-minute exposures at f/8

Wild Goose Island

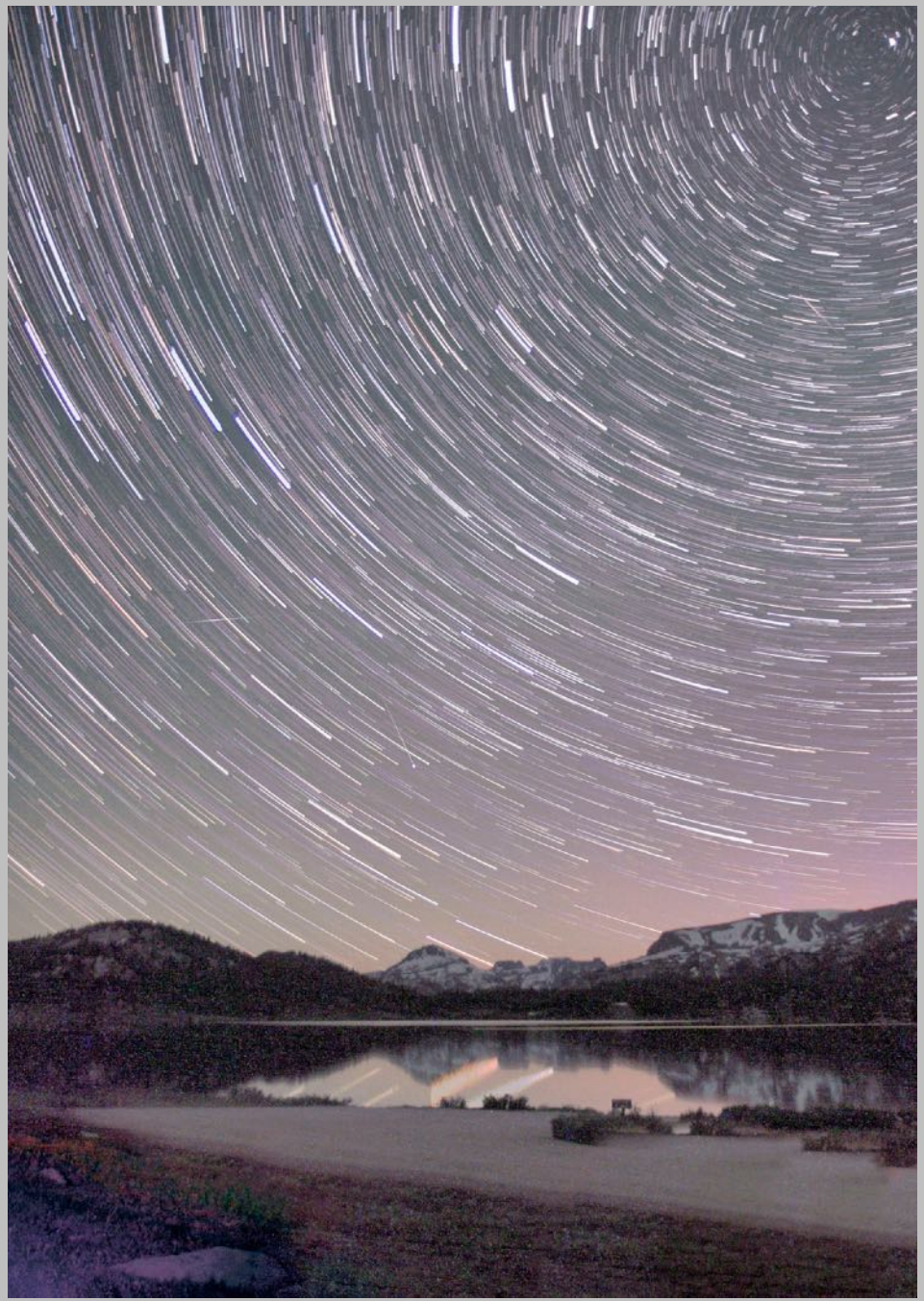
I return to this iconic overlook in Glacier Park and try again. Previously (2001), the weather compromised the view, tonight it is perfectly clear and the traffic over Logan Pass nonexistent. The pink smudge to the left is not a cloud, it is the core of the Milky Way, moving its way across the sky on a beautifully clear August night.

Glacier Park, Montana
25 August 2009
Canon EOS 20Da, 10-22mm (10mm) at f/3.5, ISO 3200
Composited series of 8-second exposures
over a duration of two hours

Beartooth Pass at Midnight

I had been here before, in 2001, attempting to recreate a scene of the night sky reflected in a calm alpine lake. I didn't succeed then, but here I was with another opportunity. I'm still not fully satisfied; I guess I will have to come back and try again!

Beartooth Pass, Montana
25 July 2011
Canon EOS 20Da, 17-55mm (17mm), ISO 1600, f/2.8



Transit Sunset

It is rare for Venus to pass in front of the sun and so I assembled telescopes and equipment and hosted a picnic, inviting family and friends to view an event that won't happen again for a hundred years. We spent the afternoon and evening watching the silhouette of Venus move slowly across the face of the sun until it dropped behind clouds and trees at sunset.

Minneapolis MN
5 June 2012
Canon EOS 20Da on Televue-85

Kilimanjaro Sunrise

The silhouette of the famous mountain shows behind acacia trees as six hours of startrails are recorded and dawn will soon arrive.

Amboseli National Park, Kenya
28 October 2013
Canon EOS 60D, 17-55@17mm
Blend of exposures 10 minutes @ f/5, ISO 400

Samburu Sunrise

An acacia tree is illuminated by six hours of starlight and the brightening pre-dawn sky at a game reserve in Kenya.

Samburu National Reserve, Kenya
31 October 2013
Canon EOS 60D, 10-22mm f/3.5
Blend of exposures 10 minutes @ f/5, ISO 400

Orion Over Kilauea

Kilauea is an active volcano on the Big Island, Hawaii, and the central feature of Volcano National Park. In the previous years there had been lava flows from vents further down the slopes of the edifice, but the crater at the top maintained a relatively stable pool of molten rock and gas emissions, stable enough that roads, trails, and a visitor center were constructed along the rim for visitors to enjoy and learn from it.

The visitor center was very popular, especially at night, and on this evening we enjoyed the spectacle of a lake of hot lava, along with many others that overflowed the visitor center parking lot. Park rangers gave presentations as we watched the boiling cauldron emit a plume of gases and steam. As I prepared a camera on a tripod, one of them made a suggestion that I could step beyond the tourist line and find a position along the crater wall that would offer a more photogenic view.

I was very appreciative of this implicit permit, and soon found a position along the trail where I could include the fiery exhalation of the lake of lava, a tree that had survived these conditions for its lifetime, and a view of the sky that included the constellation of Orion.

28 December 2014
Volcano National Park, Hawaii
Canon EOS 60Da, 10-22mm (10mm), ISO 800
30 sec at f/4

Fire Behind Rising Wolf

Forest fires have become common occurrences in our western states, a consequence of global warming, and our national parks are not immune. On this date we could enjoy the facilities of our campground at Two Medicine Lake, but other areas of the park were closed off, including those just north of the distinctive peak of Rising Wolf. The glow of the fire is reflected by the smoke in the sky in this startrail exposure.

Glacier Park, Montana
13 August 2015
Canon EOS 60Da, 10-22mm (10mm)
ISO 800, f/8
Composition of 4-minute exposures.

Lodgepole Campground

A serendipitous stay at a National Forest campground, where we enjoyed the burbling sounds of the river and watched fly-fishers ply their way into the waters to test their fishing skills. At night, the stars travel their usual paths, and the sky silhouettes the pine covered ridge on the other side of the creek.

Pioneer Mountains Scenic Byway, Montana
14 August 2015
Canon EOS 60Da, 10-22mm (10mm), ISO 800
2-hour composite of 15-minute exposures at f/8.

Makoshika

A beautiful state park along Montana's Dinosaur Trail.

Makoshika State Park, Montana
24 August 2015
Canon EOS 60Da, 10-22mm (10mm), ISO 400
Two hour composition of 5-minute exposures at f/5.6

Super Blood Moonrise

A “blood moon” is the name given to a total lunar eclipse, due to its reddish color when in the Earth’s shadow. The title “supermoon” is given to a full moon when it is at its closest approach, making it appear a bit larger than average. When a lunar eclipse happens at this perigee, it may be called a super blood moon.

This is a picture at moonrise over Lake Nokomis, just before the lunar eclipse began. The orange color is not the blood of the eclipse, it is the normal colors of the sun and moon while rising or setting.

Nokomis Lake, Minneapolis
27 September 2015
Canon EOS 60Da on Televue-85 and field flattener
1/45 sec, f/5.6, ISO 400

Half Eclipse

We can see the curvature of the Earth as the moon enters its shadow. The color in the shadow is a coppery red, but it is a thousandth of the brightness of the still-illuminated half.

Nokomis Lake, Minneapolis
27 September 2015
Canon EOS 60Da on Televue-85 and field flattener
1/500 sec, f/5.6, ISO 400

Super Blood Moon

A “blood moon” is the name given to a total lunar eclipse, due to its reddish color when in the Earth’s shadow. The title “supermoon” is given to a full moon when it is at its closest approach, making it appear a bit larger than average. When a lunar eclipse happens at this perigee, it may be called a super blood moon.

At totality, the moon is entirely inside the shadow of the Earth, although it might not be perfectly centered. The color is a dark orange, but not uniformly so. It is so dim that stars, normally washed out by the moon's glare, can be seen in the background.

Nokomis Lake, Minneapolis
27 September 2015
Canon EOS 60Da on Televue-85 and field flattener
1 sec, f/5.6, ISO 800

Photographing Aurora

As ribbons of northern light drift above us, an aurora photographer arranges her next shot. The technique is not difficult and the results on the small camera screen reveal colors and textures beyond what we could see ourselves directly.

Kiruna Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
8 seconds, f/3.5, ISO 1600

Ghost Train

During this 8-second exposure, a train enters the view, its headlight illuminating the landscape. The train adds its own trails of light, including the arcs of its electrical contact with the overhead wire.

Kiruna Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
8 seconds, f/3.5, ISO 1600

Aurora Arcs

Green light from ionized oxygen dominates but is accompanied by reds from ionized nitrogen. They follow complex fields that creates sheets and apparent loops of light.

Kiruna Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
8 seconds, f/3.5, ISO 1600

Aurora at the Gates of Lapland

An auroral cloud covers the constellation Orion above the landmark gap in the mountains known as the “Gates of Lapland”

Abisko, Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
30 seconds, f/4.5, ISO 1600

Aurora Reflections 1

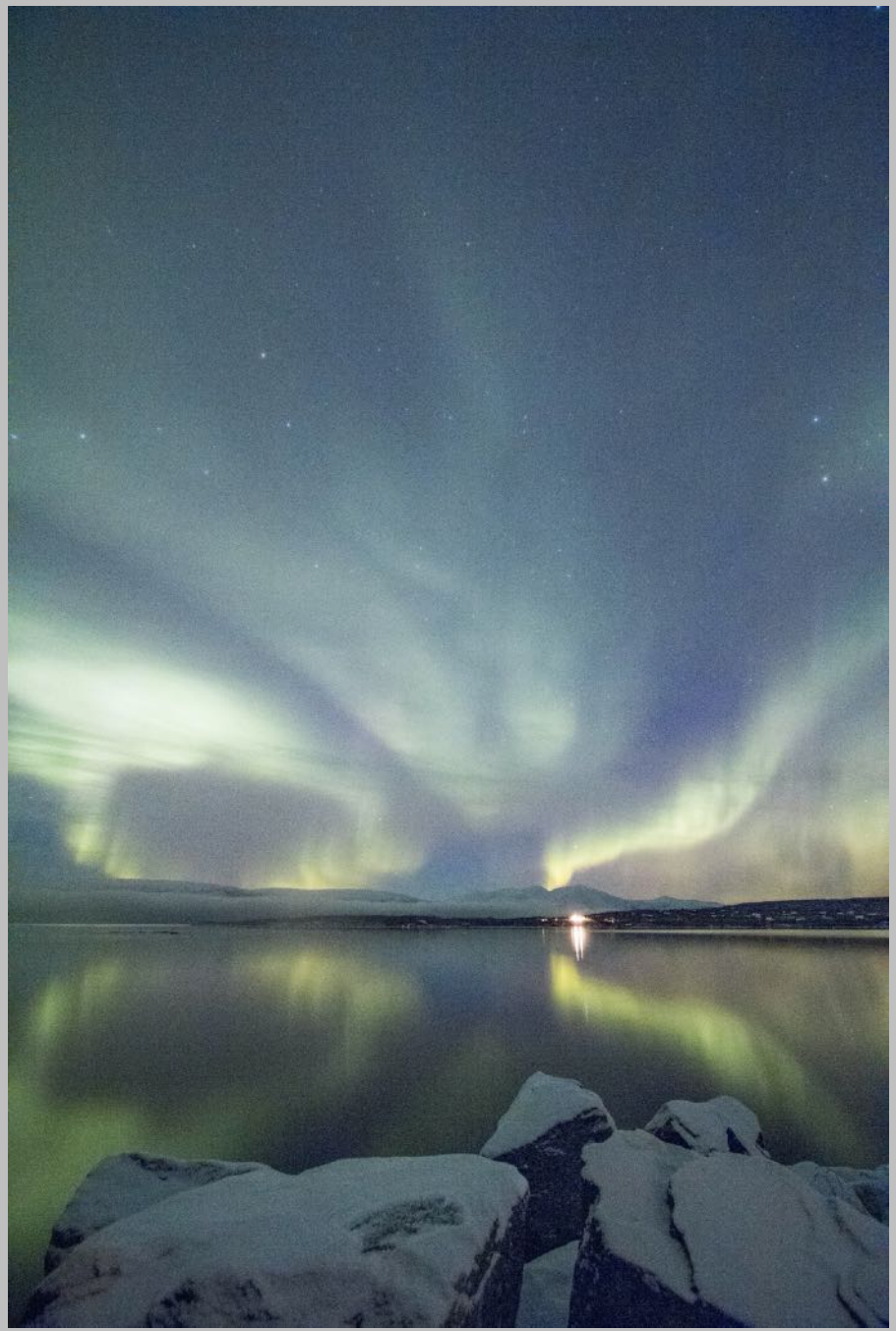
The view from the docks at the town of Abisko on Lake Trondetraske. The “Gates of Lapland” is seen in the distance as a notch in the wall of mountains.

Abisko, Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
30 seconds, f/3.5, ISO 1600

Aurora Reflections 2

Aurora reflected in the waters of Lake Trondetraske,
Sweden's longest and deepest lake.

Abisko, Sweden
16 Nov 2015
EOS 60Da with EFS 10-22mm(10mm)
8 seconds, f/3.5, ISO 1600

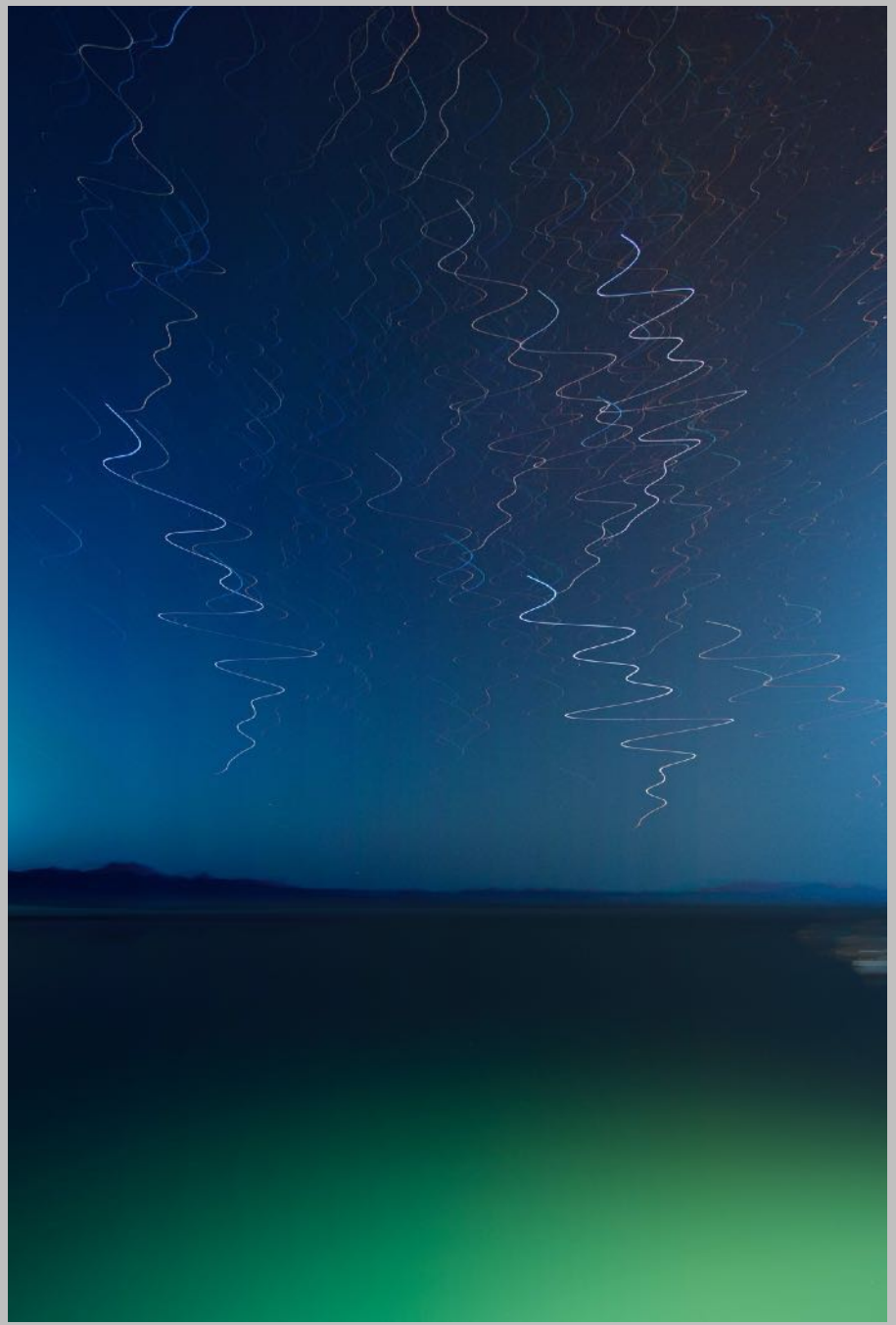


Nile Startrails

We are guests on the river boat *Omar El Kayan*, named after an Arab poet, visiting the areas of Egypt where Lake Nasser, created by the Aswan dam has submerged the ancient temples along the former banks of the Nile river. Abu Simbel was the most famous, but there were others, and we visited the sites where they had been carefully relocated.

At the end of a hot day navigating the lake, the boat moored. The wind and water were calm and the sky was dark on this section of the Nile. Out of curiosity I made a series of exposures hoping to capture the feeling of stars above the famous river and the desert around me. But calm water does not mean motionless water, and the camera recorded the small wave motions rocking the boat on which I was a passenger for the night.

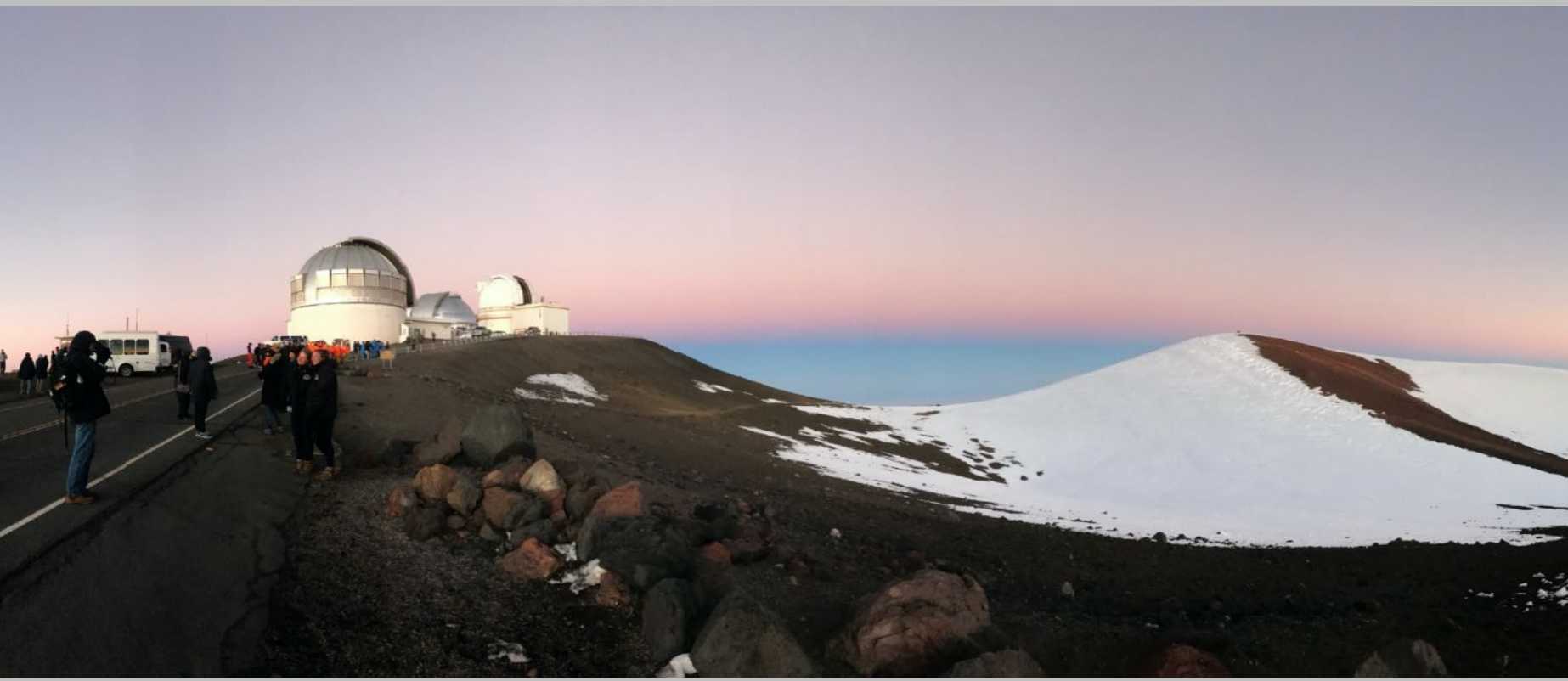
Nile River near Kasr Ibrim
8 October 2016
Composite of 23 5-minute exposures (~2 hours)



The Belt of Venus

The rosy glow of scattered twilight in the East is known as the “Belt of Venus”, which rides above the deep blue of Earth’s shadow on the sky. Here it is witnessed from the vantage of Hawaii’s tallest peak, Mauna Kea, as the world’s premier telescopes prepare for another evening of peering into the universe.

Mauna Kea, Hawaii
3 January 2017
iPhone7+ panorama



Sunset at Mauna Kea

At the top of the tallest volcanic mountains on Hawaii are the world's premier telescopes. They are here because the air is calm and dry, high above the clouds and turbulence of lower elevations. The tradeoff is cold and snow, a small price to pay for the chance to explore the secrets of the universe.

Mauna Kea, Hawaii
3 January 2017
iPhone7+ panorama

Corona

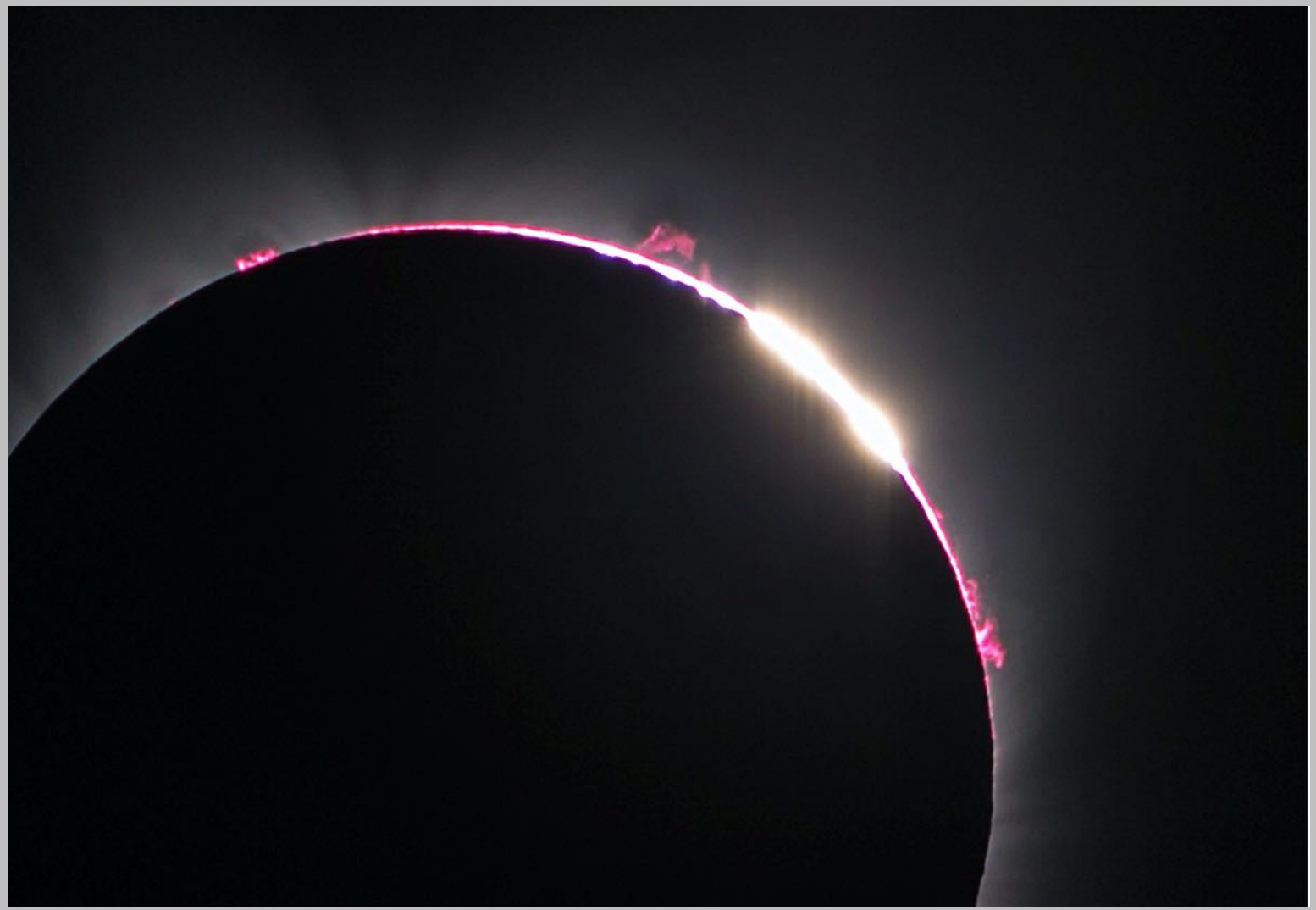
Only when the moon covers the sun in a total eclipse can its halo be seen. This is the corona, a mystery to astronomers, who only get a glimpse of it for a few minutes during totality. The dot to the lower left is the star Regulus, in the constellation Leo, suddenly visible while the sun is eclipsed.

Heise Hot Springs, Idaho
21 August 2017
EOS 6D on Televue-85, 480 mm f/5.6
HDR composite of 8 exposures

Prominences

During the Great American Eclipse, the moon covered the brilliance of the sun's photosphere, revealing the activity occurring at its surface. Deep red flares of energized gas erupt and eject for thousands of miles, then follow the lines of magnetic force back to the surface.

Heise Hot Springs, Idaho
21 August 2017
EOS 6D on Televue-85, 480 mm f/5.6



The Diamond Ring

At the end of totality, the moon starts to uncover the sun's incredibly brilliant photosphere and creates a visual effect called the "diamond ring". It lasts only a moment but leaves a remarkably strong emotional impression that may be responsible for why those that witness it, seek it again, at the next total eclipse of the sun.

Heise Hot Springs, Idaho
21 August 2017
EOS 6D on Televue-85, 480 mm f/5.6

Icelandic Aurora

At 66 degrees north, Husavik Iceland is one degree away from the arctic circle. This places it directly beneath the usual position of the auroral oval, that zone of active energized atmosphere that creates the northern lights. The weather in Iceland is often overcast, but on this day the clouds cleared, and the aurora were so brilliant they could be seen even over the lights of the city center and its active harbor.

Husavik Iceland
21 September 2017
Canon EOS 60Da, EFS 10-22mm @ 12mm
2 sec, f/4, ISO 800

Moonrise over Minneapolis

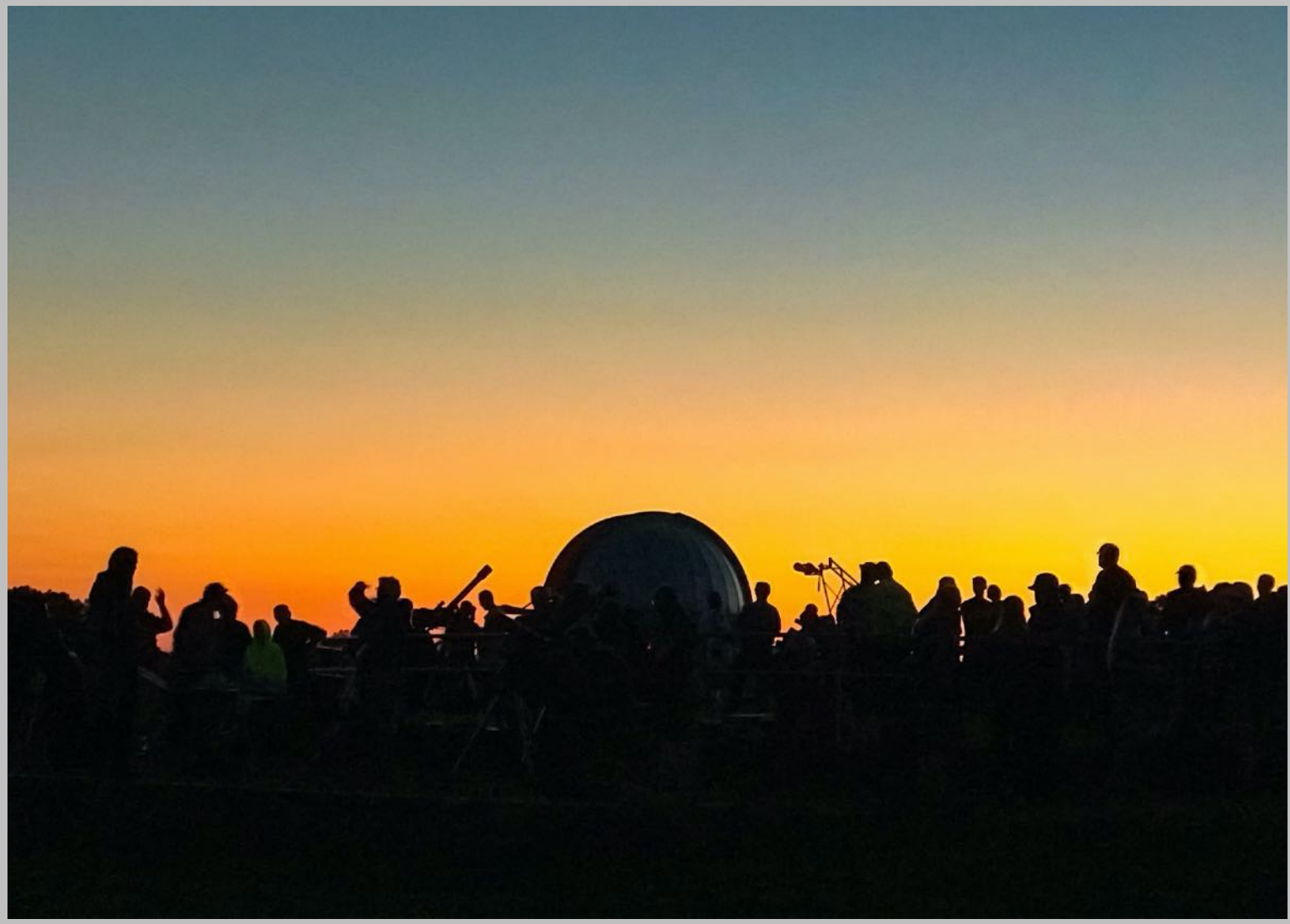
The moon rises over the cityscape of Minneapolis as its buildings start to turn on their own lighting. This is the "supermoon", a designation for when the moon is unusually close to Earth and hence, appears even larger than expected.

Minneapolis MN
2 December 2017
Canon EOS 60Da, EF 70-200mm f/2.8 @ 70mm
1/60, f/2.8, ISO 400

Astronomical League Convention

Amateur astronomers from around the country gathered at the observing facilities of the Minnesota Astronomical Society on a warm July evening in 2018. They discuss their observing plans for the night and wait in eager anticipation as the brighter planets start to appear in the fading twilight of the clear skies.

Eagle Lake Observatory at Baylor Regional Park
Young America MN
13 July 2018
Apple iPhone 7+
1/60 @ f/2.8, ISO 1250



Ayres Bridge

The Earth moves under the North Star while the moon illuminates the red rock canyon wall of Ayers Natural Bridges Park.

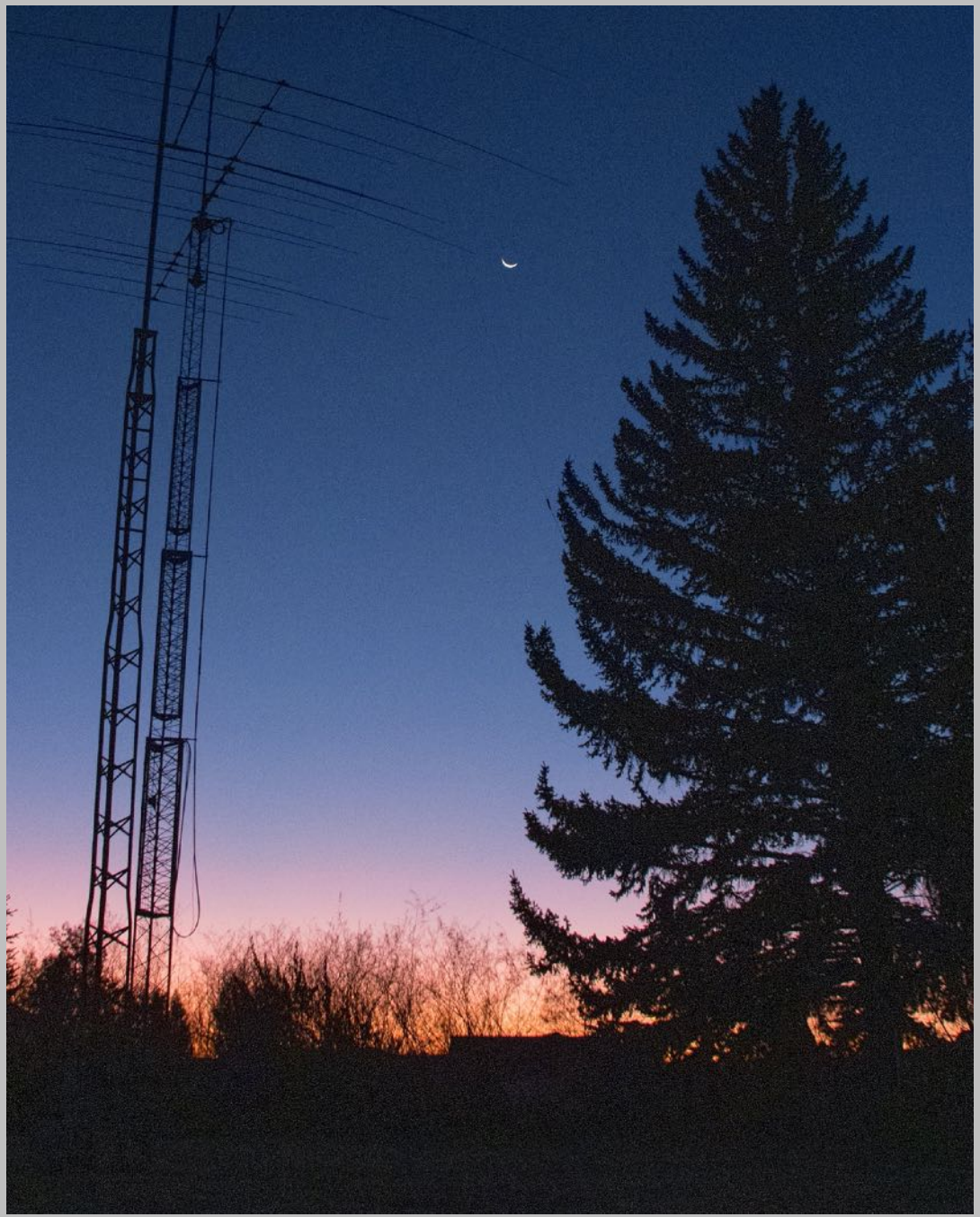
We were pleasantly surprised to discover this hidden gem in Wyoming, land donated from their ranch by the Ayres family. The park was entirely free, including campsites, but no pets are allowed. This is considered a benefit to some.

10 July 2019
Ayres Natural Bridge Park, Douglas Wyoming
Canon 60Da with EOS EFS 10-22mm(@10mm)
Composited 5-minute exposures at f/5.6, ISO 200
2-1/2 hours elapsed

Jackie's Last Moonrise

An old moon precedes the sunrise. The view from her
home in Idaho Falls where the landscape is shared with her
late husband's ham radio towers.

Idaho Falls, ID
27 October 2019



Arctic Power

The ocean of trees part to make way for electric power to cross the northern regions of Sweden. The sun has momentarily peeked above the horizon and will soon drop below it again in the days before the winter solstice at this arctic circle location.

18 Dec 2019
Jokkmokk, Sweden

Arctic Moon

A few days from the winter solstice, at the arctic circle, the moon sets at noon. The sun, hugging the opposite horizon is also about to set, casting its red light on different generations of pine trees.

18 Dec 2019
Jokkmokk, Sweden

Solstice Moonset

A few days from the winter solstice, we travel the snow-
covered roads near the arctic circle during the short day.
We watch the moon set in the northwest at the same time
the sun was rising for its few minutes above the southern
horizon.

18 Dec 2019
Jokkmokk, Sweden

Comet Neowise

A photogenic comet visits in a year when the world is shut down by a virus. We can still appreciate its beauty and find an isolated area in a nearby park. Photographing comets has become considerably easier in the twenty years since my previous attempts trying to capture Comet Hale-Bopp on film!

Excelsior, MN
20 July 2020
Canon EOS Ra with 70-200mm (200)
4 sec, f/2.8, ISO 1600

Northern Sunflower Trails

I have long been fascinated by sunflowers. On my travels across the prairies of the Dakotas I loved to encounter sunflower fields with their collective bright yellow heads all aimed in the same direction.

It is generally known that sunflowers track the sun across the sky, from east to west. I wondered what happens after sunset, when the flowers would all be facing west. With no phototropism to guide it, how would they get ready for the eastern sunrise? Would they be caught off-guard in the morning and suddenly swing their heads back at the risk of floral whiplash? Or is there a gradual re-setting of the neck-stalk fibers back to an easterly gaze?

I thought I could answer this by capturing a nighttime movie of a sunflower field. I was pleased to learn that other people share my enjoyment of sunflowers and in fact there is a small family-farmer industry of growing sunflower fields for the purpose of providing a beautiful setting for photo shoots. Weddings and family photos are popular at such places, as well as individual portraits, making enticing promotional shots for whatever the personal business or interest.

I encountered one such field in Otsego MN, planted as one of a dozen or so by Fish Sunflowers [https://www.fishsunflowers.com], an activity sponsored by Fish Realty. Each field is timed to reach its peak bloom over successive weeks in the late summer and is open to the public for their enjoyment as a way for Fish to express their appreciation to the community. On the night I was there, many families were enjoying the setting. Most had prepared by dressing up for the photo opportunity; some had brought professional photographers, who were striking photographic gold during the beauty light preceding sunset.

My project was less flamboyant than the scenes created by families and artists at the props in the field: benches, tractors, antique cars, pianos, boats etc. I was able to find locations to place my cameras that did not intrude on those photo-shoot activities but captured a feeling of being in a rural setting while watching the beauty of the sky progress through its diurnal and nocturnal rhythms

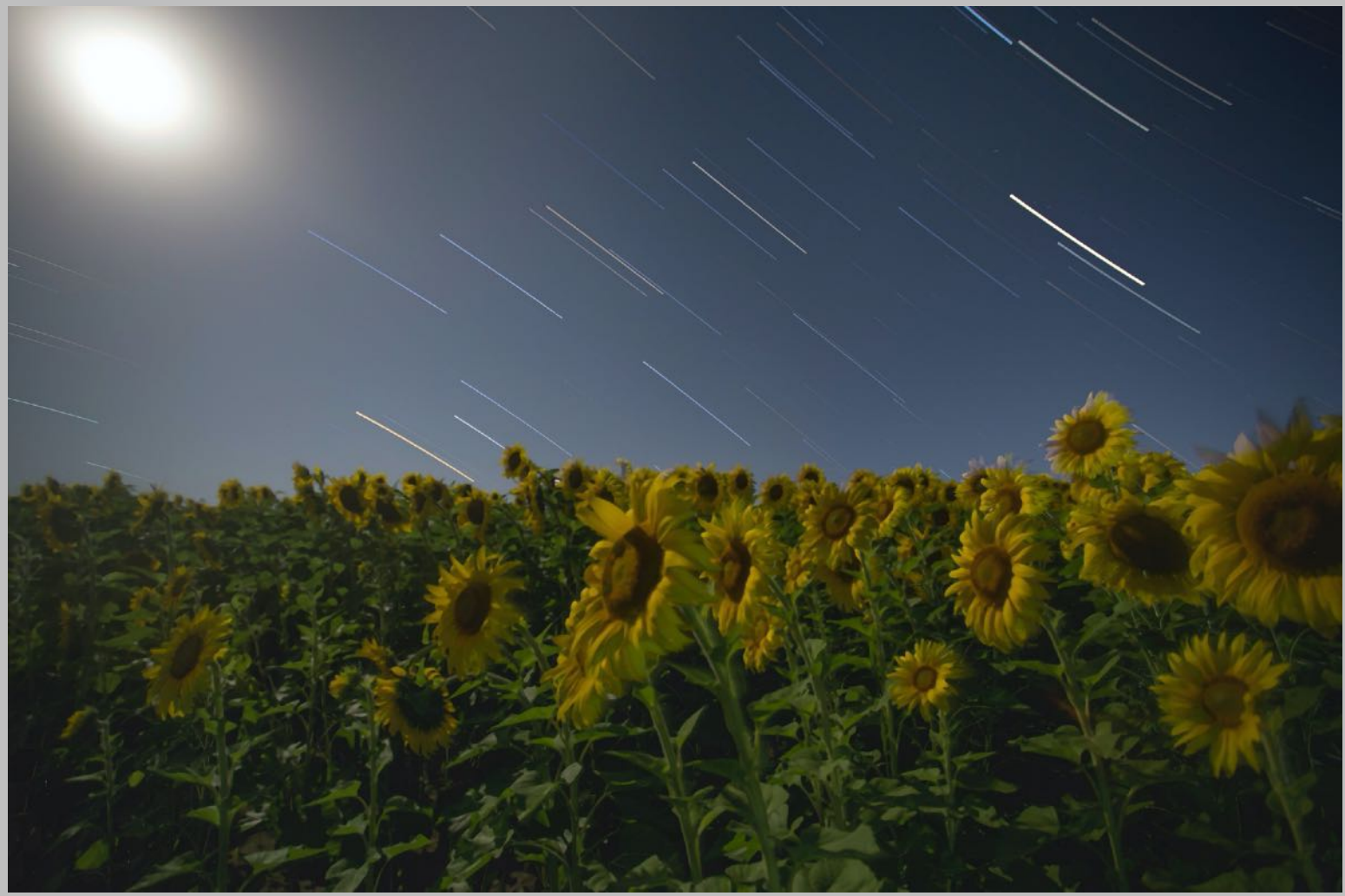
It turns out that sunflowers tracking the sun is ephemeral, it happens only during a particular growth phase, and when the blooms mature, they all face east; there is no more tracking. This field of sunflowers had reached that maturity. The mystery of what they do when they are left facing west at the end of a day of tracking, will have to wait for another day.

2 September 2020
Otsego MN
Canon EOS Ra with EFS 10-22mm(@10mm)
Blended 10 sec intervals at f/4, ISO 800, 1/2 hour elapsed

Moonflower Trails

I had another camera in the sunflower field. This one faced south and caught the arcs of stars and planets near the ecliptic. Eventually the full moon entered the scene.

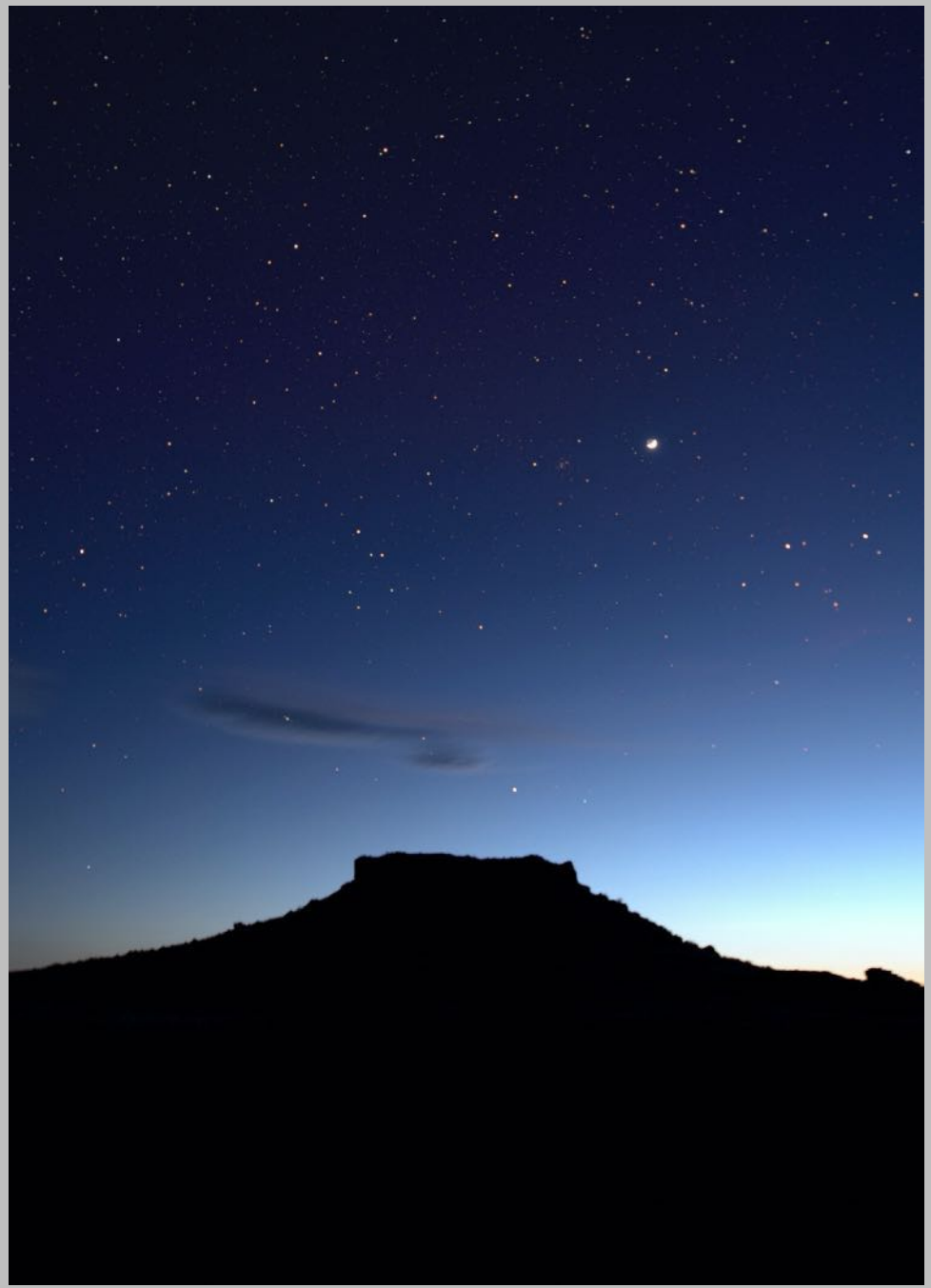
2 September 2020
Otsego MN
Canon EOS 6D with EF 17-40mm(@17mm)
Blended 10 sec intervals at f/4, ISO 800, 1/2 hour elapsed



Wupatki Moon

"The Citadel", one of the structures built by indigenous people who lived here from 500-1200 CE, provides a focus for a nighttime exposure. The Arizona skies are clear except for a cloud condensed by the contrasting air flows over the monument.

15 May 2021
Wupatki National Monument
Flagstaff AZ
Canon EOS 6D with Sigma 14mm f/1.8
2 sec @ f/2, ISO 3200



Wupatki Startrails

"The Citadel" remains the focus for this startrail image. The moon dominates the scene, and this blend of exposures shows its path among the stars.

The cloud persisted above the monument over the course of the exposure, growing and shrinking, but never moving away or evaporating.

15 May 2021
Wupatki National Monument
Flagstaff AZ
Canon EOS 6D with Sigma 14mm f/1.8
458 exposures, 8 sec @ f/2, ISO 3200 (76 minutes)

Polaris on the Playa

One of the active topics in modern photography is the distinction between "blends" (combining multiple exposures from a single camera viewpoint), and "composites" (which combine unrelated images into a synthetic scene). Both are valid uses of photography, but I prefer to limit my efforts to the former, hoping to reveal some scientific beauty in the result.

In this case the relative motion of the stars is "stacked" (added) from 2,335 10-second exposures. Each frame looks like a normal picture of the sky, but when accumulated creates the star trail effect. The frames were selected from the period after "astronomical twilight" when the sun is more than 18-degrees below the horizon. On this date, official night lasted over six hours, and the star trails cover more than 1/4 of a full circle (and even Polaris shows that it is not exactly on the north celestial pole).

Although it was "night", it was not completely dark. The moon was up and illuminated the scene until it set around midnight. This allows the foreground to show, including the "sailing stone" [https://en.wikipedia.org/wiki/Sailing_stones] with its path on the dry lakebed trailing behind it, a contrast of time scales against the motion of the sky.

A final detail to explain: the streaks below and to the left are the result of trains of Starlink satellites moving across the sky. Dozens of satellites follow each other into and out of the sunlight at their altitude, reflecting it down to our observing position on the playa and creating its own trail on this image.

For more of the backstory on making this image and the next, see [https://thorolson.com/2021/06/22/a-night-on-the-playa-part-2/].

19 May 2021
Racetrack Playa
Death Valley National Park CA
Canon EOS Ra with EFS 10-22mm
2335 exposures, 8 sec @ f/4, ISO 3200 (6-1/2 hours)

Milky Way Sails the Playa

Racetrack Playa is a dry lakebed in Death Valley. It is a vast expanse, miles by miles, of dried mud cracks. It is flat and nearly level, the north end merely inches higher than the south. The occasional stone can be found on the playa, delivered by erosion forces on the surrounding mountains, falling down and rolling out onto the lakebed. They are stones, not boulders, maybe a foot or two across, heavier than is convenient to carry away, but not heavy enough to protect them from magic seekers.

And the magic they seek is that many of the stones are found at the end of a long, physically engraved trail, recording their traversal of the ancient lakebed. How could these stones have moved across the dry playa? It has been a mystery to geologists for years. Various theories have been proposed, and some have been tested, but it is a difficult research project. The stones lie inert for years, and then, when next inspected, they have moved. With new trails marking their path! This is the magic that the stone thieves are after.

We spent the day exploring the dry lakebed and trying to keep our cool in the heat. By late afternoon I had found a photogenic sailing stone to arrange my photo composition. I set up my equipment and waited for the sun to set.

At the end of astronomical twilight night officially begins. But on this night, a half-moon was out, providing plenty of light for humans to navigate. My cameras however, had reached their limits and were now on their time lapse settings that would last all night. There was nothing more for me to do.

I joined my partner Poldi at the oasis she had made for us in the desert. The sleeping bags were deployed but the temperature was still too warm to climb in. We were at that transition from the heat of day to the cool of night where the temperature is perfectly neutral; we watched the stars come out and the moon beam its reflected light down on our landscape.

The romantic power of moonlight, and of being in such a strangely beautiful, exotic and remote place is irresistible. And so, despite the day's heat and dust and grime, we responded to the emotions that surfaced as we gazed at the sky and at each other, lovers lit by moonlight with a backdrop of stars in the middle of the playa.

The night continued its magical sequence. The temperature dropped and we retreated to our sleeping bags, occasionally waking to find ourselves immersed under a full sky of stars. Each time a new view presented itself: the setting of the moon, the rising of the Milky Way, the Big Dipper circumnavigating Polaris.

Eventually, 4:00 am arrived and I had to get up to tend the cameras for their morning twilight schedule. It would be days before I found out if they were successful in capturing the motions of the sky that night. But what a night it had been! As we gathered our stuff at sunrise to portage back to the car at lake's edge, we thought back on the experience. This was not going to blend in among the many other outings we have enjoyed. It will stand out as a highlight of a lifetime.

To those who remove them, I must explain that the magic of the sailing stones is not in the stones themselves; rather it infuses the place where they make their remarkable journeys. We know this because we felt the magic all around us during our night on the playa.

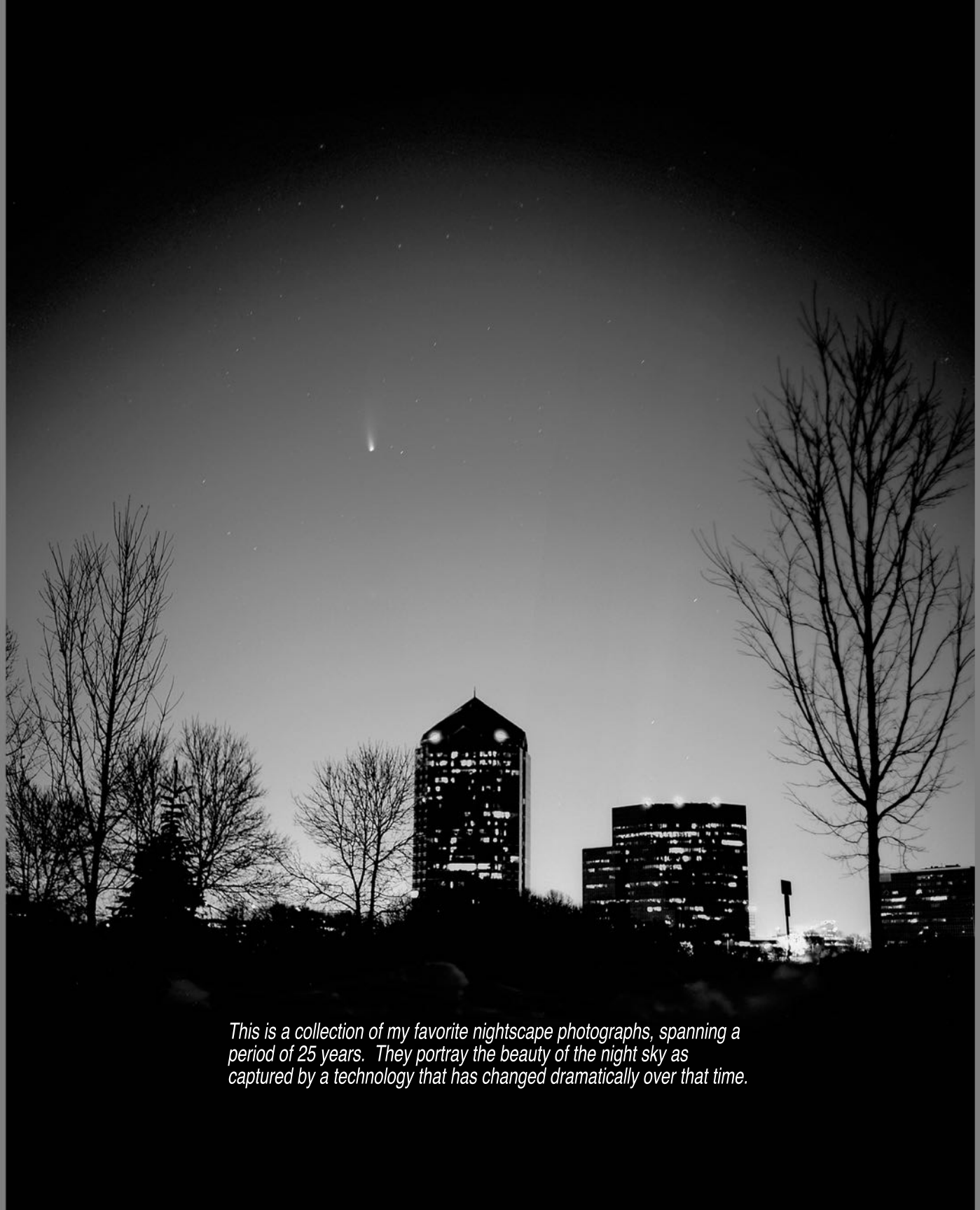
19 May 2021
Racetrack Playa, Death Valley National Park CA
Canon EOS 6D with Sigma 14mm f/1.8
8 sec @ f/2, ISO 3200

Epilogue

It has been a remarkable few decades since I began taking these pictures. The world, and our understanding of it, have changed. Space probes and telescopes have beamed back impressive imagery that reveal more and more of our amazing universe. The pictures I have taken over this time may not be scientifically significant, but I hope they convey a sense of curiosity and wonder at what can be seen in our night sky.

The tools and techniques for taking these pictures have also changed. Although I don't expect an equivalent to the digital revolution we have experienced, there are dramatic advances underway in "computational photography" and other imaging technologies that will provide even more opportunities to make inspiring and beautiful images of the night sky. I will follow along as far as I can, so that maybe, someday, I will make a sequel to this coffee table book. Just imagine what another 25 years of nightscapes will bring!

Thor Olson
2021



This is a collection of my favorite nightscape photographs, spanning a period of 25 years. They portray the beauty of the night sky as captured by a technology that has changed dramatically over that time.